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Dear Client, we are pleased to present this Intellectual Property (IP) Analysis Report to help keep you informed of potentially impactful developments in the patent landscape.

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**Report for the Subject file: US8998798B2\_Endo.pdf**

**Multi-lumen tracheal tube with visualization device  
Inventor:** Sarah Hayman, [Lockett E. Wood](https://patents.google.com/patent/US8998798B2/en?oq=US8998798B2), [Neville DeWitt Pierrat](https://patents.google.com/patent/US8998798B2/en?oq=US8998798B2), [Steven J. Grate](https://patents.google.com/?inventor=Steven+J.+Grate&peid=631c3eee20ad8%3A440%3Ac5bd4e9), [Jonathan Bloom](https://patents.google.com/?inventor=Jonathan+Bloom&peid=631c3eee3d3e0%3A441%3A387ca5d7), [Roger Mecca](https://patents.google.com/patent/US8998798B2/en?oq=US8998798B2), [Alissa Wong](https://patents.google.com/patent/US8998798B2/en?oq=US8998798B2), [Christina Kornreich](https://patents.google.com/?inventor=Christina+Kornreich&peid=631c3eed28630%3A43f%3Adf6b5dd2), [Susan Roweton](https://patents.google.com/patent/US8998798B2/en?oq=US8998798B2), [Shannon E. Campbell](https://patents.google.com/patent/US8998798B2/en?oq=US8998798B2), [Mark R. Behlmaier](https://patents.google.com/?inventor=Mark+R.+Behlmaier&peid=631c3eed18078%3A43e%3Aa7a3447a)  
**Date range filter**: After: 2000-01-01 Before: 2025-04-01  
**Top CPCs used:** A61M16/0486, A61M16/0404, A61M16/04, A61M16/0459, A61M16/0434, A61M16/04, A61B1/267, A61M16/00, A61B1/00, A61B1/04  
**Number of Top Patents for Claims Breakdown:** 50

**Application** US12/981,296 events

2010-12-29

[Application filed by Covidien LP](https://patents.google.com/?assignee=Covidien+LP&peid=631c4011ec628%3A4c5%3Af0f94957)

2010-12-29

[Priority to US12/981,296](https://patents.google.com/patent/US8998798B2/en?oq=US8998798B2&peid=631c40125a7e0%3A4c8%3A17c9aba)

2012-07-05

[Publication of US20120172664A1](https://patents.google.com/patent/US20120172664A1/en?oq=US8998798B2&peid=631c401401d50%3A4c9%3A6cf20181)

2015-04-07

Application granted

2015-04-07

[Publication of US8998798B2](https://patents.google.com/patent/US8998798B2/en?oq=US8998798B2&peid=631c4014f2110%3A4ca%3Acebcb346)

Status

Active

2032-06-28

Adjusted expiration

-------------------------------------------------------------------------------------------------------------------**Subject Description Overview:**

The Subject invention (A61M16/0486) is a tracheal tube designed for ventilation with integrated visualization capabilities. Its primary function is to facilitate dual-lumen ventilation, allowing independent ventilation of each lung, while also providing a means for visual confirmation of tube placement through an integrated camera. The underlying functions include the delivery of respiratory gases through two separate lumens, with one lumen extending into a bronchial stem. Unique keywords specific to the Subject include 'multi-lumen', 'camera apparatus', and 'bronchial intubation'. The design incorporates a camera positioned to view through an opening in the second ventilation lumen, ensuring accurate placement within the patient's respiratory system.

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-------------------------------------------------------------------------------------------------------------------**Compared file: US8998798B2**Multi-lumen tracheal tube with visualization device  
**Inventor: HAYMAN SARAH  
Assignee: HAYMAN SARAH  
Priority Date: 12-29-2010  
Publication Date: 04-07-2015  
CPC: A61B1/04  
IPV™ Rating: 8.2702  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/002-074-540-954-572/frontpage?l=en](https://www.lens.org/lens/patent/002-074-540-954-572/frontpage?l=en)

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The primary function of the Compared invention (A61B1/04) is to provide a visualization device, specifically an endoscope, for examining internal body cavities, such as the trachea and bronchi. From a mechanical engineering perspective, this involves designing a flexible, elongated tube with optical components that can be inserted into the body to transmit images from the internal environment to an external viewing system. The device must be capable of navigating through the respiratory tract, maintaining structural integrity, and providing clear imaging under varying conditions.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a high possibility of overlap between the Subject and Compared patents, as they describe very similar tracheal tube designs with integrated visual monitoring systems. Both patents focus on the operational role of providing enhanced ventilation and visual inspection within the respiratory system, specifically for medical applications in respiratory care. The potential commercial impact of these patents could be significant, given the importance of advanced respiratory support systems in healthcare. The integration of visual technology into tracheal tubes could lead to improved patient outcomes and increased demand for such devices in clinical settings.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve systemic principles of optical transmission and mechanical flexibility. The underlying functions include light transmission through fiber optics or digital imaging systems, which require precise alignment and protection within the endoscope's structure. Essential components include the optical lens, light source, and imaging sensor, which interact to capture and transmit visual data. The internal dynamics involve the manipulation of the endoscope's tip to navigate through the respiratory tract, requiring control mechanisms such as cables or electronic actuators. The operational role of this system is to facilitate diagnostic procedures by providing real-time visualization, which is crucial in medical contexts like thoracic surgery or bronchial intubation.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera within a multi-lumen tracheal tube, specifically designed for endobronchial intubation. This differs from the Compared invention, which focuses on a standalone visualization device without the integrated ventilation function. The Subject's design allows for simultaneous ventilation and visualization, reducing the need for separate bronchoscopic procedures. The mechanical underpinnings of the Subject include the precise alignment of the camera with the opening in the second lumen, ensuring optimal field of view, and the use of cuffs to create an airtight seal, which is not a feature of the Compared invention. The Subject's approach to addressing real-world challenges, such as the difficulty in placing endobronchial tubes and the need for frequent reassessment, offers a significant advantage in terms of efficiency and patient safety. Both inventions target the medical field, but the Subject's integration of ventilation and visualization into a single device provides a competitive edge in procedures requiring independent lung ventilation.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The claims from both Subject and Compared patents describe a tracheal tube with dual ventilation lumens, where the second lumen is longer and designed to align with the upper bronchus of a patient. Both patents detail the presence of an opening in the second lumen's distal region and a camera positioned opposite this opening, with the camera's field of view directed through the opening. This setup is intended for visual monitoring within the respiratory system. Both patents also mention the use of cuffs, with specific configurations around the lumens, and additional features like light emitting diodes, suction lumens, and fluid delivery systems for camera maintenance. The methodologies and designs are nearly identical, focusing on the integration of visual technology into respiratory support systems. The operational role of these tracheal tubes is primarily for enhanced ventilation and monitoring in medical settings, specifically within the context of respiratory care. The underlying functions involve air delivery and visual inspection, with essential components like the dual lumens, cuffs, and camera system. Core interactions include the camera's visual feedback to medical personnel, and internal dynamics relate to the flow of air and the positioning of the camera for optimal viewing. The practical applications are centered around improving patient care in respiratory therapy, particularly in scenarios requiring intubation and ventilation.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claims from the Subject and Compared patents exhibit a high degree of overlap, with nearly identical descriptions of the tracheal tube's structure, components, and functionalities. The similarity in the design and purpose of the tracheal tubes, including the dual lumens, camera placement, and cuff configurations, indicates a significant overlap in the intended use and operational capabilities. The presence of additional features like light emitting diodes, suction, and fluid delivery systems further reinforces the strong overlap between the two sets of claims.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US8998798B2) Claim number: 1 and Subject Claim: 1**

Both claims describe a tracheal tube with dual ventilation lumens, where the second lumen is longer and aligned with the upper bronchus. Both include an opening in the second lumen's wall and a camera positioned opposite this opening for viewing through it. The scope of both claims covers the structural arrangement and functional integration of the camera and lumens for ventilation and visualization purposes. The similarity is high due to the identical description of the tracheal tube's components and their configuration.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US8998798B2) Claim number: 4 and Subject Claim: 4**

Both claims specify that the camera is embedded within the wall of the second ventilation lumen. This detail enhances the integration of the camera into the tracheal tube's structure, potentially improving its stability and reducing the risk of obstruction. The scope of both claims focuses on the specific placement of the camera, which is identical in both descriptions, indicating a high level of similarity.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US8998798B2) Claim number: 8 and Subject Claim: 8**

Both claims describe the tracheal tube having two separate inflation lumens, one for each cuff. This configuration allows for independent inflation and deflation of the cuffs, which is crucial for managing airway pressure and sealing. The scope of both claims is focused on the dual inflation system, which is described identically, leading to a high similarity score.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US8998798B2) Claim number: 2 and Subject Claim: 2**

Both claims detail the camera's placement within an annular collar, which suggests a specific method of mounting the camera to ensure its stability and alignment. The scope of both claims is centered on this particular feature of the camera's integration into the tracheal tube, which is described in the same manner, resulting in a high similarity score.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US8998798B2) Claim number: 12 and Subject Claim: 12**

Both claims mention the inclusion of a suction lumen with a port located proximal to the first cuff, which is used for clearing secretions from the airway. The scope of both claims is focused on this additional feature for airway management, and the descriptions are identical, leading to a high similarity score.

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**Compared file: US9155854B2**Tracheal tube with visualization device and integrated flushing system  
**Inventor: HAYMAN SARAH  
Assignee: HAYMAN SARAH  
Priority Date: 08-31-2011  
Publication Date: 10-13-2015  
CPC: A61B1/04  
IPV™ Rating: 8.148  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/037-591-351-308-112/frontpage?l=en](https://www.lens.org/lens/patent/037-591-351-308-112/frontpage?l=en)

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The primary function of the Compared invention (A61B1/04) is to provide a visualization apparatus integrated into a tracheal tube system, specifically designed to facilitate accurate placement and monitoring of the tube within the trachea and bronchial stems. This system includes a camera apparatus that aids in the correct intubation of the left or right bronchus, ensuring an airtight seal and independent ventilation of one lung. The camera is part of a unitary assembly that maintains an acceptable profile for comfortable intubation and includes additional components like light sources and cleaning devices to ensure clear visualization.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a high possibility of overlap between the Subject and Compared patents due to their shared focus on dual-lumen tracheal tubes with integrated cameras for visualization during intubation. Both patents aim to enhance the precision and safety of respiratory support in medical settings. The operational role of these devices involves energy conversion for ventilation and motion transfer for air delivery, with a load-bearing capacity to maintain structural integrity within the trachea. The potential commercial impact of these patents could be significant, as they address critical needs in medical care, potentially leading to widespread adoption in hospitals and emergency care facilities.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the Compared invention involves the integration of a visualization system into a multi-lumen tracheal tube. The underlying functions include the use of a camera to provide real-time imaging of the tracheal and bronchial pathways, which is crucial for correct placement and monitoring. Essential components include the camera, a housing that encircles the ventilation lumens, and a fluid delivery system for cleaning the camera lens. The core interactions involve the camera's field of view being directed through an opening in the tracheal tube, allowing for visualization of the bronchial intubation process. The internal dynamics of the system focus on maintaining the camera's functionality through fluid delivery for cleaning, ensuring continuous and clear imaging during medical procedures.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its specific configuration of dual cuffs, which allows for a more precise control over ventilation and sealing within the trachea and bronchus. This differs from the Compared invention, which focuses more on the integration of a visualization system. The Subject's use of a right-stem endobronchial tube and the strategic placement of cuffs around the ventilation lumens provide a unique approach to achieving an airtight seal and independent lung ventilation. The Compared invention, while also addressing bronchial intubation, emphasizes the visualization aspect through the camera apparatus, which is not a feature of the Subject. The overlap between the two inventions lies in their application to tracheal tubes and bronchial intubation, but they diverge in their primary focus and mechanical design. The Subject's design approaches, such as the use of dual cuffs and specific lumen configurations, enhance its mechanical identity and distinguish it from the Compared invention's focus on visualization technology.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tubes described in both Subject and Compared patents share several key features and functionalities, indicating a significant overlap in their design and operational roles. Both patents detail a tracheal tube with dual ventilation lumens, where the second lumen is longer than the first, and both are configured to be coupled to a ventilator. This design is intended for use in medical settings, specifically for intubation and ventilation support, which is crucial in surgical and critical care contexts.  
  
In terms of methodologies and designs, both patents include a camera for visualization within the tracheal system. The Subject patent specifies the camera's location on the second ventilation lumen with an opening for the camera's field of view, while the Compared patent positions the camera near the first distal end. Both configurations aim to provide visual feedback during intubation, which is essential for precise placement and monitoring.  
  
The operational role of these tracheal tubes involves energy conversion in the form of converting mechanical ventilation into respiratory support, and motion transfer as the air moves through the lumens. The load-bearing capacity is evident in the structural integrity required to maintain the lumens' shape and function within the trachea.  
  
Underlying functions include the delivery of air or oxygen to the lungs, facilitated by the dual lumens, and the visualization of the tracheal area through the camera. Essential components in both patents are the first and second ventilation lumens, the camera, and in the Compared patent, a fluid delivery system for camera maintenance.  
  
Core interactions involve the interaction between the ventilation system and the patient's respiratory system, as well as the camera's interaction with the tracheal environment for visualization. Internal dynamics include the flow of air through the lumens and the operation of the camera within the tracheal tube.  
  
The practical applications of these tracheal tubes are primarily in medical settings, such as hospitals and emergency care units, where they are used for intubation and ventilation during surgeries or in critical care scenarios.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 8.148 indicates a high degree of similarity between the Subject and Compared patents. The overlap is significant, as both patents describe tracheal tubes with dual ventilation lumens, a camera for visualization, and configurations for coupling to ventilators. The Subject patent's detailed description of the camera's placement and the opening for its field of view closely aligns with the Compared patent's focus on camera positioning and fluid delivery for camera maintenance. Both patents also mention the alignment of the second distal end with the upper bronchus, further indicating a strong overlap in their intended use and functionality.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US9155854B2) Claim number: 14 and Subject Claim: 11**

Both claims describe the tracheal tube's capability to be connected to various ventilation systems. The Subject claim and the Compared claim are identical in their description of the tracheal tube's connectivity options, indicating a high level of similarity in their functional scope. The scope of both claims is focused on the versatility of the tracheal tube in terms of its connection to different ventilation sources, which is crucial for its practical application in medical settings.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US9155854B2) Claim number: 16 and Subject Claim: 3**

Both claims specify that the tracheal tube includes a right-stem endobronchial tube. The Subject claim and the Compared claim are identical in this aspect, indicating a direct match in their functional description. The scope of both claims is limited to the specific type of tracheal tube used, which is significant for targeted medical applications.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US9155854B2) Claim number: 2 and Subject Claim: 6**

Both claims describe the tracheal tube with a first cuff around both ventilation lumens and a second cuff around only the second ventilation lumen. The Subject claim and the Compared claim are identical in their description of the cuff arrangement, indicating a high level of similarity in their functional scope. The scope of both claims is focused on the sealing mechanism of the tracheal tube, which is essential for its effective use in medical procedures.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US9155854B2) Claim number: 3 and Subject Claim: 10**

Both claims describe the positioning of the first distal end of the tracheal tube between the first and second cuffs. The Subject claim and the Compared claim are very similar, with the only difference being the reference to the previous claim. The scope of both claims is focused on the precise location of the first distal end, which is crucial for the tracheal tube's functionality in medical applications.

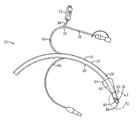
------------------------------------------------------------------------------------------------------------------- **Compared Patent (US9155854B2) Claim number: 1 and Subject Claim: 1**

Both claims describe a tracheal tube with dual ventilation lumens, where the second lumen is longer than the first. The Subject claim specifies the co-termination of proximal ends and alignment of the second distal end with the upper bronchus, while the Compared claim focuses on the camera's attachment near the first distal end and includes a detailed fluid delivery system. The scope of the Subject claim is broader in terms of the tracheal tube's overall configuration and camera placement, whereas the Compared claim is more specific about the fluid delivery mechanism. The similarity lies in the dual lumen structure and camera integration, but the differences in detail and focus on fluid delivery indicate a moderate level of similarity.

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**Compared file: US9211060B2**Visualization device and holder for use with a tracheal tube  
**Inventor: WALDRON PAUL  
Assignee: WALDRON PAUL  
Priority Date: 04-05-2011  
Publication Date: 12-15-2015  
CPC: A61B1/04  
IPV™ Rating: 8.0169  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/026-894-700-004-168/frontpage?l=en](https://www.lens.org/lens/patent/026-894-700-004-168/frontpage?l=en)

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The primary function of the Compared invention (A61B1/04) is to facilitate the visualization of internal body cavities, specifically the trachea, during medical procedures such as intubation. From a mechanical engineering perspective, this involves designing a system that can be inserted into the trachea, maintain structural integrity under varying conditions, and provide clear imaging capabilities. The device must be capable of withstanding the mechanical stresses of insertion and operation within the body, ensuring that the visualization components remain functional and accurately positioned.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a high possibility of overlap between the Subject and Compared patents, primarily due to the shared focus on integrating a visualization device within a tracheal tube for medical applications. Both patents emphasize the operational role of the tracheal tube in facilitating ventilation and providing visual feedback for intubation and monitoring, with the camera's placement and function being central to their designs. The potential commercial impact of these patents could be significant in the medical device market, particularly in critical care and surgical settings where precise visualization during intubation is crucial. The Subject patent's detailed approach to camera placement and additional features like cuffs and fluid delivery systems could offer competitive advantages in terms of functionality and ease of use, while the Compared patent's focus on a more complex housing structure for the camera might appeal to markets seeking advanced visualization capabilities.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the integration of optical and electronic components within a mechanically robust structure. The underlying functions include the transmission of light to illuminate the trachea and the capture of images or video for real-time visualization. Essential components include the optical lens system, light source, and imaging sensor, which must be precisely aligned and protected within the device. The core interactions involve the mechanical coupling of these components to the tracheal tube, ensuring that the field of view remains unobstructed and that the device can be maneuvered as needed. Internally, the dynamics involve managing the flow of air and fluids around the visualization components to prevent fogging or contamination, which is critical for maintaining image clarity. The mechanical system's role is to facilitate the accurate placement and stabilization of the visualization device within the trachea, enabling effective diagnostic and procedural interventions.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its multi-lumen design, which allows for independent ventilation of different lung sections, a feature not explicitly detailed in the Compared invention. The integration of a camera apparatus within the tracheal tube itself, rather than as a separate device, represents a significant innovation in terms of design and functionality. This approach enhances the precision of bronchial intubation and provides continuous monitoring capabilities, which differ from the Compared invention's focus on general tracheal visualization. The mechanical underpinnings of the Subject invention include the management of force distribution across the multi-lumen structure to maintain an airtight seal and the design of the camera's mounting to ensure optimal field of view. The design approaches involve the use of a unitary assembly for the camera, which simplifies the integration and operation within the tracheal tube, and the use of specific fabrication techniques to ensure the structural integrity and functionality of the multi-lumen system. The Subject invention's focus on bronchial intubation and independent ventilation sets it apart from the Compared invention, which is more broadly applicable to tracheal visualization during intubation procedures. Both inventions address real-world challenges in respiratory care, but the Subject invention offers a more specialized solution for managing complex ventilation scenarios, potentially impacting practices in critical care and thoracic surgery. The Compared invention, while less specialized, provides a versatile tool for tracheal visualization that can be applied across various medical settings, potentially improving the accuracy and safety of intubation procedures.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from both Subject and Compared patents focus on medical devices designed for intubation and ventilation, with specific emphasis on incorporating visualization capabilities within the tracheal tube structure. Both patents describe a tracheal tube with at least two lumens: one for ventilation and another for housing a camera or visualization device. The Subject patent details a tracheal tube with a first and second ventilation lumen, where the second lumen is longer and includes an opening and a camera, aimed at providing visual access to the upper bronchus. The Compared patent similarly describes a tracheal tube with a ventilation lumen and a second lumen that houses a visualization device, including a camera, designed to provide a field of view towards the carina. Both patents mention the integration of the camera within the second lumen, with the Subject patent specifying the camera's location opposite an opening, and the Compared patent detailing a more complex housing structure for the camera. Both also discuss the potential for additional features like cuffs, light sources, and fluid delivery systems to enhance functionality. The operational role of these devices is centered around facilitating intubation, monitoring, and ventilation in medical settings, with the visualization component aiding in precise placement and ongoing assessment. The underlying functions involve fluid transfer for ventilation and visual feedback for medical procedures. Essential components include the ventilation lumens, the camera, and in some cases, additional lumens for fluid delivery or suction. Core interactions involve the camera's field of view through the second lumen, and internal dynamics relate to the flow of air or fluids through the lumens. The practical applications are primarily in clinical settings for patient care, particularly in critical care and surgical environments.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claims from the Subject and Compared patents show a significant overlap in the concept of integrating a visualization device, specifically a camera, within a tracheal tube to enhance medical procedures. Both patents describe a tracheal tube with a primary ventilation lumen and a secondary lumen designed to house a camera, indicating a strong conceptual similarity. The Subject patent's detailed description of the camera's placement opposite an opening in the second lumen aligns closely with the Compared patent's focus on a camera within a housing at the distal end of the second lumen. Both patents also mention the potential for additional features like cuffs and fluid delivery systems, further reinforcing the overlap in design and functionality. The claim\_score of 8.0169 suggests a high degree of similarity, supported by the detailed descriptions of the camera's integration and purpose within the tracheal tube structure.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US9211060B2) Claim number: 1 and Subject Claim: 1**

Both claims describe a tracheal tube with a ventilation lumen and a second lumen, both of which are configured to be coupled to a ventilator. The Subject claim specifies that the second lumen is longer and its distal end aligns with the upper bronchus, while the Compared claim mentions the second lumen being integrally formed within the exterior wall of the ventilation lumen. Both claims include a camera, but the placement and configuration differ: the Subject claim has the camera attached to the wall of the second lumen with a field of view through an opening, whereas the Compared claim has the camera within a housing at the distal tip of the second lumen. The scope of the Subject claim focuses on the specific positioning and alignment of the second lumen and camera, while the Compared claim emphasizes the detailed structure of the housing and channels within the second lumen. The similarity score reflects the commonality in the use of dual lumens and a camera for visualization, but the detailed differences in structure and placement reduce the score.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US9211060B2) Claim number: 2 and Subject Claim: 11**

Both claims specify that the tracheal tube can be coupled to various ventilation devices, including a ventilator, a bag for ventilation, inspiration valving, expiration valving, or an air supply. The Subject claim and the Compared claim are identical in this aspect, indicating a high level of similarity. The scope of both claims is focused on the versatility of the tracheal tube's connection capabilities, which is crucial for its practical application in different medical scenarios. The similarity score is high due to the exact match in the description of the coupling options.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US9211060B2) Claim number: 8 and Subject Claim: 13**

Both claims describe the use of a lumen to deliver fluid to the camera's surface. The Compared claim specifies that the second lumen is configured to deliver air or fluid to the camera's surface, while the Subject claim mentions a dedicated fluid delivery lumen that not only supplies fluid but also removes buildup. The scope of the Compared claim focuses on the delivery of air or fluid, whereas the Subject claim emphasizes the dual function of fluid delivery and cleaning. The similarity score reflects the commonality in the use of a lumen for fluid delivery to the camera, but the additional cleaning function in the Subject claim reduces the score.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US8887730B2**Dual-lumen tracheal tube with assembly portion  
**Inventor: WOOD LOCKETT E  
Assignee: WOOD LOCKETT E  
Priority Date: 05-26-2011  
Publication Date: 11-18-2014  
CPC: A61M11/00  
IPV™ Rating: 7.9743  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/065-772-176-343-700/frontpage?l=en](https://www.lens.org/lens/patent/065-772-176-343-700/frontpage?l=en)

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The primary function of the Compared invention is to facilitate the independent ventilation of a patient's lungs using a dual-lumen tracheal tube system, which includes an assembly end designed to simplify manufacturing and enhance functionality. This system is particularly useful in thoracic surgery where one lung needs to be isolated for surgical intervention while the other is ventilated. The assembly end may include a camera apparatus to aid in the precise placement of the tube within the patient's bronchial stem, ensuring effective ventilation and monitoring.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a high possibility of overlap between the Subject and Compared patents, given the significant similarities in their design, functionality, and intended use. Both patents focus on tracheal tubes designed for mechanical ventilation, with features such as multiple lumens, cameras for visualization, and cuffs for sealing, which are crucial for their operational role in energy conversion (ventilation) and motion transfer (airflow). The purpose within their applied context is to provide effective ventilation and airway management in medical settings, particularly in intensive care and surgical environments. The potential commercial impact of both patents could be significant, as they address critical needs in patient care and could be adopted in hospitals and clinics worldwide.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of dual-lumen ventilation, where one lumen is used for ventilating one lung while the other can be opened to ambient pressure to isolate the other lung. The assembly end, which may include a camera, utilizes systemic principles of visualization and monitoring to ensure correct placement within the bronchial stem. The underlying functions involve the transfer of respiratory gases through the lumens, with the camera providing real-time visual feedback to aid in placement and monitoring. Essential components include the dual-lumen tube, the assembly end with integrated camera, and cuffs for sealing the airways. Core interactions occur between the tube and the patient's respiratory system, with internal dynamics focused on maintaining an airtight seal and ensuring efficient gas exchange.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel features such as the integration of a camera within the second ventilation lumen, specifically designed for right-stem endobronchial intubation. This differs from the Compared invention, which focuses on a more general assembly end approach. The Subject's use of a fenestration on the side wall of the second lumen and a fluid delivery lumen for camera maintenance adds to its novelty. Both inventions aim to improve the precision of bronchial intubation, but the Subject's design offers enhanced visualization and maintenance capabilities. The mechanical underpinnings of the Subject include optimized force distribution for maintaining the camera's position and energy efficiency in gas transfer, while the Compared invention focuses on simplifying manufacturing processes. The Subject's design approaches, such as the use of specific tolerance standards and fabrication techniques for the camera integration, further distinguish its mechanical identity.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from both Subject and Compared patents exhibit similarities in their design and functionality, particularly in the context of medical ventilation systems. Both patents describe a tracheal tube with multiple ventilation lumens, which are essential for delivering air to the patient's lungs. The Subject patent details a tracheal tube with a first and second ventilation lumen, where the second lumen is longer and includes an opening and a camera for visualization, which is crucial for guiding the tube and monitoring the patient's airways. The Compared patent also mentions a tracheal tube with multiple lumens, specifically noting a configuration where the lumens are divided into proximal and distal portions, with the distal portion containing a camera. This indicates a shared focus on improving visibility and precision in tracheal intubation procedures. Both patents also mention the use of cuffs, which are critical for sealing the airways and preventing air leakage. The Subject patent describes multiple cuffs around different lumens, while the Compared patent discusses cuffs that encircle the coupling between different tube sections. This suggests a common operational role in ensuring effective ventilation and isolation of the lungs. The underlying function of both tracheal tubes is to facilitate mechanical ventilation, with the added feature of visual guidance through the camera. Essential components such as the ventilation lumens, cuffs, and camera are present in both, indicating a core interaction aimed at improving patient care during intubation. The internal dynamics involve the flow of air through the lumens and the visual feedback provided by the camera, which are crucial for the tube's operation.  
  
In terms of applied context, both patents are designed for use in medical settings, specifically in intensive care units or during surgical procedures where mechanical ventilation is required. The practical applications include emergency intubation, long-term ventilation support, and procedures requiring precise placement of the tube within the patient's airways.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claims from the Subject and Compared patents show a high degree of overlap in their design and functionality. Both patents focus on tracheal tubes with multiple ventilation lumens, the use of cameras for visualization, and the implementation of cuffs for sealing. The Subject patent's detailed description of the camera's placement and the lumens' configuration closely aligns with the Compared patent's mention of a camera in the distal portion and the division of lumens into proximal and distal sections. The operational role of both tubes is centered around effective ventilation and airway management, with a strong emphasis on visual guidance. The underlying functions, essential components, core interactions, and internal dynamics are remarkably similar, indicating a significant overlap in the intended use and application within medical settings.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US8887730B2) Claim number: 1 and Subject Claim: 1**

Both claims describe a tracheal tube with multiple ventilation lumens. The Subject claim specifies a first and second ventilation lumen with the second being longer, and includes a camera and an opening for viewing. The Compared claim also mentions two lumens with the first being longer, but focuses on the structural separation into proximal and distal portions with a coupling feature to form a continuous passageway. The Subject claim's scope includes specific details about the camera and its positioning, while the Compared claim's scope is more about the structural design and connectivity of the lumens. The similarity lies in the dual-lumen configuration and the length difference, but the Subject claim adds the camera feature which is not mentioned in the Compared claim.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US8887730B2) Claim number: 4 and Subject Claim: 11**

Both claims specify that the tracheal tube can be coupled to various ventilation devices. The Subject claim and the Compared claim are identical in this aspect, focusing on the connectivity of the tracheal tube to external devices. The scope of both claims is limited to the coupling capability, with no additional features mentioned. The similarity is high due to the exact match in the description of the coupling options.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US8887730B2) Claim number: 9 and Subject Claim: 3**

Both claims mention the tracheal tube as an endobronchial tube. The Subject claim specifies it as a right-stem endobronchial tube, adding a specific detail to the type of endobronchial tube. The Compared claim is more general, simply stating it as an endobronchial tube. The scope of the Subject claim is narrower due to the specific type mentioned, while the Compared claim's scope is broader. The similarity is high due to the commonality of the endobronchial tube feature, but the Subject claim adds a specific detail.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US8887730B2) Claim number: 6 and Subject Claim: 1**

Both claims mention a camera in the tracheal tube. The Subject claim provides detailed information about the camera's location, its relation to an opening, and its field of view, while the Compared claim simply states that the distal portion comprises a camera. The scope of the Subject claim is much broader, detailing the camera's integration into the tube's structure, whereas the Compared claim's scope is limited to the presence of the camera. The similarity is based on the common feature of the camera, but the Subject claim adds significant detail.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US8887730B2) Claim number: 5 and Subject Claim: 6**

Both claims mention the use of cuffs in the tracheal tube. The Subject claim specifies two cuffs, one around both lumens and another around only the second lumen, while the Compared claim mentions a second cuff around the distal portion. The scope of the Subject claim is more detailed, specifying the placement of the cuffs around specific lumens, whereas the Compared claim's scope is broader, focusing on the presence of a second cuff. The similarity is based on the common feature of using cuffs, but the Subject claim provides more specific details.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US8887730B2) Claim number: 8 and Subject Claim: 11**

Both claims are identical, specifying that the tracheal tube can be coupled to various ventilation devices. The scope of both claims is limited to the coupling capability, with no additional features mentioned. The similarity is high due to the exact match in the description of the coupling options.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US8978657B2**Dual-lumen tracheal tube with shaped lumen divider  
**Inventor: SANDMORE DONALD R  
Assignee: SANDMORE DONALD R  
Priority Date: 07-29-2010  
Publication Date: 03-17-2015  
CPC: A61M16/04  
IPV™ Rating: 7.8458  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/135-856-304-280-982/frontpage?l=en](https://www.lens.org/lens/patent/135-856-304-280-982/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate the controlled flow of gases into and out of a patient's trachea, specifically designed for use in thoracic surgery where independent ventilation of each lung is required. This is achieved through a double-lumen endobronchial tube that allows for the isolation of one lung while ventilating the other. The tube's design includes a shaped divider that separates the tracheal and bronchial ventilation lumens, enabling the insertion of medical devices like bronchoscopes for precise placement within the correct bronchus.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated high overlap between the Subject and Compared patents, primarily due to their shared focus on dual ventilation lumens and the enhancement of tracheal tube functionality in medical settings. The Subject patent's addition of a camera system for visual diagnostics and the Compared patent's emphasis on structural flexibility for medical device passage both contribute to the advancement of patient care in ventilation scenarios. The potential commercial impact of the Subject patent could be significant in markets focused on diagnostic tools within ventilation systems, while the Compared patent may have a strong impact in markets requiring adaptable tracheal tubes for various medical interventions. Both patents have the potential to improve patient outcomes in clinical environments, with the Subject patent possibly leading to innovations in real-time monitoring and the Compared patent facilitating more versatile medical procedures.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the Compared invention involves the use of a shaped divider within the tracheal tube to create separate ventilation lumens. This divider is more rigid than the surrounding side wall, which is elastically deformable, allowing for the introduction of medical devices into the lumens without compromising the structural integrity of the tube. The underlying function is to provide an airtight seal within the trachea and one bronchus, enabling independent ventilation of each lung. Essential components include the first and second ventilation lumens, the elastically deformable side wall, and the rigid divider. Core interactions involve the deformation of the side wall upon the introduction of a medical device, creating an enlarged region for device passage. The internal dynamics of the system are centered around maintaining the separation of the ventilation pathways while allowing for the flexibility needed for device insertion and correct positioning within the patient's respiratory system.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces a novel approach by integrating a camera directly into the tracheal tube, which significantly enhances the visualization capabilities during intubation. This differs from the Compared invention, which relies on the insertion of external bronchoscopes through the lumens. The Subject's design allows for a more streamlined and less invasive procedure, as it eliminates the need for additional bulky equipment. The integration of the camera into the tube's structure also addresses the challenge of operating within the smaller diameter of the bronchial lumen, a limitation noted in the Compared invention. From a mechanical engineering perspective, the Subject's design involves unique considerations for the placement and protection of electronic components within the tracheal environment, ensuring durability and functionality. The practical applications of the Subject invention are primarily in thoracic surgery and critical care settings, where precise intubation is crucial. In contrast, the Compared invention's applications are similar but may be less efficient due to the reliance on external devices. Both inventions aim to improve patient outcomes in respiratory care, but the Subject's innovation offers a competitive advantage in terms of ease of use, accuracy, and potential cost savings by reducing the need for additional equipment.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tubes described in both Subject and Compared patents share several common features and functionalities, particularly in the context of medical ventilation systems. Both patents detail a tracheal tube with dual ventilation lumens, indicating a focus on improving ventilation efficiency and patient care in clinical settings. The Subject patent emphasizes the integration of a camera within the second ventilation lumen, which is designed to provide visual feedback of the patient's bronchial area, enhancing diagnostic capabilities during ventilation. This camera is strategically placed opposite an opening in the lumen wall, suggesting a design aimed at optimizing the field of view for medical professionals. The Compared patent, on the other hand, focuses on the structural design of the tracheal tube, specifically the flexible divider between the two lumens. This divider is engineered to allow for the passage of medical devices through an enlarged region, which can be created by the elastic deformation of the divider. Both patents mention the use of cuffs around the lumens, which are crucial for sealing and maintaining pressure within the ventilation system. The Subject patent's mention of different cuff configurations and the Compared patent's emphasis on the flexible divider's material properties and shapes (e.g., curved, zigzag) highlight their respective approaches to enhancing the operational role of the tracheal tube in energy conversion (ventilation) and motion transfer (insertion and manipulation of medical devices). The underlying functions of both patents revolve around improving patient ventilation and medical intervention capabilities, with essential components like the ventilation lumens, cuffs, and in the Subject patent, the camera and associated lighting. Core interactions in both designs involve the flow of air through the lumens and the interaction of medical devices with the tracheal tube's structure. The internal dynamics of the Subject patent include the visual feedback system, while the Compared patent focuses on the dynamic adjustment of lumen size. Both patents are applied in the context of medical and possibly emergency care, with practical applications in hospitals and intensive care units, where efficient and safe ventilation is critical.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the Subject and Compared patents is significant, particularly in the shared concept of dual ventilation lumens and the use of cuffs. The Subject patent's focus on integrating a camera system for visual diagnostics complements the Compared patent's emphasis on structural flexibility and adaptability for medical device passage. Both patents aim to enhance the functionality of tracheal tubes in clinical settings, with the Subject patent adding a diagnostic tool and the Compared patent improving the tube's adaptability to different medical needs. The claim\_score of 7.8458 indicates a strong overlap in the core functionalities and intended applications of the tracheal tubes described in both patents.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US8978657B2) Claim number: 4 and Subject Claim: 0**

Both claims describe the positioning of the first distal end of the tracheal tube between two cuffs. The Subject claim specifies that it is between 'a first cuff and a second cuff', while the Compared claim refers to 'the first cuff and the second cuff', indicating a direct reference to claim 3. The scope of both claims is similar, focusing on the structural arrangement of the tracheal tube's distal end relative to the cuffs. The similarity score reflects the high degree of similarity in the positioning and structural description of the tracheal tube.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US8978657B2) Claim number: 2 and Subject Claim: 1**

Both claims are identical in their description of the tracheal tube's capability to be coupled to various ventilation devices. The scope of both claims is the same, focusing on the connectivity options of the tracheal tube. The similarity score is 1.0 due to the exact match in text and functionality described.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US8978657B2) Claim number: 3 and Subject Claim: 6**

Both claims describe the arrangement of cuffs on the tracheal tube, with a first cuff around both ventilation lumens and a second cuff around only the second ventilation lumen. The Subject claim uses 'the second ventilation lumen' while the Compared claim uses 'the ventilation second lumen', which is a minor variation in wording. The scope of both claims is focused on the cuff arrangement. The similarity score is high due to the near-identical description of the cuff configuration.

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**Compared file: US9242058B2**Tracheal tube positioning devices and methods  
**Inventor: HAYMAN SARAH  
Assignee: HAYMAN SARAH  
Priority Date: 07-29-2011  
Publication Date: 01-26-2016  
CPC: A61M16/04  
IPV™ Rating: 7.7601  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/060-787-885-003-303/frontpage?l=en](https://www.lens.org/lens/patent/060-787-885-003-303/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to provide a tracheal tube assembly that facilitates controlled ventilation of a patient's airway. This is achieved through a tubular body with an inflatable cuff designed to seal against the tracheal wall, ensuring that air or other gases flow only through the tube. The cuff's design, which includes multiple inflatable chambers, allows for an asymmetrical inflation to better control the positioning of the tube within the trachea, which is crucial for effective ventilation and when auxiliary devices like imaging systems are used.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated high overlap between the Subject and Compared patents, primarily due to the shared use of imaging devices and cuff systems for tracheal ventilation and monitoring. Both patents focus on the operational role of facilitating air flow and providing visual access within the trachea, with applications in critical care and surgical settings. The potential commercial impact of these patents could be significant, as they address critical needs in medical procedures, potentially leading to improved patient outcomes and market demand for such advanced tracheal tube systems. However, the Subject's use of multiple ventilation lumens and the Compared's asymmetrical cuff design indicate some differentiation in approach, suggesting a low possibility of complete overlap in all aspects.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of controlled inflation to achieve an effective seal within the trachea. The underlying functions include the inflation of the cuff to create an airtight seal, which is facilitated by separate inflatable chambers within the cuff. Essential components include the tubular body, the cuff with its first and second inflatable chambers separated by a partition, and an annular collar with an imaging device. Core interactions involve the inflation of the chambers to different extents, which affects the cuff's geometry and the positioning of the tube. The internal dynamics of the system involve the flow of air through the inflation lumens to the chambers, and the resultant pressure distribution that ensures the tube remains centered or positioned as desired within the trachea. This system is designed to address the mechanical challenge of maintaining a stable and effective seal while allowing for the integration of imaging technology.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus directly into the multi-lumen tracheal tube, which is not present in the Compared invention. This feature enhances the precision of tube placement within the bronchus, addressing the mechanical challenge of accurate intubation. The Subject's design also allows for independent ventilation of one lung, which is a specific application not directly addressed by the Compared invention's focus on general tracheal tube positioning and sealing. The Compared invention's use of an asymmetrical cuff for better positioning within the trachea is a different approach to solving the issue of tube placement, but it does not include the visualization technology or the specific application for bronchial intubation. The overlap between the two inventions lies in their use of tracheal tubes for patient ventilation, but the Subject's multi-lumen design and integrated camera system set it apart, offering a more specialized solution for thoracic surgery and critical care. The practical applications of the Subject invention are primarily in thoracic surgery and critical care, where precise bronchial intubation is crucial, while the Compared invention is more broadly applicable to general tracheal intubation scenarios. Both inventions aim to improve patient care through better control over ventilation, but they target different aspects of the mechanical engineering challenge in medical devices.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from Subject and Compared share similarities in the use of imaging devices, such as cameras, and the presence of cuffs for sealing against the tracheal wall. In Subject, the tracheal tube includes a camera attached to the second ventilation lumen, with specific configurations like being within an annular collar or embedded in the lumen wall. This aligns with the Compared's tracheal tube assembly, which features an imaging device within an annular collar. Both systems aim to provide visual access to the tracheal area, enhancing medical procedures. The Subject's tracheal tube also mentions multiple ventilation lumens, which differ from the single tubular body in Compared, but both systems focus on ventilation and sealing mechanisms. The Subject's use of multiple cuffs and the Compared's asymmetrical cuff design both serve to improve the seal and positioning within the trachea. The operational role of both systems is centered on facilitating ventilation and monitoring within the tracheal environment, with applications in critical care and surgical settings. The underlying functions involve air passage and sealing, with essential components like lumens, cuffs, and imaging devices. Core interactions include the interaction between the cuffs and the tracheal wall, and the imaging devices' field of view. Internally, the dynamics involve air flow management and imaging capabilities, crucial for their applied context in medical procedures.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claims from Subject and Compared exhibit a significant overlap in the use of imaging devices for tracheal visualization and the employment of cuffs for sealing purposes. The Subject's detailed description of camera placement and cuff configurations closely aligns with the Compared's use of an imaging device within an annular collar and an asymmetrical cuff design. This overlap is evident in the shared focus on enhancing medical procedures through improved visualization and sealing. The methodologies and designs, such as the use of multiple lumens in Subject and a single tubular body in Compared, show a common goal of effective ventilation and monitoring. The operational roles of both systems are geared towards energy conversion in the form of air flow management and motion transfer in terms of positioning within the trachea. The purpose within their applied context is to aid in critical care and surgical interventions, with practical applications in hospitals and emergency settings. The overlap in these aspects suggests a strong similarity between the two sets of claims.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US9242058B2) Claim number: 1 and Subject Claim: 6**

Both claims describe tracheal tubes with multiple cuffs or chambers. The Compared claim details a tracheal tube assembly with a cuff having two inflatable chambers of different sizes, creating an asymmetrical cross-sectional geometry, and includes an annular collar with an imaging device. The Subject claim mentions a tracheal tube with two cuffs, one around both ventilation lumens and another around only the second ventilation lumen. The scope of the Compared claim is broader, encompassing the design and function of the cuff and the integration of an imaging device, while the Subject claim focuses on the arrangement of cuffs around the ventilation lumens. The similarity lies in the use of multiple cuffs, but the Compared claim adds complexity with the asymmetrical design and imaging device.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US9242058B2) Claim number: 4 and Subject Claim: 8**

Both claims address the inflation of multiple cuffs or chambers in a tracheal tube. The Compared claim specifies that the first and second inflatable chambers can be separately inflated, focusing on the functionality of the chambers. The Subject claim mentions separate inflation lumens for the first and second cuffs, which is a structural detail supporting the functionality described in the Compared claim. The scope of the Compared claim is on the operational aspect of inflation, while the Subject claim focuses on the structural support for this operation. The similarity is in the concept of separate inflation for multiple cuffs or chambers.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US9242058B2) Claim number: 5 and Subject Claim: 8**

Both claims describe the use of separate inflation lumens for different cuffs or chambers in a tracheal tube. The Compared claim provides detailed information about the path and function of the inflation lumens, specifying their connection to the inflatable chambers. The Subject claim mentions the association of inflation lumens with cuffs but does not detail their path or function. The scope of the Compared claim is more comprehensive, focusing on the operational details of the inflation system, while the Subject claim is more general, focusing on the presence of the inflation lumens. The similarity is in the use of separate inflation lumens for multiple cuffs or chambers.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US10682047B2**Tracheal tube  
**Inventor: NAKATATE KENICHI  
Assignee: FUJIKURA LTD  
Priority Date: 03-28-2013  
Publication Date: 06-16-2020  
CPC: A61B1/267  
IPV™ Rating: 7.6176  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/093-300-656-202-720/frontpage?l=en](https://www.lens.org/lens/patent/093-300-656-202-720/frontpage?l=en)

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The primary function of the Compared invention (A61B1/267) is to facilitate tracheal intubation and enable real-time observation of the tracheal and bronchial state post-intubation. From a mechanical engineering perspective, this involves the design and integration of a hollow tube body, a lumen, and a scope unit with an imaging optical system. The system is designed to be inserted into a subject, allowing for the imaging device to capture internal visuals, which aids in the precise placement of the tracheal tube and subsequent monitoring.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated overlap between the Subject and Compared patents, primarily due to their shared focus on enhancing medical visualization within the respiratory system through imaging systems. The Subject patent's dual-lumen system with a camera and the Compared patent's single-lumen system with an advanced optical setup both aim to improve medical procedures, though they differ in their specific designs and methodologies. The Subject patent's design could have a significant commercial impact in critical care and surgical settings, where dual ventilation and real-time visualization are crucial. The Compared patent's focus on high-quality imaging could impact diagnostic and educational applications in medicine. Given the significant overlap in their core functions, there is a high possibility of overlap between these patents.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention revolve around the integration of mechanical and optical systems to achieve its function. The underlying functions include the insertion of the tube body into the subject, which requires careful design to ensure minimal resistance and optimal fit. Essential components include the hollow tube body, the lumen for housing the scope unit, and the imaging optical system, which comprises an imaging device (e.g., CMOS sensor) and an illumination system with light-guide fibers. Core interactions involve the mechanical insertion of the tube and the optical capture and transmission of images. The internal dynamics focus on maintaining the structural integrity of the tube while allowing for the flexibility needed for insertion and the optical clarity required for effective visualization. The system's operational role is to facilitate the transfer of visual data from inside the subject to external monitoring equipment, aiding in real-time decision-making during medical procedures.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integrated camera system within an endobronchial tube, specifically designed for bronchial intubation. This differs from the Compared invention, which focuses on tracheal intubation and uses a separate scope unit. The Subject's design allows for a unitary assembly with the camera embedded in the wall of the second ventilation lumen, providing a more streamlined approach to visualization during bronchial intubation. The mechanical underpinnings of the Subject include considerations for force distribution to maintain the structural integrity of the double-lumen tube while accommodating the camera and associated components. The design approaches involve specific fabrication techniques to integrate electronic components like the camera and LEDs into the tube structure, ensuring functionality and durability. In contrast, the Compared invention's mechanical control systems are centered around the integration of the scope unit and the tube body, with less emphasis on a unitary design. Both inventions address real-world mechanical challenges such as ease of placement and visualization, but the Subject's focus on bronchial intubation and its integrated camera system offers a competitive advantage in thoracic surgery and critical care settings. The practical applications of the Subject are primarily in thoracic surgery and critical care, where precise bronchial intubation and monitoring are crucial, while the Compared invention is more broadly applicable to general tracheal intubation and respiratory care. Both innovations have the potential to improve patient outcomes by enhancing the precision and safety of intubation procedures, but the Subject's targeted approach to bronchial intubation could lead to more specialized applications and potentially greater impact in specific medical fields.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tubes described in both Subject and Compared patents involve the use of imaging systems for visualizing the inside of a patient, which indicates a shared focus on enhancing medical procedures through visual aids. The Subject patent details a tracheal tube with dual ventilation lumens, one of which is equipped with a camera and an opening for viewing, aimed at aligning with the upper bronchus. This setup is designed for specific operational roles such as facilitating ventilation and providing visual feedback during intubation or bronchoscopy. The camera's placement and the inclusion of light sources (LEDs) suggest a design focused on improving visibility and operational efficiency in medical settings, particularly in scenarios requiring precise positioning within the respiratory system.  
  
In contrast, the Compared patent describes a tracheal tube with a single lumen and a scope unit that includes an imaging device and illumination system. The design emphasizes the integration of optical systems to illuminate and image the inside of the subject, with specific attention to reducing light interference into the imaging device. This patent's focus on the optical and illumination aspects suggests an intent to enhance the quality of imaging during medical procedures, potentially applicable in various diagnostic and therapeutic contexts within the respiratory system.  
  
Both patents share the underlying function of aiding medical visualization within the trachea, but they differ in their approach to achieving this. The Subject patent focuses on a dual-lumen system with a camera for direct visualization, while the Compared patent emphasizes a more complex optical system with light management to improve image quality. The essential components in both include imaging devices and lumens, but the Subject patent includes additional elements like cuffs and a suction lumen, which are not detailed in the Compared patent. The core interactions in the Subject patent involve the camera's field of view through an opening, whereas in the Compared patent, it involves the interaction between the imaging and illumination systems to prevent light interference. The internal dynamics of the Subject patent revolve around the dual-lumen system's ability to ventilate and visualize simultaneously, while the Compared patent's dynamics focus on optimizing light and image capture.  
  
In terms of practical applications, the Subject patent's design could be particularly useful in scenarios requiring dual ventilation and real-time visualization, such as in critical care settings or during complex surgical procedures. The Compared patent's design might be more suited for applications where high-quality imaging is crucial, such as in diagnostic bronchoscopy or for educational purposes in medical training.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.6176 suggests a significant degree of overlap between the Subject and Compared patents. Both patents focus on tracheal tubes with integrated imaging systems, indicating a shared interest in enhancing medical visualization within the respiratory system. The Subject patent's dual-lumen system with a camera and the Compared patent's single-lumen system with an advanced optical setup both aim to provide visual feedback during medical procedures. However, the Subject patent's emphasis on dual ventilation and specific camera placement contrasts with the Compared patent's focus on light management and image quality. Despite these differences, the core function of aiding medical visualization through imaging systems creates a notable overlap. The overlap can be described as significant due to the shared goal of improving medical procedures through visual aids, though the methodologies and specific designs differ.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US10682047B2) Claim number: 1 and Subject Claim: 1**

Both claims describe a tracheal tube with imaging capabilities. The Compared claim details a tracheal tube with a hollow tube body, a lumen, and a scope unit with an imaging optical system and an illumination system, focusing on the arrangement of light-guide fibers to prevent light from entering the imaging device. The Subject claim, on the other hand, describes a tracheal tube with two ventilation lumens and a camera system, where the camera's field of view is through an opening in the second lumen. The scope of the Compared claim is more focused on the detailed configuration of the imaging and illumination systems, while the Subject claim emphasizes the dual-lumen structure and the camera's positioning. The similarity lies in the use of imaging technology within a tracheal tube, but the specifics of the imaging systems and the structural details of the tube differ significantly.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: EP3763410B1**TRACHEAL TUBE  
**Inventor: YAMADA MASAYUKI  
Assignee: DAIKEN MEDICAL CO LTD  
Priority Date: 03-07-2018  
Publication Date: 06-14-2023  
CPC: A61M16/04  
IPV™ Rating: 7.5821  
Inferred Equivalence: High**

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The primary function of the Compared invention (A61M16/04) is to facilitate the intubation and ventilation of a patient's trachea and bronchi. From a mechanical engineering perspective, this involves the design and operation of a tracheal tube system that can be inserted into the trachea, ensuring an airtight seal to prevent aspiration and gas leakage. The system includes mechanisms for inflation and deflation of cuffs to secure the tube's position and maintain airway isolation, which is crucial for effective ventilation and patient safety.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated overlap between the Subject and Compared patents, primarily due to their shared focus on improving respiratory support through tracheal tubes. The Subject patent's emphasis on a dual-lumen system with a camera for visualization and the Compared patent's focus on a helical cuff design for ventilation both aim to enhance patient care in medical settings. The operational roles of both patents involve facilitating ventilation and monitoring within the respiratory system, with potential applications in hospitals and clinical environments. The commercial impact of the Subject patent could be significant in markets seeking advanced monitoring capabilities, while the Compared patent might appeal to markets prioritizing efficient ventilation. Given the high overlap level, there is a notable possibility of overlap in their practical applications and market segments.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of a tracheal tube with multiple cuffs to achieve selective ventilation. The underlying functions include the inflation and deflation of cuffs to create an airtight seal within the trachea and bronchi. Essential components include the main tracheal tube, a dividing wall to create separate lumens, and inflatable cuffs. The core interactions involve the cuffs expanding radially to press against the tracheal and bronchial walls, ensuring a secure fit and isolation of the airway. Internally, the dynamics involve the control of fluid flow into and out of the cuffs, which is critical for maintaining the seal and adjusting the tube's position. The mechanical system's role is to facilitate energy conversion (from fluid pressure to mechanical force) and motion transfer (inflation/deflation) to achieve effective ventilation in medical contexts.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus within the endobronchial tube, which enhances the precision of bronchial intubation. This feature distinguishes it from the Compared invention, which lacks such a visualization device. The Subject's design with unequal length tubes and a camera allows for more accurate placement in the bronchial stem, addressing the challenge of correct positioning in selective lung ventilation. The mechanical underpinnings of the Subject include improved force distribution through the use of cuffs and the camera's role in guiding placement, which enhances structural integrity and energy efficiency in the context of medical ventilation. The design approaches, such as the integration of electronic components for visualization, set the Subject apart by offering a more advanced solution for one-lung ventilation. In contrast, the Compared invention focuses on general tracheal intubation and ventilation, lacking the specialized features for selective lung ventilation. Both inventions target the medical ventilation market, but the Subject's innovation offers a competitive advantage in procedures requiring precise bronchial intubation, potentially influencing industry practices by improving the safety and efficacy of such procedures.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from both Subject and Compared patents focus on medical devices designed for respiratory support, specifically for insertion into the trachea and bronchi. The Subject patent describes a tracheal tube with dual ventilation lumens, where the second lumen is longer and includes a camera and an opening for visualization, aimed at improving patient monitoring and care. The Compared patent details a tracheal tube with a main tube and a branch tube, featuring a bronchial cuff with ventilation spaces and through holes for enhanced ventilation. Both patents address the operational role of facilitating ventilation and monitoring within the respiratory system, with the Subject focusing on dual-lumen design and camera integration, and the Compared emphasizing a helical cuff design for ventilation efficiency. The methodologies involve different approaches to achieve similar goals of improved respiratory support; the Subject uses a camera for direct visualization, while the Compared uses a structured cuff design for better air distribution. The essential components in the Subject include dual lumens, a camera, and an opening, whereas the Compared includes a main tube, branch tube, and a helical cuff. Core interactions in the Subject involve the camera's field of view through the opening, and in the Compared, the interaction between the cuff and the bronchus to create ventilation spaces. The internal dynamics of the Subject focus on the camera's function and the dual-lumen system's operation, while the Compared's dynamics revolve around the cuff's interaction with the bronchus to facilitate ventilation. Both patents are applied in the context of medical respiratory care, with practical applications in hospitals and clinical settings for patient ventilation and monitoring.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.5821 indicates a significant degree of overlap between the Subject and Compared patents. Both patents deal with tracheal tubes designed for respiratory support, with the Subject focusing on a dual-lumen system with a camera for visualization, and the Compared emphasizing a helical cuff design for ventilation. The overlap is evident in the shared goal of improving respiratory care, though the methodologies differ. The Subject's camera and dual-lumen design aim to enhance monitoring, while the Compared's helical cuff and ventilation spaces focus on improving air distribution. Despite these differences, the core function of facilitating ventilation and the context of medical application are common, suggesting a strong overlap in the intended operational role and practical applications.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (EP3763410B1) Claim number: 1 and Subject Claim: 6**

Both claims describe a tracheal tube with multiple lumens and cuffs. The Compared claim specifies a main tube with two paths, one with a bronchial cuff and another with a tracheal cuff, and an open end of the second path between these cuffs. The Subject claim mentions a first cuff around both ventilation lumens and a second cuff around only the second lumen. The scope of the Compared claim focuses on the specific arrangement of cuffs and paths, while the Subject claim emphasizes the dual cuff system around the lumens. The similarity lies in the use of multiple cuffs and lumens, but the Compared claim provides more detail on the positioning and structure of the cuffs and paths.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (EP3763410B1) Claim number: 2 and Subject Claim: 6**

Both claims discuss the use of cuffs in tracheal tubes. The Compared claim specifies a tracheal cuff on the outer peripheral surface of the tube body to press against the trachea. The Subject claim describes a first cuff around both ventilation lumens and a second cuff around only the second lumen. The scope of the Compared claim is narrower, focusing on a single cuff's function, while the Subject claim covers a dual cuff system. The similarity is in the use of cuffs, but the Subject claim provides more detail on the arrangement of multiple cuffs.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US9687621B2**Dual lumen endobronchial tube device  
**Inventor: HOFTMAN NIR  
Assignee: HOFTMAN NIR  
Priority Date: 07-06-2012  
Publication Date: 06-27-2017  
CPC: A61M16/04  
IPV™ Rating: 7.3475  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/052-212-892-715-256/frontpage?l=en](https://www.lens.org/lens/patent/052-212-892-715-256/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate the ventilation of a patient's lungs through a double-lumen endotracheal tube, allowing for independent ventilation of each lung. This is achieved by providing a tracheal lumen and a bronchial lumen, each equipped with cuffs to create an airtight seal within the trachea and a bronchus, respectively. The invention aims to support thoracic surgeries where single lung ventilation or separate ventilation of the lungs is necessary, addressing challenges such as bronchial damage and vocal cord scarring by enabling the use of a smaller diameter tube.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated overlap between the Subject and Compared patents, primarily due to their shared focus on multi-lumen tracheal or endotracheal tubes designed for respiratory support in medical settings. The Subject's inclusion of a camera for visualization adds a unique feature that could enhance the safety and effectiveness of the ventilation process, potentially offering additional diagnostic capabilities. The Compared's focus on the flexibility and positioning of the dividing wall to prevent occlusion during medical device insertion also aims to enhance the functionality and safety of the ventilation process. Both patents have the potential for significant commercial impact in the medical field, particularly in critical care and surgical settings where advanced respiratory support and diagnostic tools are crucial.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of dual-lumen ventilation, where one lumen is positioned in the trachea and the other extends into a bronchus. The underlying functions include the creation of an airtight seal using inflatable cuffs, which are crucial for maintaining positive pressure ventilation and preventing the ingress of foreign matter into the lungs. Essential components include the tracheal and bronchial lumens, cuffs, and a dividing wall that separates the lumens. Core interactions involve the inflation of cuffs to seal against the tracheal and bronchial walls, and the independent flow of respiratory gases through each lumen. Internal dynamics include the potential for the bronchial lumen to shift due to muscle contractions or patient movement, which can affect the positioning of the tube and its effectiveness in ventilation.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces significant novelty by integrating a camera apparatus into the tracheal tube, which is not present in the Compared invention. This addition allows for direct visualization of the bronchial intubation process, enhancing the precision and safety of tube placement. The Compared invention focuses on the mechanical aspects of dual-lumen ventilation without visual aids, whereas the Subject invention combines mechanical functionality with electronic components for real-time monitoring. The Subject's design also includes a fenestration on the side wall of the second lumen, which is a unique structural feature not found in the Compared invention. The practical applications of the Subject invention extend to improving the accuracy of endobronchial tube placement, potentially reducing complications associated with incorrect positioning. Both inventions target the medical field, specifically thoracic surgeries, but the Subject invention offers a competitive advantage by addressing the challenge of visualization during intubation, which could influence industry practices towards more integrated and technologically advanced medical devices.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from the Subject and the endotracheal tube claims from the Compared share several similarities in design and function, particularly in the context of medical ventilation systems. Both sets of claims describe tubes with multiple lumens designed for insertion into a patient's trachea and bronchus, aimed at facilitating ventilation and potentially other medical procedures. The Subject's claims focus on a tracheal tube with two ventilation lumens, one of which is longer and aligns with the upper bronchus, and includes a camera for visualization. The Compared's claims describe an endotracheal tube with a main tracheal tube and a bronchial tube, also featuring multiple lumens separated by a dividing wall, and designed for sealing with cuffs. Both systems are intended for use in medical settings, specifically for respiratory support and potentially for diagnostic or therapeutic interventions. The Subject's camera and opening in the second lumen could be seen as analogous to the Compared's focus on the flexibility and positioning of the dividing wall to prevent occlusion during medical device insertion, as both features aim to enhance the functionality and safety of the ventilation process. The methodologies involve the design of multi-lumen tubes, the operational role centers around respiratory support, and the underlying functions include ventilation and, in the Subject's case, visualization. Essential components include the lumens, cuffs, and in the Subject's case, a camera. Core interactions involve the interaction between the lumens and the patient's respiratory system, while internal dynamics relate to the flow of air and, in the Subject's case, the field of view of the camera. The practical applications of both are in clinical settings for patient care, with the Subject potentially offering additional diagnostic capabilities.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.3475 suggests a significant degree of overlap between the Subject and Compared claims. The Subject's tracheal tube with its dual ventilation lumens and camera system shares a conceptual similarity with the Compared's endotracheal tube, which also features multiple lumens and focuses on preventing occlusion during medical procedures. Both systems are designed for respiratory support, with the Subject's camera providing an additional function for visualization, which could be seen as enhancing the safety and effectiveness of the ventilation process, similar to the Compared's focus on maintaining ventilation through flexible lumen design. The overlap is described as significant due to the shared purpose of respiratory support and the similar multi-lumen design, though the Subject's inclusion of a camera adds a unique feature not directly addressed in the Compared's claims.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US9687621B2) Claim number: 6 and Subject Claim: 1**

Both claims describe a tracheal tube with two lumens, one longer than the other, and both connected to a ventilator. The Compared claim specifies a tracheal tube and a bronchial tube, with detailed descriptions of the lumens and their openings, as well as the positioning of inflatable cuffs. The Subject claim includes a camera and an opening in the second lumen, which are not mentioned in the Compared claim. The scope of the Compared claim focuses on the structural arrangement and sealing mechanisms, while the Subject claim emphasizes the integration of a camera for visualization. The similarity lies in the dual lumen design and their connection to a ventilator, but the Subject claim introduces additional functionality with the camera.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US9687621B2) Claim number: 1 and Subject Claim: 1**

Both claims describe a tracheal tube with two lumens, one extending into a bronchial tube. The Compared claim details the sealing mechanisms and the structural arrangement of the dividing wall, while the Subject claim focuses on the integration of a camera and an opening in the second lumen. The similarity lies in the dual lumen design and the connection to a ventilator, but the Subject claim introduces additional functionality with the camera, which is not present in the Compared claim. The scope of the Compared claim is more focused on the structural and sealing aspects, whereas the Subject claim emphasizes visualization capabilities.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US10406309B2**Endobronchial tube with integrated image sensor and a cleaning nozzle arrangement  
**Inventor: DAHER ELIAS  
Assignee: ETVIEW LTD  
Priority Date: 07-11-2011  
Publication Date: 09-10-2019  
CPC: A61B1/12  
IPV™ Rating: 7.2718  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/033-587-253-858-711/frontpage?l=en](https://www.lens.org/lens/patent/033-587-253-858-711/frontpage?l=en)

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The primary function of the Compared invention (A61B1/12) is to provide a means for visualizing the internal respiratory system, specifically the trachea and bronchi, during medical procedures. From a mechanical engineering perspective, this involves the integration of an endoscope or similar visualization device into an endobronchial tube, which must maintain structural integrity and flexibility to navigate the respiratory tract while ensuring the visualization device remains functional and clear.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated high overlap between the Subject and Compared patents, as both focus on enhancing respiratory care through ventilation and imaging. The operational roles of both devices involve energy conversion in the form of air flow management and motion transfer through the movement of air and imaging components. Their purpose within the applied context of medical care, particularly in respiratory therapy, is to provide effective ventilation and visual monitoring. The potential commercial impact of both patents is significant, as they address critical needs in clinical settings, potentially improving patient outcomes in surgeries, intensive care, and diagnostics. However, the Subject's broader range of features, including various camera placements and additional lumens, might offer a more versatile solution compared to the Compared's more specialized cleaning system for the image sensor.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of optical systems and electronic components to enable real-time visualization. The underlying functions include light transmission and image capture, facilitated by components such as a CCD or CMOS camera, light sources, and possibly cleaning mechanisms to maintain a clear field of view. Essential components include the endoscope itself, which must be designed to fit within the constraints of the respiratory tube, and the mechanical structure of the tube, which must support the endoscope while allowing for air passage. Core interactions involve the transmission of light from the source to the target area and the return of visual data to the camera. Internally, the dynamics include the management of fluid and air flow around the visualization device to prevent obstruction and ensure clear imaging. The mechanical system's role is to facilitate the safe and effective insertion of the tube into the respiratory system, ensuring that the visualization device can perform its function without compromising the tube's primary purpose of ventilation.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its multi-lumen design, which allows for independent ventilation of different lung sections, combined with an integrated camera system for continuous monitoring. This differs from the Compared invention, which primarily focuses on the integration of an endoscope for visualization but does not emphasize the multi-lumen aspect for ventilation. The Subject's design approach includes specific placement of cameras within the tube's structure, such as on the interior surface or embedded within the wall, which enhances the visualization capabilities without compromising the tube's structural integrity or ventilation function. The mechanical underpinnings of the Subject invention focus on optimizing force distribution and energy efficiency to ensure the tube's performance in a clinical setting, while the Compared invention's mechanical focus is more on the integration and operation of the visualization device. Both inventions target the medical field, specifically respiratory care, but the Subject invention offers a more integrated solution for both ventilation and visualization, potentially impacting clinical practices by reducing the need for separate visualization tools and improving patient safety through continuous monitoring.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the endobronchial tube in the Compared claims share several similarities in their design and functionality, particularly in the context of medical ventilation and imaging. Both devices incorporate multiple lumens for ventilation, with the Subject's first and second ventilation lumens and the Compared's first and second lumens. The Subject's second ventilation lumen aligns with an upper bronchus, similar to the positioning of the Compared's second lumen, which is designed to interact with bronchial branches. Both devices also feature imaging capabilities; the Subject includes a camera attached to the second ventilation lumen, while the Compared has an image sensor within a dedicated lumen. The operational role of both devices involves facilitating ventilation and providing visual feedback for medical procedures, specifically within the respiratory system. The essential components include lumens for air passage, cuffs for sealing, and imaging systems for visualization. The core interactions involve the flow of air through the lumens and the capture of images for monitoring. Internally, both devices manage the dynamics of air pressure and flow, alongside maintaining clear visibility for the imaging systems. The purpose within their applied context is to support respiratory care in clinical settings, with practical applications in surgeries, intensive care, and diagnostic procedures. The Subject's additional features like cuffs, light emitting diodes, and fluid delivery systems for camera maintenance further align with the Compared's cleaning nozzle arrangement designed to maintain the image sensor's field of view.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.2718 indicates a high degree of similarity between the Subject and Compared claims. The overlap is significant, as both devices are designed for similar medical applications involving ventilation and imaging within the respiratory system. The Subject's tracheal tube and the Compared's endobronchial tube both feature multiple lumens for ventilation, imaging systems for visual feedback, and mechanisms for maintaining the functionality of these systems. The Subject's camera and the Compared's image sensor serve analogous roles in providing visual access to the respiratory tract. The presence of cuffs in both devices for sealing purposes and the Subject's fluid delivery system for camera maintenance are functionally similar to the Compared's cleaning nozzle arrangement. This strong overlap suggests that both patents address similar challenges in respiratory care, with a focus on improving ventilation and monitoring capabilities.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US10406309B2) Claim number: 10 and Subject Claim: 1**

Both claims describe a medical tube with a second lumen that includes an imaging device. The Subject claim details a tracheal tube with a camera in the second ventilation lumen, designed to view through an opening in the lumen wall. The Compared claim specifies an endobronchial tube with a second image sensor in the second lumen. The scope of the Subject claim includes detailed structural and positional elements of the camera and lumens, while the Compared claim focuses on the presence of a second image sensor without specifying its position or the structural details of the lumens. The similarity lies in the use of imaging technology within a second lumen, but the Subject claim provides more comprehensive details on the tube's configuration.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US10406309B2) Claim number: 14 and Subject Claim: 1**

Both claims involve imaging capabilities within a medical tube. The Subject claim describes a tracheal tube with a camera in the second ventilation lumen, aimed at viewing through an opening. The Compared claim specifies an endobronchial tube with an image sensor lumen designed to view specific anatomical structures. The Subject claim's scope includes detailed structural elements and positioning of the camera, while the Compared claim focuses on the specific anatomical targets for imaging. The similarity is in the use of imaging for medical purposes, but the Subject claim provides more detailed structural information.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US10406309B2) Claim number: 9 and Subject Claim: 16**

Both claims describe the positioning of an imaging device within a medical tube. The Subject claim specifies a camera on a dividing wall between the first and second ventilation lumens, while the Compared claim mentions a dedicated image sensor lumen within the tube wall between the first and second lumens. The scope of the Subject claim focuses on the camera's placement on the dividing wall, whereas the Compared claim emphasizes the image sensor lumen's location within the tube wall. The similarity lies in the positioning of imaging technology between the lumens, but the Subject claim provides more detail on the camera's placement.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US10245402B2**Endobronchial tube with integrated image sensor  
**Inventor: DAHER ELIAS  
Assignee: ETVIEW LTD  
Priority Date: 07-11-2011  
Publication Date: 04-02-2019  
CPC: A61B1/00  
IPV™ Rating: 7.2099  
Inferred Equivalence: High**

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The primary function of the Compared invention (A61B1/00) is to provide continuous monitoring and visualization of the tracheal carina and bronchial placement during respiratory procedures. From a mechanical engineering perspective, this involves the integration of an image sensor and a light source within an endobronchial tube to ensure correct tube positioning and to facilitate one-lung ventilation procedures. The mechanical design focuses on maintaining the structural integrity of the tube while accommodating the electronic components necessary for visualization.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated high overlap between the Subject and Compared patents, given their shared focus on ventilation and imaging within the respiratory tract. Both patents aim to support respiratory function while providing visual access for monitoring and intervention, which is critical in medical settings. The potential commercial impact of these patents could be significant, as they address essential needs in patient care, particularly in critical care environments where real-time monitoring and effective ventilation are paramount. The Subject's tracheal tube and the Compared's endobronchial tube could compete in the market for medical devices used in respiratory care, with the potential to influence clinical practices and patient outcomes.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve systemic principles of optical imaging and illumination within a medical device. The foundational processes include the use of a CCD or CMOS camera to capture images of the tracheal carina, supported by a light source such as an LED to enhance visibility. The underlying functions are to provide real-time visual feedback to medical professionals, ensuring correct tube placement and monitoring for potential complications like cuff dislodgement or secretion accumulation. Essential components include the image sensor, light source, and the structural framework of the endobronchial tube, which must maintain an airtight seal and adequate airflow. Core interactions involve the transmission of light from the LED to the camera's field of view, and the subsequent transmission of visual data to external monitoring systems. The internal dynamics focus on the mechanical stability of the tube and the integration of electronic components without compromising the tube's primary function of ventilation.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its multi-lumen design and integrated camera apparatus, which allows for precise visualization during bronchial intubation. Unlike the Compared invention, which focuses on continuous monitoring of the tracheal carina, the Subject invention emphasizes the facilitation of intubation and independent ventilation through its unique structural design. The Subject's approach to integrating the camera within the tube's structure, specifically aligned with an opening in the second ventilation lumen, provides a distinct mechanical advantage in terms of visualization accuracy and ease of use. The Compared invention, while also using a camera, does not specify the integration method or the precise alignment with an opening, which are key differentiators in the Subject's design. Both inventions address the challenge of ensuring correct tube placement, but the Subject's multi-lumen configuration and specific camera placement offer a more targeted solution for bronchial intubation. The practical applications of the Subject invention are primarily in surgical and critical care settings where precise intubation and independent lung ventilation are required, potentially improving patient outcomes by reducing the risk of misplacement. The Compared invention, on the other hand, is more focused on continuous monitoring, which could be advantageous in long-term care scenarios where ongoing surveillance is necessary. Both technologies aim to enhance the safety and efficacy of respiratory procedures, but they serve slightly different purposes within the medical field.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the endobronchial tube in the Compared claims share several similarities in their design and functionality, particularly in the context of medical ventilation and imaging. Both devices incorporate multiple lumens for ventilation, with the Subject's tracheal tube featuring a first and second ventilation lumen, and the Compared's endobronchial tube having a first and second lumen. Both also include imaging capabilities, with the Subject's tracheal tube having a camera attached to the second ventilation lumen, and the Compared's endobronchial tube featuring an image sensor within a dedicated image sensor lumen. The operational role of both devices involves facilitating ventilation while providing visual access to the respiratory tract, which is crucial in medical settings for monitoring and intervention. The underlying function of both devices is to support respiratory function and enable visual inspection, with essential components including lumens for air passage, cuffs for sealing, and imaging systems. Core interactions involve the flow of air through the lumens and the transmission of visual data from the camera or image sensor. Internally, both devices manage the dynamics of air pressure and flow, alongside maintaining clear visibility through their respective imaging systems. In terms of applied context, these devices are used in clinical settings for patient care, particularly in intensive care units or during surgical procedures. The practical applications include mechanical ventilation support and real-time monitoring of the respiratory tract.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the Subject and Compared claims is significant, as both devices are designed for similar medical applications involving ventilation and imaging. The Subject's tracheal tube and the Compared's endobronchial tube both utilize multiple lumens for ventilation and incorporate imaging technology to visualize the respiratory tract. The Subject's camera and the Compared's image sensor serve analogous purposes, though their specific implementations differ slightly. The presence of cuffs in both devices for sealing and the focus on maintaining clear visibility through cleaning mechanisms in the Compared's device further indicate a strong overlap in the intended functionality and operational role. The claim\_score of 7.2099 suggests a high degree of similarity in the context and literal words used in the claims.

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**Claims Breakdown and Comparison Summary:**

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US10722110B2**Medical devices and methods of placement  
**Inventor: MOLNAR ROBERT  
Assignee: WM & DG INC  
Priority Date: 08-08-2014  
Publication Date: 07-28-2020  
CPC: A61B1/00  
IPV™ Rating: 7.1003  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/192-632-312-513-007/frontpage?l=en](https://www.lens.org/lens/patent/192-632-312-513-007/frontpage?l=en)

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The primary function of the Compared invention (A61B1/00) is to provide a visualization device for intubation, extubation, ventilation, drug delivery, feeding, and continuous remote monitoring of a patient. From a mechanical engineering perspective, this involves designing a system that can be integrated into various medical devices to facilitate accurate placement and ongoing monitoring of medical procedures. The device includes a camera tube that can be attached to different medical devices, allowing for real-time visualization and remote monitoring, which is crucial for ensuring patient safety and effective medical intervention.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated overlap between the Subject and Compared patents, primarily due to their shared use of visualization technology for intubation. However, the structural differences between the tracheal tube and the oral airway device, as well as their specific applications, indicate that the overlap is not complete. The Subject's device is specifically designed for tracheal intubation, potentially in critical care settings, while the Compared's device is more versatile and can be used for various intubation methods, including emergency and routine procedures. The potential commercial impact of the Subject's patent may be significant in the critical care and surgical markets, where tracheal intubation is common. The potential commercial impact of the Compared's patent may be broader, as it can be used in various intubation scenarios, potentially impacting emergency medicine, routine procedures, and other medical settings. Overall, there is a high possibility of overlap between the two patents, but their specific applications and structural differences may limit the extent of the overlap.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of a camera tube with a sealed distal end and an open proximal end, allowing for the insertion and retraction of a camera. The camera tube is designed to be a separate component that can be attached externally to various medical devices, such as oral airways or endotracheal tubes. The underlying functions include the transmission of visual data from the camera to external monitoring systems, which requires the integration of electronic components for data processing and transmission. Essential components include the camera, the camera tube, and the transparent material at the distal end. Core interactions involve the camera's ability to capture and transmit images, while internal dynamics focus on the mechanical stability and flexibility of the camera tube to ensure it can be used in various medical contexts. The system's operational role is to provide continuous visualization and monitoring, which is critical for medical procedures involving the airway and other internal systems.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its multi-lumen design specifically tailored for endobronchial intubation, which includes a camera apparatus integrated into the tracheal tube itself. This contrasts with the Compared invention, which focuses on a separate camera tube that can be attached to various medical devices. The Subject's design allows for a more integrated approach to visualization during intubation, potentially improving the accuracy and ease of placement within the bronchial stem. The mechanical underpinnings of the Subject invention involve the precise control of the camera's position and field of view within the tracheal tube, which is critical for effective bronchial intubation. The design approaches and protocols for the Subject invention focus on ensuring the structural integrity and flexibility of the multi-lumen tube, as well as the integration of electronic components for camera operation. In contrast, the Compared invention's mechanical identity is defined by its adaptability to different medical devices, with a focus on the camera tube's ability to be reused and retracted on demand. The Subject invention is aimed at the medical field, specifically for use in bronchial intubation procedures, while the Compared invention has broader applications across various medical procedures requiring visualization. The potential impacts of the Subject invention include improved patient outcomes through more accurate intubation and reduced risk of complications, whereas the Compared invention offers the advantage of versatility and cost-effectiveness through its reusable camera system.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from the Subject and the oral airway device claims from the Compared both involve medical devices used for airway management and visualization during intubation. The Subject's tracheal tube includes dual ventilation lumens with a camera for visualization, specifically designed for tracheal intubation with features like cuffs for sealing and a camera for monitoring. The Compared's oral airway device also features a visualization system, but it is designed for oral airway management and intubation, with a camera tube that can be attached externally or internally to the device's tubal body. Both devices aim to facilitate intubation under continuous visualization, but they differ in their structural design and specific applications. The Subject's device focuses on tracheal intubation with dual lumens and specific camera placement, while the Compared's device is more versatile, designed for oral airway management and can be used with various intubation methods. The methodologies involve the use of cameras for visualization, but the Subject's device uses a camera within the ventilation lumen, whereas the Compared's device uses a separate camera tube. The operational role of both devices is to aid in intubation, but the Subject's device is specifically for tracheal intubation, potentially in critical care settings, while the Compared's device is more broadly applicable to oral airway management. The underlying functions of both devices are to provide a clear pathway for intubation and continuous monitoring, but the essential components and core interactions differ due to their structural differences. The Subject's device has dual lumens and specific camera placement, while the Compared's device has a rotating central passageway and a separate camera tube. The internal dynamics of the Subject's device involve the interaction between the dual lumens and the camera, while the Compared's device involves the interaction between the rotating half-cylinders and the camera tube. The practical applications of the Subject's device are primarily in tracheal intubation, potentially in critical care or surgical settings, while the Compared's device can be used in various intubation scenarios, including emergency and routine procedures.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.1003 suggests a significant degree of overlap between the Subject and Compared claims. The overlap is primarily in the use of visualization technology for intubation, as both devices incorporate cameras to aid in the procedure. However, the structural differences between the tracheal tube and the oral airway device, such as the dual lumens in the Subject's device versus the rotating central passageway in the Compared's device, indicate that the overlap is not complete. The Subject's device is specifically designed for tracheal intubation, while the Compared's device is more versatile and can be used for various intubation methods. The methodologies, designs, and operational roles of the devices are similar in their use of visualization but differ in their specific applications and structural components. The underlying functions of providing a clear pathway for intubation and continuous monitoring are shared, but the essential components and core interactions differ due to the structural differences. The internal dynamics of the devices also differ, with the Subject's device focusing on the interaction between the dual lumens and the camera, while the Compared's device focuses on the interaction between the rotating half-cylinders and the camera tube. The practical applications of the devices are similar in their use for intubation but differ in their specific contexts and settings.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US9357905B2**Airway device, airway assist device and the method of using same  
**Inventor: MOLNAR ROBERT  
Assignee: MOLNAR ROBERT  
Priority Date: 06-01-2012  
Publication Date: 06-07-2016  
CPC: A61M16/04  
IPV™ Rating: 7.0813  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/066-627-584-355-191/frontpage?l=en](https://www.lens.org/lens/patent/066-627-584-355-191/frontpage?l=en)

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The Compared invention, described under CPC code A61M16/04, is an airway device designed for insertion into a patient's throat to facilitate breathing, ventilation, and intubation. From a mechanical engineering perspective, the primary function involves the structural design of dual tubes (ventilating and intubating) that allow for multiple modes of respiratory support. The device includes a dome at the distal ends of the tubes, which serves as a junction for air flow and a mounting point for a camera and transmission lumen, enhancing visualization and monitoring capabilities during medical procedures.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated overlap between the Subject and Compared patents due to their shared focus on airway management and the inclusion of a camera for visualization. Both devices are designed to be used in similar medical contexts, such as during surgery or in critical care settings, and both aim to improve patient outcomes by facilitating effective ventilation and intubation. The Subject's device offers a more integrated approach with the camera and opening within the second ventilation lumen, while the Compared's device provides flexibility with its removable camera and additional features like sound transmission. The potential commercial impact of both patents is significant, as they address critical needs in medical care, particularly in emergency and intensive care settings. The Subject's device may have a competitive advantage in terms of direct visualization, while the Compared's device may appeal to users seeking a more modular and versatile solution.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention revolve around the mechanical integration of compliant plastics materials forming the ventilating and intubating tubes, which are designed to flex and conform to the patient's anatomy. The underlying functions include the creation of passageways for air and the insertion of an endotracheal tube, facilitated by the dome's elliptical perimeter and the alignment of tube centerlines along the major axis. Essential components such as the camera lumen and transmission lumen are integral to the system, enabling real-time visualization and sound transmission. The core interactions involve the seamless transition of air and medical instruments through the tubes, while internal dynamics focus on maintaining structural integrity and flexibility to minimize patient trauma during insertion and use. The mechanical system's operational role is to provide a reliable pathway for respiratory support and intubation, with the camera and transmission lumen enhancing the device's utility in clinical settings.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects in its design and application, particularly in the integration of a camera apparatus within a multi-lumen tracheal tube for bronchial intubation. This differs from the Compared invention, which focuses on a more general airway device for ventilation and intubation without specific emphasis on bronchial applications. The Subject's design includes a double-lumen structure with unequal lengths, tailored for independent lung ventilation, which is not present in the Compared invention. The camera in the Subject invention is part of a unitary assembly designed for bronchial visualization, contrasting with the Compared invention's camera, which is more broadly applied for general airway visualization. The mechanical underpinnings of the Subject invention focus on precise force distribution and structural integrity to ensure effective bronchial intubation, while the Compared invention emphasizes flexibility and compliance for general airway management. The Subject's design approach involves specific fabrication techniques to accommodate the camera and ensure its functionality within the bronchial environment, distinguishing it from the Compared invention's more general approach to airway device construction. In terms of practical applications, the Subject invention targets thoracic surgery and critical care, offering advantages in precise lung isolation and visualization, whereas the Compared invention serves a broader range of respiratory support scenarios. Both inventions address real-world mechanical challenges such as durability and scalability, but the Subject invention's focus on bronchial intubation provides a competitive edge in specialized medical fields.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the airway device in the Compared claims both involve medical devices designed for airway management and ventilation, which are critical in medical contexts such as emergency care, anesthesia, and intensive care units. Both devices incorporate multiple lumens or tubes for different functions, such as ventilation and intubation, and both include a camera for visual monitoring, which is essential for guiding the placement of the device and monitoring the patient's airway. The Subject's tracheal tube features a dual-lumen design with one lumen longer than the other, specifically designed to align with the upper bronchus, and includes an opening and a camera for direct visualization. In contrast, the Compared's airway device uses a dome structure with ventilating and intubating tubes that empty into the dome, and a camera that can be inserted and removed from a camera lumen attached to the dome. Both devices aim to facilitate ventilation and intubation, but they differ in their structural design and the specific placement of the camera. The Subject's device focuses on a more integrated approach with the camera and opening within the second ventilation lumen, while the Compared's device uses a more modular approach with the camera being removable. The operational role of both devices is centered around airway management, with the Subject's device potentially offering more direct visualization due to the camera's placement, and the Compared's device providing flexibility with its removable camera and additional features like sound transmission.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the Subject and Compared claims is significant due to the shared purpose of airway management and the inclusion of a camera for visualization. Both devices are designed to be used in similar medical contexts, such as during surgery or in critical care settings, and both aim to improve patient outcomes by facilitating effective ventilation and intubation. The methodologies and designs differ, with the Subject's device using a dual-lumen approach with an integrated camera, while the Compared's device employs a dome structure with separate ventilating and intubating tubes and a removable camera. The operational role of both devices is to ensure proper airway management, with the Subject's device potentially offering more precise visualization due to the camera's placement, and the Compared's device providing additional features like sound transmission. The underlying functions of both devices are to facilitate ventilation and intubation, with essential components including the lumens or tubes, the camera, and in the case of the Compared's device, the dome and additional lumens for sound transmission. The core interactions involve the interaction between the device and the patient's airway, with the internal dynamics focusing on the flow of air and the placement of the camera. The practical applications of both devices are in medical settings where airway management is critical, such as during surgery or in intensive care units. The claim\_score of 7.0813 indicates a strong overlap between the two sets of claims, suggesting a high degree of similarity in their intended use and functionality.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US10888679B2**Endobronchial tube with integrated image sensor  
**Inventor: DAHER ELIAS  
Assignee: AMBU AS  
Priority Date: 07-11-2011  
Publication Date: 01-12-2021  
CPC: A61B1/07  
IPV™ Rating: 7.0765  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/173-899-006-428-756/frontpage?l=en](https://www.lens.org/lens/patent/173-899-006-428-756/frontpage?l=en)

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The primary function of the Compared invention (A61B1/07) is to provide an endobronchial tube that facilitates continuous monitoring and verification of its placement relative to the Tracheal Carina. This is achieved through an integrated image sensor and light source, allowing for real-time visualization and ensuring correct positioning within the trachea and bronchi for effective one-lung ventilation.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated high overlap between the Subject and Compared patents, primarily due to their shared focus on providing ventilation and imaging within the respiratory system. Both systems are designed to interact with different parts of the respiratory tract, with the Subject's tracheal tube aligning with an upper bronchus and the Compared's endobronchial tube extending past the Tracheal Carina. The imaging capabilities in both systems are intended to provide visual feedback for medical professionals, indicating a strong overlap in their operational roles. The potential commercial impact of both patents could be significant in the medical field, particularly in intensive care and surgical settings where precise ventilation and visualization are crucial. The Subject's tracheal tube might find applications in routine ventilation and monitoring, while the Compared's endobronchial tube could be more specialized for surgical or emergency use, potentially affecting their market positioning and commercial viability.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of continuous monitoring through an integrated image sensor, such as a CCD or CMOS camera, and a corresponding light source, typically an LED. The underlying functions include visualizing the Tracheal Carina to confirm correct tube placement, which is crucial for ensuring proper ventilation during procedures. Essential components include the dual lumens of different lengths, the first lumen terminating proximally to the Carina within the trachea, and the second lumen extending past the Carina into either the left or right bronchial branch. Core interactions involve the image sensor capturing images through a dedicated lumen, while the light source illuminates the area of interest. Internal dynamics focus on maintaining airway patency and optimizing lumen patency for adequate airflow, with the system designed to detect and react to potential issues like cuff dislodgement or secretion accumulation.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its multi-lumen tracheal tube design with an integrated camera apparatus, which differs from the Compared invention's focus on continuous monitoring via an image sensor. The Subject's camera is positioned to facilitate left or right bronchial intubation, and its design includes a unitary assembly with electronic components, which is not explicitly detailed in the Compared invention. The Subject's approach to visualization involves a camera on the wall of the second ventilation lumen, contrasting with the Compared's dedicated image sensor lumen. Overlapping aspects include the use of visualization technology for correct tube placement, but the Subject's design emphasizes a more integrated approach with the camera apparatus as part of the tube's structure. From a mechanical engineering perspective, the Subject's design may offer advantages in terms of force distribution and structural integrity due to its unitary assembly, while the Compared invention focuses on optimizing lumen patency for airflow. Both inventions address the challenge of ensuring correct tube placement, but the Subject's approach may provide enhanced control and visualization capabilities. The practical applications of the Subject invention are primarily in surgical and critical care settings for one-lung ventilation, while the Compared invention aims at continuous monitoring during procedures, potentially impacting patient safety and procedural efficiency in similar settings. Both technologies could influence industry practices by improving the accuracy and safety of respiratory tube placement, with the Subject offering potential advantages in terms of integration and ease of use.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the endobronchial tube in the Compared claims share several similarities in their design and functionality, particularly in the context of medical ventilation and imaging. Both systems incorporate multiple lumens for ventilation, with the Subject's first and second ventilation lumens and the Compared's first and second lumens designed to interact with different parts of the respiratory system. The Subject's second ventilation lumen aligns with an upper bronchus, while the Compared's second lumen extends past the Tracheal Carina into a bronchial branch, indicating a focus on targeted ventilation.  
  
Both systems include imaging capabilities, with the Subject featuring a camera attached to the second ventilation lumen and the Compared having a dedicated image sensor lumen. The camera in the Subject is positioned to view through an opening in the second ventilation lumen, while the Compared's image sensor is designed to provide images of the Tracheal bifurcation and bronchial branches. This indicates a shared purpose of visualizing the respiratory tract for medical procedures.  
  
The operational role of both systems involves facilitating ventilation and providing visual feedback for medical professionals. The Subject's tracheal tube is designed for coupling with ventilators and other respiratory equipment, while the Compared's endobronchial tube is adapted for various insertion methods, suggesting a broader application in clinical settings. The essential components include multiple lumens, imaging devices, and in the case of the Compared, cleaning mechanisms to maintain the functionality of the image sensor.  
  
The underlying functions of both systems are to support respiratory care by providing controlled ventilation and real-time imaging. The core interactions involve the lumens interfacing with the patient's respiratory system, and the imaging components interacting with the medical environment to provide visual data. The internal dynamics of both systems involve the flow of air through the lumens and the operation of imaging and, in the Compared, cleaning systems.  
  
In terms of practical applications, the Subject's tracheal tube could be used in intensive care settings for patients requiring mechanical ventilation and monitoring, while the Compared's endobronchial tube might be used in surgical or emergency situations where precise placement and visualization of the respiratory tract are critical.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.0765 indicates a significant degree of overlap between the Subject and Compared claims. The Subject's tracheal tube and the Compared's endobronchial tube both feature multiple lumens for ventilation, with specific designs to interact with different parts of the respiratory system. The imaging capabilities in both systems, with the Subject's camera and the Compared's dedicated image sensor lumen, suggest a strong overlap in the purpose of providing visual feedback during medical procedures. The operational roles of both systems in facilitating ventilation and providing imaging are closely aligned, indicating a significant overlap in their intended use within medical contexts. The essential components, underlying functions, core interactions, and internal dynamics of both systems show a notable degree of similarity, further supporting the assessment of strong overlap.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US9415179B2**Medical device, and the methods of using same  
**Inventor: MOLNAR ROBERT  
Assignee: WM & DG INC  
Priority Date: 06-01-2012  
Publication Date: 08-16-2016  
CPC: A61B1/04  
IPV™ Rating: 7.0527  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/188-080-921-428-089/frontpage?l=en](https://www.lens.org/lens/patent/188-080-921-428-089/frontpage?l=en)

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The Compared invention (A61B1/04) primarily functions as a laryngeal mask airway designed to facilitate ventilation and the administration of anesthesia during surgical procedures. It is positioned in the throat of the patient, proximal to the vocal folds, and allows for both spontaneous and assisted breathing through a connected ventilator. The device includes a tube that can flex to assume a curved shape and may have an inflatable cuff to ensure proper sealing within the patient's pharynx.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated overlap between the Subject and Compared patents, primarily due to their shared focus on intubation, ventilation, and visualization within the respiratory system. The Subject's tracheal tube with dual ventilation lumens and integrated camera system, and the Compared's medical device assembly with a slidable camera lumen, both aim to enhance patient care during intubation procedures. The potential commercial impact of the Subject patent could be significant in settings requiring dual ventilation capabilities, such as in critical care units, while the Compared patent might appeal to markets valuing flexibility in camera positioning for optimal visualization. Both patents could influence the market for advanced intubation and ventilation devices, with the Subject potentially offering a more comprehensive solution for complex respiratory management and the Compared providing a more adaptable visualization tool.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the Compared invention involves the use of a laryngeal mask airway to provide an alternative to endotracheal intubation. The underlying function is to create a sealed airway passage that allows for the delivery of oxygen and anesthetic gases. Essential components include the tube, which can be straight or curved, and an optional inflatable cuff that seals the airway by seating against the epiglottis and esophagus. The functional process involves inserting the device into the patient's mouth, where it slides against the palate and into the pharynx. The internal dynamics include the flexibility of the tube to conform to the patient's anatomy and the inflation of the cuff to create an airtight seal. The operational role is to facilitate ventilation and anesthesia delivery, with the challenge of ensuring proper placement without visual guidance.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus within a multi-lumen tracheal tube, specifically designed for bronchial intubation. This allows for direct visualization during the placement of the tube, which is a significant advancement over traditional methods that rely on bronchoscopes or other external visualization devices. The Compared invention, a laryngeal mask airway, does not include such a feature and is designed for a different purpose, focusing on ventilation and anesthesia delivery without the need for intubation through the vocal folds. The Subject's design and methodology, including the use of a camera for precise placement, differ markedly from the Compared invention's approach, which involves blind insertion and relies on the flexibility of the tube and the sealing capability of the cuff. The Subject's focus on bronchial intubation and independent lung ventilation sets it apart from the Compared invention's broader application in general ventilation and anesthesia. The practical applications of the Subject invention are primarily in thoracic surgery and critical care settings where precise lung isolation is necessary, whereas the Compared invention is used more broadly in surgical settings requiring airway management. The potential impact of the Subject invention includes improved patient outcomes through reduced intubation-related complications and enhanced procedural efficiency, while the Compared invention offers ease of use and reduced trauma during airway management.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the medical device assembly in the Compared claims share several similarities in their design and operational roles. Both involve a medical device for insertion into a patient's cavity, specifically designed for intubation and ventilation. The Subject's tracheal tube includes two ventilation lumens, one of which is longer and aligns with the upper bronchus, featuring an opening and a camera for visualization. Similarly, the Compared's assembly includes a medical device with a camera lumen and a separate camera for continuous visualization, which can be slidably adjusted for optimal viewing. Both devices incorporate an inflatable cuff, with the Subject's having multiple cuffs and the Compared's having one. The Subject's camera is integrated into the second ventilation lumen, while the Compared's camera is removable and housed in a separate lumen. Both devices aim to provide visualization within the patient's respiratory system, with the Subject focusing on dual ventilation and the Compared on adjustable visualization. The operational role of both devices is centered around intubation, ventilation, and visualization, with the Subject's design potentially offering more complex ventilation options due to its dual lumen structure, while the Compared's design emphasizes flexibility in camera positioning.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.0527 indicates a significant degree of overlap between the Subject and Compared claims. The Subject's tracheal tube and the Compared's medical device assembly both focus on intubation and ventilation, with integrated camera systems for visualization. The Subject's dual ventilation lumens and the Compared's slidable camera lumen represent different approaches to achieving similar goals of visualization and ventilation within the respiratory system. The presence of inflatable cuffs in both designs further underscores their shared purpose in sealing the airway during intubation. However, the Subject's more complex ventilation system and the Compared's emphasis on camera adjustability suggest distinct design philosophies, yet the core functionalities of intubation, ventilation, and visualization are strongly aligned.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US10786640B2**Reversible airway device and related method for ventilating a subject  
**Inventor: AVITSIAN RAFI  
Assignee: CLEVELAND CLINIC FOUND  
Priority Date: 05-15-2015  
Publication Date: 09-29-2020  
CPC: A61M16/04  
IPV™ Rating: 6.9804  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/083-287-580-270-703/frontpage?l=en](https://www.lens.org/lens/patent/083-287-580-270-703/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to provide a reversible airway device that facilitates ventilation in patients, particularly through the use of an endotracheal tube that can be inserted into a multi-lumen tubular guide within a supra-glottic airway support. This device is designed to be used in conjunction with a ventilator to deliver respiratory assistance and, if necessary, anesthesia to the patient. The system includes a sealing mechanism, such as an inflatable cuff, to ensure an effective seal within the trachea, preventing leakage and aspiration.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated high overlap between the Subject and Compared patents due to their shared focus on multi-lumen devices for airway management in medical applications. Both patents address the operational role of managing airflow and supporting respiratory functions, with the Subject's device additionally providing visualization capabilities. The purpose within their applied context is to facilitate respiratory support in critical care settings, with the Subject's device used for intubation and monitoring, and the Compared's device for both intubation and extubation processes. The potential commercial impact of the Subject's patent could be significant in critical care and surgical settings due to its integrated visualization feature, while the Compared's patent may have a broader impact in emergency and surgical applications due to its reversible airway management capabilities.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the Compared invention involves the integration of a multi-lumen tubular guide within a supra-glottic airway support, which allows for the insertion and positioning of an endotracheal tube. The underlying function is to provide a pathway for gas exchange, with the essential components being the multi-lumen guide, the endotracheal tube, and the sealing member (cuff). The core interactions occur between the endotracheal tube and the tracheal wall, where the cuff seals against the trachea to prevent leakage. The internal dynamics involve the flow of gases through the lumens, facilitated by the design of the tubular guide and the positioning of the endotracheal tube. The system's operational role is to enable effective ventilation and anesthesia delivery, with the cuff's sealing capacity being crucial for maintaining positive pressure within the lungs.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus within a multi-lumen tracheal tube specifically designed for pediatric patients. This feature allows for enhanced visualization and precise placement during bronchial intubation, which is not present in the Compared invention. The Subject's use of a double-lumen endobronchial tube for independent lung ventilation further distinguishes it from the Compared invention, which focuses on a reversible airway device with a single endotracheal tube. The mechanical underpinnings of the Subject include the design of the camera system to optimize force distribution and energy efficiency during intubation, while the Compared invention relies on traditional sealing mechanisms. The Subject's design approach involves specialized fabrication techniques to accommodate the camera and ensure structural integrity, whereas the Compared invention uses standard endotracheal tube designs. The Subject and Compared inventions serve different purposes within the medical field, with the Subject aimed at pediatric respiratory care and the Compared invention targeting broader ventilation needs. The Subject's potential impact includes improved accuracy and safety in pediatric intubation procedures, while the Compared invention offers versatility in airway management across various patient demographics.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the reversible airway device in the Compared claims both involve multi-lumen structures designed for airway management, which indicates a similarity in their fundamental design and purpose within medical applications. The Subject's tracheal tube includes a first and second ventilation lumen, with specific configurations for ventilation and camera placement for visualization, which aligns with the Compared's multi-lumen tubular guide that facilitates gas flow and includes a sealing mechanism for controlling airflow. Both devices are intended for use in respiratory support, with the Subject focusing on tracheal intubation and visualization, while the Compared emphasizes reversible airway management and staged extubation processes. The operational role of both devices involves managing airflow and supporting respiratory functions, with the Subject's device also incorporating visual monitoring capabilities. The underlying functions of both devices include gas delivery and airway maintenance, with essential components such as lumens and seals. Core interactions in both involve the manipulation of gas flow, and internal dynamics include the control of ventilation and, in the Subject's case, camera operation. The practical applications of the Subject's device are primarily in critical care settings for intubation and monitoring, whereas the Compared's device is used for both intubation and extubation, potentially in surgical or emergency medical scenarios.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.9804 suggests a high degree of similarity between the Subject and Compared claims. The overlap is significant, as both patents deal with multi-lumen devices for airway management, with the Subject focusing on tracheal intubation with visualization capabilities and the Compared on reversible airway management with a sealing mechanism. The methodologies and designs of both devices share the common goal of managing respiratory functions, though they differ in specific features like the camera in the Subject's device and the sealing mechanism in the Compared's device. The operational roles of both devices involve energy conversion in the form of gas flow management, and their purpose within the applied context of medical care is to support respiratory functions. The overlap in essential components, core interactions, and internal dynamics is evident, as both devices manipulate airflow and support ventilation, albeit with different mechanisms for control and monitoring.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US9314580B2**Single lung/lobe ventilation endotracheal tube  
**Inventor: HAMMER GREGORY BENSON  
Assignee: HAMMER GREGORY BENSON  
Priority Date: 01-21-2012  
Publication Date: 04-19-2016  
CPC: A61M16/04  
IPV™ Rating: 6.9638  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/001-156-355-171-050/frontpage?l=en](https://www.lens.org/lens/patent/001-156-355-171-050/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate single lung ventilation through an advanced endotracheal tube system. This system includes a hollow main tube with a moveable sleeve that can block or unblock a ventilating orifice, allowing for selective ventilation of one lung. From a mechanical engineering perspective, this involves precise control over the movement of the sleeve within the main tube, ensuring that the ventilating orifice can be effectively sealed or opened as needed. The system's design must account for the mechanical forces involved in moving the sleeve, the sealing integrity of the sleeve against the orifice, and the overall structural integrity of the tube to withstand the pressures of ventilation.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated overlap between the Subject and Compared patents, primarily due to their shared focus on respiratory support and ventilation. Both systems are designed to manage airflow and ensure effective ventilation, which is crucial in medical settings. The Subject's tracheal tube with dual lumens and a camera for visual monitoring and the Compared's apparatus for single lung ventilation with a movable sleeve represent different approaches to achieving similar goals. The potential commercial impact of the Subject's patent could be significant in medical procedures requiring dual-lumen ventilation and visual monitoring, while the Compared's patent could have a specialized impact in thoracic surgeries or other procedures requiring isolated lung ventilation. Given the high degree of overlap in their operational roles and underlying functions, there is a high possibility of overlap between these patents.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention revolve around the mechanical system's ability to selectively ventilate one lung. The underlying functions include the movement of the sleeve within the main tube, which is facilitated by an external structure connected to the sleeve via a connecting element. This mechanism allows for the sleeve to be positioned in two distinct states: one where the ventilating orifice is open, and another where it is blocked. Essential components include the hollow main tube, the moveable sleeve, the ventilating orifice, and the external structure with the connecting element. The core interactions involve the mechanical linkage between the external structure and the sleeve, ensuring precise control over the sleeve's position. Internally, the dynamics of the system focus on the smooth movement of the sleeve and the sealing mechanism at the ventilating orifice, which must be robust enough to withstand the pressures of ventilation while maintaining the structural integrity of the tube.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus within a multi-lumen tracheal tube, specifically designed for bronchial intubation. This feature allows for real-time visualization, which is not present in the Compared invention. The Subject's design also includes a double-lumen configuration with unequal lengths, enabling independent ventilation of the lungs, which differs from the single-lumen approach of the Compared invention. From a mechanical engineering perspective, the Subject's design must address the challenges of integrating electronic components like the camera into the tube while maintaining the structural integrity and ensuring the camera's field of view is not obstructed. The Compared invention focuses on mechanical control over a sleeve to block or unblock a ventilating orifice, which is a different approach to achieving selective ventilation. The Subject's use of a camera and multi-lumen design represents a significant advancement in visualization and control over ventilation, distinguishing it from the Compared invention's mechanical sleeve mechanism. The practical applications of the Subject invention are primarily in surgical and critical care settings where precise visualization and independent lung ventilation are crucial, whereas the Compared invention is aimed at single lung ventilation scenarios. Both inventions address real-world challenges in ventilation, but the Subject's integration of visualization technology offers potential advantages in improving intubation accuracy and patient outcomes.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the apparatus for single lung ventilation in the Compared claims share similarities in their operational roles within the context of respiratory support and ventilation. Both systems are designed for use in medical settings, specifically for managing patient ventilation, which is crucial in surgical or critical care scenarios. The Subject's tracheal tube includes dual ventilation lumens, one of which is longer and aligns with the upper bronchus, featuring an opening and a camera for visual monitoring. This design facilitates targeted ventilation and visual inspection of the respiratory tract. In contrast, the Compared's apparatus focuses on single lung ventilation with a movable sleeve inside a main tube that can selectively block a ventilating orifice to control airflow to different lung lobes. Both systems incorporate mechanisms for controlling airflow and ensuring effective ventilation, albeit through different methodologies. The Subject's system uses dual lumens and a camera for precision and monitoring, while the Compared's system uses a movable sleeve for selective ventilation control. The underlying function of both is to manage respiratory support, with essential components like lumens, cuffs, and control mechanisms. The core interactions involve the manipulation of airflow and, in the Subject's case, visual feedback. Internally, both systems must manage pressure and flow dynamics to ensure patient safety and effective ventilation. The practical applications of the Subject's tracheal tube could extend to various medical procedures requiring dual-lumen ventilation and visual monitoring, whereas the Compared's apparatus is specifically tailored for single lung ventilation, potentially used in thoracic surgeries or other procedures requiring isolated lung ventilation.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.9638 indicates a high degree of similarity between the Subject and Compared claims. The overlap is significant, as both systems are designed for respiratory support and ventilation, albeit with different approaches. The Subject's tracheal tube with dual lumens and a camera for visual monitoring shares a conceptual similarity with the Compared's apparatus, which uses a movable sleeve for selective ventilation control. Both systems aim to manage airflow and ensure effective ventilation, which suggests a strong overlap in their intended operational roles and underlying functions. However, the methodologies and specific designs differ, with the Subject focusing on dual-lumen ventilation and visual feedback, while the Compared focuses on single lung ventilation with a movable sleeve. This indicates a strong overlap in the broader context of respiratory support but with distinct differences in their specific implementations.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US11123509B2**Respiratory treatment apparatus  
**Inventor: PURDY F ROBERT  
Assignee: PROVINCIAL HEALTH SERVICES AUTHORITY  
Priority Date: 05-12-2017  
Publication Date: 09-21-2021  
CPC: A61M16/04  
IPV™ Rating: 6.953  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/187-933-321-080-66X/frontpage?l=en](https://www.lens.org/lens/patent/187-933-321-080-66X/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate lung isolation and one-lung ventilation by using an endotracheal tube coupled with a bronchial blocker. This system allows for the occlusion of a portion of the respiratory system to prevent fluid flow between lungs, which is crucial for surgical procedures requiring access to one lung. The mechanical engineering perspective focuses on the design and integration of the endotracheal tube and bronchial blocker to ensure effective sealing and positioning within the respiratory tract.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated overlap between the Subject and Compared patents, primarily due to their shared focus on medical airway management and ventilation. The Subject's tracheal tube with its integrated camera system and the Compared's modular endotracheal tube and bronchial blocker system both aim to enhance patient care in respiratory procedures. However, the Subject's system is more specialized for visual monitoring, while the Compared's system offers greater flexibility and customization. The potential commercial impact of the Subject patent could be significant in settings requiring precise visual monitoring during intubation, whereas the Compared patent's modularity could appeal to a broader range of medical applications, potentially impacting a wider market. Overall, there is a high possibility of overlap, but the distinct features of each system suggest they could coexist in the market with different applications.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of an endotracheal tube as a primary conduit for ventilation, with a bronchial blocker attached to selectively occlude a bronchus. The underlying functions include the ability to inflate the bronchial blocker to create a seal, which is facilitated by an inflation tube. Essential components include the endotracheal tube, the bronchial blocker, and the attachment structures that allow for non-concentric coupling. The core interactions involve the inflation mechanism of the blocker and its positioning relative to the endotracheal tube, which is critical for achieving the desired isolation. Internally, the dynamics involve the pressure management within the respiratory system to maintain the seal and ensure proper ventilation. The system's operational role is to manage airflow and pressure distribution to support surgical procedures, focusing on energy conversion from the ventilator to the patient's lungs and motion transfer for the inflation and positioning of the blocker.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces significant novelty through the integration of a camera apparatus within the tracheal tube, which is not present in the Compared invention. This feature allows for real-time visualization during intubation, enhancing the precision and safety of the procedure. The multi-lumen design with unequal lengths and the ability to independently ventilate each lung further distinguish the Subject from the Compared invention, which focuses on lung isolation using a bronchial blocker. From a mechanical engineering perspective, the Subject's design involves complex force distribution and energy efficiency considerations due to the integration of electronic components and the need for a compact, yet functional, assembly. The Compared invention, while mechanically simpler, focuses on the mechanical control systems for inflation and positioning of the bronchial blocker. The Subject's design approaches and protocols, such as the integration of the camera and the management of electronic components, set it apart in terms of structural integrity and operational complexity. The practical applications of the Subject invention are primarily in surgical settings where precise intubation is critical, potentially impacting the field of thoracic surgery by improving procedural outcomes. In contrast, the Compared invention is aimed at general respiratory therapy, particularly in scenarios requiring lung isolation, with potential impacts on surgical efficiency and patient safety. Both inventions address different mechanical challenges, with the Subject focusing on visualization and precision, and the Compared invention on effective sealing and isolation.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims features a dual-lumen design with a camera and an opening in the second ventilation lumen, aimed at providing visual access to the bronchial region. This design is intended for use in medical settings, specifically for intubation and ventilation, with the camera enhancing the ability to monitor and navigate within the patient's airways. The camera's placement and the inclusion of additional features like cuffs, light emitting diodes, and fluid delivery systems suggest a focus on improving visibility and functionality during medical procedures. The tracheal tube's configuration allows for energy conversion in the form of air flow management and motion transfer through the movement of air and fluids within the system, serving a critical operational role in patient care.  
  
In contrast, the Compared claims describe an apparatus involving an endotracheal tube and a bronchial blocker, designed to manage airflow and isolate lung segments. The system includes detachable components and various attachment structures, focusing on flexibility and adaptability in medical applications. The operational role here involves motion transfer through the movement of the bronchial blocker and energy conversion via the inflation and deflation of cuffs to control airflow. The design emphasizes modularity and the ability to customize the apparatus for different patient needs, which is evident in the kit configuration that allows for various sizes and attachments.  
  
The similarities between the Subject and Compared claims lie in their medical application for airway management and ventilation. Both systems involve the use of lumens and cuffs, though the Subject focuses on a dual-lumen tracheal tube with integrated camera technology, while the Compared emphasizes a modular system with detachable bronchial blockers. The underlying functions of both systems include managing airflow and providing access to the respiratory system, but the Subject's system is more integrated with visual monitoring capabilities, whereas the Compared's system prioritizes flexibility and customization.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.953 suggests a significant degree of overlap between the Subject and Compared claims. The Subject's tracheal tube with its dual-lumen design and camera system shares a conceptual similarity with the Compared's endotracheal tube and bronchial blocker system, both aimed at managing and monitoring respiratory functions. However, the Subject's focus on an integrated camera system for visual monitoring and the Compared's emphasis on modularity and detachable components indicate distinct approaches to achieving similar end goals. The overlap is primarily in the context of medical airway management and ventilation, but the specific methodologies and designs differ significantly, with the Subject's system being more specialized for visual access and the Compared's system offering greater adaptability.

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**Inventor: DAHER ELIAS  
Assignee: ETVIEW LTD  
Priority Date: 07-11-2011  
Publication Date: 12-24-2014  
CPC: A61B1/00  
IPV™ Rating: 6.9384  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/154-712-762-167-844/frontpage?l=en](https://www.lens.org/lens/patent/154-712-762-167-844/frontpage?l=en)

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The primary function of the Compared invention (A61B1/00) is to facilitate the visualization and monitoring of the respiratory system during medical procedures, particularly for confirming the correct placement of endobronchial tubes within the trachea and bronchi. This is achieved through the use of an integrated camera apparatus within a multi-lumen tracheal tube system, designed to provide continuous monitoring and facilitate left or right bronchial intubation. The system aims to enhance the safety and efficacy of one-lung ventilation procedures by allowing real-time visualization and adjustment of the tube's position.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated high overlap between the Subject and Compared patents, given the significant similarities in their design, operational roles, and intended applications within the medical field, specifically in respiratory care. Both patents focus on the mechanical system's role in energy conversion through ventilation, motion transfer via airflow, and enhancing load-bearing capacity through imaging for correct placement and operation. The Subject's tracheal tube and the Compared's endobronchial tube share a common purpose in providing ventilation and visual feedback, with similar design elements such as the use of cuffs for sealing and positioning. The potential commercial impact of both patents could be significant, as they address critical needs in medical procedures, potentially improving patient outcomes and operational efficiency in respiratory care settings.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the Compared invention involves the integration of a visualization device, such as a camera, into a multi-lumen tracheal tube. The underlying function is to provide continuous visual feedback of the tracheal bifurcation and bronchial branches, which is crucial for accurate tube placement. Essential components include the camera apparatus, which may be a unitary assembly with integral light sources and cleaning mechanisms to maintain clear imaging. The functional processes involve the transmission of visual data from the camera to external monitoring systems, allowing physicians to adjust the tube's position in real-time. The internal dynamics of the system focus on maintaining the camera's field of view and ensuring the integrity of the imaging system during the procedure. The mechanical system's operational role is to facilitate the transfer of visual information, aiding in the precise positioning of the tube for effective ventilation.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention demonstrates novelty through its dedicated image sensor lumen, which is specifically designed to provide continuous and seamless monitoring of the tube's position relative to the Tracheal Carina. This differs from the Compared invention, which integrates a camera apparatus within a multi-lumen tracheal tube but does not specify a dedicated lumen for the imaging system. The Subject's design approach focuses on enhancing the structural integrity and functionality of the tube by embedding the imaging system within the tube's wall, potentially improving the reliability and accuracy of the monitoring process. Both inventions aim to address the challenge of tube displacement during procedures, but the Subject's approach offers a more integrated and potentially more efficient solution. The practical applications of the Subject invention are primarily in surgical and critical care settings, where precise and continuous monitoring of endobronchial tube placement is crucial. The Compared invention also targets similar applications but may have broader use in various endoscopic procedures. Both technologies aim to improve patient safety and procedural efficiency in respiratory care, with the Subject offering a more specialized solution for selective lung ventilation.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from the Subject and the endobronchial tube claims from the Compared exhibit similarities in their design and operational roles, particularly in the context of medical ventilation and imaging within the respiratory system. Both sets of claims describe tubes with multiple lumens, where one lumen is longer than the other, and both are configured to be coupled to a ventilator. The Subject's claims focus on a tracheal tube with a first and second ventilation lumen, where the second lumen is longer and has an opening and a camera for visualization, which aligns with the Compared's claims of an endobronchial tube with a first and second lumen, the second extending past the Carina, and an image sensor for visualization. The Subject's camera placement and the Compared's image sensor both aim to provide visual feedback of the respiratory tract, specifically around the bronchial branches. The Subject's claims also mention cuffs, which are similar to the inflatable cuffs described in the Compared's claims, used for sealing and positioning within the respiratory tract. The methodologies and designs in both sets of claims are geared towards improving ventilation and monitoring within the respiratory system, with specific attention to the placement of imaging devices for enhanced medical procedures. The operational role of both devices is centered around energy conversion (ventilation) and motion transfer (airflow), with the imaging components serving to enhance the load-bearing capacity of the system by providing visual guidance for correct placement and operation. The underlying functions involve delivering air to the lungs and monitoring the respiratory tract, with essential components including the lumens, cuffs, and imaging devices. Core interactions include the interaction between the lumens and the respiratory system, as well as the interaction between the imaging devices and the medical personnel using them. The internal dynamics involve the flow of air through the lumens and the transmission of visual data from the imaging devices. Both sets of claims are applied within the context of medical procedures, specifically in respiratory care, with practical applications in intubation and ventilation support during surgeries or critical care scenarios.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.9384 indicates a high degree of similarity between the Subject and Compared claims. The overlap is significant, as both sets of claims describe medical tubes with multiple lumens for ventilation, imaging capabilities for monitoring the respiratory tract, and specific positioning relative to the Tracheal Carina and bronchial branches. The Subject's tracheal tube and the Compared's endobronchial tube share a common purpose in providing ventilation and visual feedback, with similar design elements such as the use of cuffs for sealing and positioning. The overlap is described as strong due to the shared focus on the operational role of energy conversion through ventilation, motion transfer via airflow, and the load-bearing capacity enhanced by imaging for correct placement and operation. The underlying functions, essential components, core interactions, and internal dynamics are closely aligned, indicating a notable degree of overlap in their intended use within medical procedures for respiratory care.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US7052456B2**Airway products having LEDs  
**Inventor: SIMON JAMES S  
Assignee: SIMON JAMES S  
Priority Date: 04-16-2003  
Publication Date: 05-30-2006  
CPC: A61B1/00  
IPV™ Rating: 6.9023  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/122-314-507-071-402/frontpage?l=en](https://www.lens.org/lens/patent/122-314-507-071-402/frontpage?l=en)

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The primary function of the Compared invention (A61B1/00) is to facilitate the visualization and examination of internal body cavities, specifically the airway, during medical procedures such as intubation. From a mechanical engineering perspective, this involves the design and integration of optical systems, light sources, and possibly suction mechanisms within a compact, maneuverable device that can be inserted into the trachea. The device must be capable of transmitting clear images to the operator, often through a fiber-optic or digital camera system, to aid in the precise placement of an endotracheal tube.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated overlap between the Subject and Compared patents, primarily due to their shared use of multiple lumens and visualization aids in airway management devices. The Subject's tracheal tube, with its camera system and specific positioning for bronchial visualization, and the Compared's endotracheal tube, with its focus on general illumination and additional functionalities, both aim to enhance medical procedures related to respiratory care. The potential commercial impact of the Subject patent may be significant in specialized medical fields requiring precise bronchial visualization, while the Compared patent could have a broader impact in general airway management and patient care due to its versatile design features. Given the significant overlap in core functionalities, there is a high possibility of overlap between these patents.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention revolve around the systemic principles of optical imaging and illumination within a medical device. The underlying functions include light transmission through fiber optics or LEDs to illuminate the airway, image capture via a camera or optical system to provide real-time visualization, and possibly suction to clear the field of view. Essential components include the light source, camera, and possibly a suction lumen, which interact to enable clear visualization. The internal dynamics involve the transmission of light and images through the device, ensuring that the operator can see the vocal cords and trachea clearly for accurate tube placement. The mechanical system's role is to facilitate the energy conversion from electrical to optical energy for illumination and to transfer motion or force for suction, all within the context of airway management during intubation.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus within a multi-lumen endobronchial tube, specifically designed for bronchial intubation. This differs from the Compared invention, which focuses on general airway visualization during intubation. The Subject's design allows for independent ventilation of each lung, a feature not present in the Compared invention, which primarily aids in the placement of a single-lumen endotracheal tube. The mechanical underpinnings of the Subject include the design of the double-lumen structure for force distribution and energy efficiency in gas delivery, as well as the integration of electronic components for camera operation, which enhances structural integrity and operational precision. The Subject's approach to bronchial intubation and lung isolation sets it apart, offering a more specialized solution for specific medical procedures compared to the general-purpose visualization provided by the Compared invention. The practical applications of the Subject are primarily in thoracic surgery and critical care, where independent lung ventilation is crucial, while the Compared invention is more broadly applicable in various intubation scenarios. Both inventions address real-world challenges in airway management, but the Subject's innovation lies in its ability to provide targeted visualization and ventilation control, potentially influencing practices in thoracic surgery and improving patient outcomes in critical care settings.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims features a dual-lumen design with a camera and an opening in the second lumen, aimed at providing visual access to the upper bronchus. The camera's placement and the inclusion of light sources (LEDs) are designed to enhance visualization within the respiratory system, which aligns with the operational role of aiding in medical procedures such as intubation or bronchoscopy. The tracheal tube's design also includes cuffs for sealing and maintaining airway pressure, and additional lumens for suction and fluid delivery, indicating a focus on comprehensive respiratory management and patient care.  
  
In contrast, the Compared claims describe an illuminated airway product, specifically an endotracheal tube, which also incorporates multiple lumens but focuses on illumination through LEDs powered by a voltage source. The design includes features like an inflatable cuff, a suction lumen, and a medicinal supply lumen, suggesting a broader application in airway management and patient treatment. The presence of a malleable stylet and a radio-opaque material further indicates a design intended for ease of insertion and visibility during medical procedures.  
  
Both sets of claims share similarities in their use of multiple lumens and the inclusion of LEDs for visualization, which are critical for their operational roles in respiratory and airway management. However, the Subject's focus on a camera system and specific positioning for bronchial visualization differs from the Compared's emphasis on general illumination and additional functionalities like suction and medicinal delivery.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.9023 indicates a significant degree of overlap between the Subject and Compared claims. Both patents involve the use of multiple lumens in airway management devices, with a focus on enhancing visualization through the use of LEDs. The Subject's tracheal tube with a camera and specific lumen configurations for bronchial access shares a conceptual similarity with the Compared's endotracheal tube, which uses LEDs for illumination during insertion and general airway management. However, the Subject's detailed camera system and specific positioning for bronchial visualization suggest a more specialized application compared to the broader illumination and additional functionalities of the Compared's design. This overlap is described as significant due to the shared focus on lumens and visualization aids, yet the differences in specific applications and additional features indicate a nuanced distinction between the two.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: EP2968819B1**DUAL LUMEN ENDOBRONCHIAL TUBE DEVICE  
**Inventor: MAHAJAN AMAN  
Assignee: HYTEK MEDICAL INC  
Priority Date: 03-14-2013  
Publication Date: 09-09-2020  
CPC: A61M16/04  
IPV™ Rating: 6.9021  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/131-513-438-636-227/frontpage?l=en](https://www.lens.org/lens/patent/131-513-438-636-227/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to provide a dual lumen endotracheal tube that facilitates independent ventilation of the lungs during thoracic surgery or other medical procedures requiring single lung ventilation. This is achieved through a main tracheal tube and a bronchial tube, each with its own lumen, allowing for selective ventilation of the left or right lung. The design includes inflatable cuffs for sealing within the trachea and bronchus, ensuring an airtight seal to prevent leakage and maintain effective ventilation.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated high overlap between the Subject and Compared patents, primarily due to their shared focus on dual lumen systems for ventilation in medical contexts. Both patents address the operational role of energy conversion for ventilatory support, with the Subject's system additionally incorporating visualization capabilities. The purpose within their applied context is to enhance patient care in clinical settings, with potential commercial impact in the medical device market, particularly in respiratory care. The Subject's inclusion of a camera could offer a competitive edge in terms of monitoring and diagnostics, while the Compared's emphasis on structural integrity and sealing efficiency could appeal to markets focused on reliability and safety in ventilation systems. Overall, there is a high possibility of overlap, with both patents potentially impacting the market for advanced respiratory support devices.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of a flexible dividing wall within the main tracheal tube to separate the tracheal and bronchial lumens. This wall maintains a neutral position during both one-lung and two-lung ventilation, ensuring equal cross-sectional areas for both lumens. The invention also employs inflatable cuffs for sealing, with one cuff positioned on the main tracheal tube for tracheal sealing and another on the bronchial tube for bronchial sealing. The design aims to minimize damage to the bronchus and vocal cords by using a smaller diameter tube, reinforced walls, and a semi-lunar cross-section of the dividing wall to optimize the distribution of forces and enhance the tube's stability within the respiratory tract. The underlying functions include the facilitation of selective ventilation, the prevention of bronchial damage, and the maintenance of an effective seal within the respiratory system.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces a novel approach by integrating a camera directly into the tracheal tube, which significantly enhances the precision and safety of bronchial intubation. This feature is not present in the Compared invention, which focuses on the structural design of the dual lumen tube to facilitate ventilation. The Subject's camera apparatus allows for real-time visualization, reducing the risk of misplacement and improving the physician's ability to navigate the respiratory system. While both inventions aim to improve the effectiveness of ventilation during medical procedures, the Subject's inclusion of electronic components and visualization technology represents a significant advancement in the field of respiratory therapy. The Compared invention's focus on minimizing damage through structural design and smaller diameter tubes complements the Subject's approach but does not overlap in terms of the integrated visualization technology. Both inventions address different aspects of the same mechanical engineering challenge, with the Subject offering a more advanced solution for precise placement and the Compared providing a structurally optimized design for ventilation.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from the Subject and the dual lumen endotracheal tube claims from the Compared exhibit several similarities in design and functionality, particularly in the context of medical ventilation systems. Both sets of claims describe a dual lumen structure intended for ventilatory support, with specific attention to the configuration and operational roles of the lumens. The Subject's claims focus on a tracheal tube with two ventilation lumens, one of which is longer and aligns with the upper bronchus, featuring an opening and a camera for visualization. The Compared's claims detail a dual lumen endotracheal tube with a main tracheal tube and a bronchial tube, separated by a flexible dividing wall, and equipped with inflatable cuffs for sealing. Both systems are designed for the purpose of facilitating ventilation in medical settings, with the Subject's system incorporating advanced visualization capabilities through the camera, while the Compared's system emphasizes structural integrity and sealing efficiency through the design of the dividing wall and cuffs. The methodologies and designs in both sets of claims aim to enhance patient care by improving ventilation and monitoring within the respiratory system. The operational role of both systems involves energy conversion (ventilation), and their practical applications are primarily in clinical settings for respiratory support.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.9021 indicates a high degree of similarity between the Subject and Compared claims. The overlap is significant, as both sets of claims describe dual lumen systems for ventilation, with specific features such as the alignment of lumens with the patient's anatomy and the use of cuffs for sealing. The Subject's inclusion of a camera for visualization adds a unique feature not explicitly mentioned in the Compared's claims, yet the core function of providing dual ventilation remains consistent. The methodologies and designs, such as the use of lumens and cuffs, show a strong overlap in their approach to achieving effective ventilation. The operational roles of both systems are focused on energy conversion for ventilation, and their practical applications are in medical settings for patient care. The overlap in underlying functions, essential components, core interactions, and internal dynamics is notable, as both systems aim to optimize respiratory support through similar structural and functional elements.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US11497394B2**Laryngoscope and intubation methods  
**Inventor: MOLNAR ROBERT W  
Assignee: WM & DG INC  
Priority Date: 10-12-2020  
Publication Date: 11-15-2022  
CPC: A61B1/267  
IPV™ Rating: 6.8831  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/159-409-338-472-460/frontpage?l=en](https://www.lens.org/lens/patent/159-409-338-472-460/frontpage?l=en)

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The primary function of the Compared invention (A61B1/267) is to facilitate the visualization and accurate placement of an endotracheal tube during intubation. From a mechanical engineering perspective, the laryngoscope comprises a handle and a curved blade designed to lift the epiglottis and provide access to the airway. It includes an ETT channel for guiding the endotracheal tube and a suction/camera channel for continuous visualization and suction, ensuring clear visibility and effective airway management during the procedure.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated overlap between the Subject and Compared patents, primarily due to the use of a camera for visualization within the medical device. However, the tracheal tube and laryngoscope differ significantly in their overall design, operational roles, and intended applications. The tracheal tube focuses on ventilation and bronchial access, while the laryngoscope is designed for lifting the epiglottis and aiding in intubation. The methodologies, designs, and operational roles of the two devices are distinct, with the tracheal tube involving dual ventilation lumens and specific camera placement for bronchial visualization, and the laryngoscope involving a handle and blade configuration with integrated channels for camera and ETT. The underlying functions, essential components, core interactions, and internal dynamics of the two devices also differ, with the tracheal tube focused on ventilation and bronchial visualization, and the laryngoscope focused on visualization of the larynx and aiding in intubation. The purpose and practical applications of the two devices are also distinct, with the tracheal tube used in critical care and anesthesia, and the laryngoscope used in emergency medicine and surgical procedures. The potential commercial impact of the tracheal tube patent may be significant in the field of critical care and anesthesia, where improved ventilation and bronchial visualization could enhance patient outcomes. The potential commercial impact of the laryngoscope patent may be significant in the field of emergency medicine and surgical procedures, where improved visualization of the larynx and aid in intubation could enhance patient outcomes.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve systemic and operational principles centered around visualization and airway management. The laryngoscope's mechanical system includes the following components and interactions:

- **Underlying Functions**: The ETT channel serves as a conduit for the endotracheal tube, ensuring precise delivery to the trachea. The suction/camera channel integrates a camera for real-time visualization and a suction mechanism to clear obstructions, enhancing the operational efficiency of intubation.

- **Essential Components**: The handle and blade form the structural framework, with the blade's curvature designed to fit the human larynx. The ETT and suction/camera channels are integral, with the latter housing a camera and providing a pathway for suction.

- **Core Interactions**: The handle's manipulation by the user controls the blade's position, which in turn affects the alignment of the ETT channel with the trachea. The camera's field of view through the suction/camera channel provides feedback to the user, guiding the endotracheal tube's placement.

- **Internal Dynamics**: The suction mechanism within the suction/camera channel operates to remove bodily secretions, maintaining clear visibility. The camera's positioning and the channel's design ensure optimal viewing angles and minimal obstruction during intubation.

The laryngoscope's purpose within its applied context is to enhance the safety and efficiency of intubation procedures, particularly in challenging cases where visualization and airway management are critical.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects in the field of tracheal tubes, particularly in the design and functionality of multi-lumen systems for bronchial intubation. From a mechanical engineering perspective, the key differences and novelties compared to the Compared invention include:

- **Design and Functionality**: The Subject invention's multi-lumen tracheal tube with unequal lengths and a camera apparatus specifically designed for bronchial intubation represents a significant departure from the Compared invention's laryngoscope, which focuses on endotracheal tube placement. The Subject's design allows for independent lung ventilation, a feature not present in the Compared invention.

- **Mechanical Underpinnings**: The Subject invention's use of a camera within the tracheal tube itself, rather than as part of a separate laryngoscope, enhances the precision of bronchial intubation. The mechanical system includes force distribution through the cuffs to maintain an airtight seal, and the camera's positioning ensures optimal energy efficiency in terms of visualization.

- **Overlapping Aspects**: While both inventions utilize cameras for visualization, the Subject's integration of the camera within the tracheal tube and its focus on bronchial intubation differ significantly from the Compared invention's use of a camera within a laryngoscope for endotracheal tube placement. The methodologies, designs, and protocols for the Subject invention are tailored to the specific challenges of bronchial intubation, with minimal overlap in terms of mechanical control systems or dedicated hardware logic.

- **Practical Applications**: The Subject invention is aimed at the medical field, specifically for thoracic surgery and other procedures requiring independent lung ventilation. Its potential impact includes improved surgical outcomes through precise bronchial intubation and reduced risk of cross-contamination. In contrast, the Compared invention targets the broader field of intubation, focusing on improving the accuracy and efficiency of endotracheal tube placement. Both inventions address real-world mechanical challenges, such as durability and scalability, but serve different purposes within the medical industry.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from the Subject and the laryngoscope claims from the Compared share some similarities, particularly in the use of a camera for visualization within the medical device. In the Subject, the tracheal tube includes a camera attached to the second ventilation lumen, with specific configurations such as being within an annular collar, embedded in the wall, or located on the interior surface of the lumen. The camera's field of view is directed through an opening in the second ventilation lumen, which is designed to align with the upper bronchus of a patient. The tracheal tube also features multiple lumens for ventilation, cuffs for sealing, and additional components like light emitting diodes and fluid delivery systems for maintaining camera functionality. In contrast, the Compared's laryngoscope includes a suction/camera channel that serves dual purposes of suction and housing a camera, with the camera's positioning and functionality being integral to the laryngoscope's operation. The laryngoscope also features an ETT channel for endotracheal tube placement, guide grooves for bougie assistance, and a cuff for sealing. Both devices aim to enhance visualization and access within the respiratory system, but they differ significantly in their design and operational roles. The tracheal tube focuses on ventilation and bronchial access, while the laryngoscope is designed for lifting the epiglottis and aiding in intubation. The methodologies and designs differ, with the tracheal tube involving dual ventilation lumens and specific camera placement for bronchial visualization, and the laryngoscope involving a handle and blade configuration with integrated channels for camera and ETT. The operational roles also differ, with the tracheal tube primarily involved in energy conversion (ventilation) and the laryngoscope in motion transfer (lifting the epiglottis). The underlying functions of the tracheal tube include ventilation and bronchial visualization, while the laryngoscope's functions include visualization of the larynx and aiding in intubation. Essential components of the tracheal tube include the dual ventilation lumens, camera, and cuffs, while the laryngoscope's essential components include the handle, blade, ETT channel, and suction/camera channel. Core interactions in the tracheal tube involve the camera's field of view through the opening and the ventilation process, while in the laryngoscope, interactions involve the camera's view through the suction/camera channel and the ETT's passage through its channel. The internal dynamics of the tracheal tube involve the flow of air through the lumens and the camera's operation, while the laryngoscope's dynamics involve the manipulation of the blade and handle to access the airway. The tracheal tube's purpose within its applied context is to provide ventilation and bronchial visualization in medical settings, while the laryngoscope's purpose is to aid in intubation and visualization of the larynx in emergency and surgical settings. Practical applications of the tracheal tube include use in critical care and anesthesia, while the laryngoscope is used in emergency medicine and surgical procedures.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.8831 indicates a high degree of similarity between the Subject and Compared claims. The overlap is primarily in the use of a camera for visualization within the medical device, with both devices incorporating a camera into their design. However, the tracheal tube and laryngoscope differ significantly in their overall design, operational roles, and intended applications. The tracheal tube focuses on ventilation and bronchial access, while the laryngoscope is designed for lifting the epiglottis and aiding in intubation. The methodologies, designs, and operational roles of the two devices are distinct, with the tracheal tube involving dual ventilation lumens and specific camera placement for bronchial visualization, and the laryngoscope involving a handle and blade configuration with integrated channels for camera and ETT. The underlying functions, essential components, core interactions, and internal dynamics of the two devices also differ, with the tracheal tube focused on ventilation and bronchial visualization, and the laryngoscope focused on visualization of the larynx and aiding in intubation. The purpose and practical applications of the two devices are also distinct, with the tracheal tube used in critical care and anesthesia, and the laryngoscope used in emergency medicine and surgical procedures. Given the high claim\_score and the significant overlap in the use of a camera, the overlap level is assessed as High.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: EP3024375B1**MEDICAL DEVICE, AND THE METHODS OF USING SAME  
**Inventor: MOLNAR ROBERT  
Assignee: WM & DG INC  
Priority Date: 07-22-2013  
Publication Date: 09-01-2021  
CPC: A61B1/04  
IPV™ Rating: 6.8164  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/016-350-849-452-294/frontpage?l=en](https://www.lens.org/lens/patent/016-350-849-452-294/frontpage?l=en)

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The primary function of the Compared invention (A61B1/04) is to facilitate the visualization and intubation process within the respiratory tract. From a mechanical engineering perspective, this involves the design of a laryngeal mask airway that can be inserted into the patient's pharynx to assist in breathing or to serve as a conduit for an endotracheal tube. The device must be flexible enough to conform to the anatomical curvature of the pharynx while maintaining structural integrity to support the insertion of additional medical instruments.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated high overlap between the Subject and Compared patents due to their shared focus on intubation devices with integrated camera systems for continuous visualization. Both patents aim to enhance patient monitoring during respiratory support, which is crucial in clinical settings. The Subject's tracheal tube with dual lumens and specific camera placement, and the Compared's endotracheal tube with a flexible camera lumen, indicate a strong overlap in their intended operational roles. The potential commercial impact of both patents could be significant in the medical device market, particularly in intensive care and surgical applications, where improved visualization and monitoring can lead to better patient outcomes.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of a flexible tube with an inflatable cuff designed to seat against the epiglottis and esophagus, creating a seal to facilitate breathing or intubation. The underlying functions include the ability of the tube to flex and conform to the patient's anatomy, the inflation mechanism of the cuff to create an airtight seal, and the structural integrity to support the passage of an endotracheal tube. Essential components include the tube itself, the inflatable cuff, and the dome at the end of the tube. Core interactions involve the cuff's interaction with the patient's anatomy to ensure proper positioning and sealing, while internal dynamics focus on the flexibility and resilience of the materials used to maintain the device's functionality during insertion and use.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its multi-lumen design and integrated camera system, which allows for precise visualization and placement within the bronchial system. This contrasts with the Compared invention, which focuses on a single tube for intubation and lacks the dual-lumen structure and integrated visualization technology. The Subject's design addresses the mechanical challenge of ensuring correct placement in both the trachea and bronchus, enhancing the precision and safety of the procedure. The Compared invention, while facilitating intubation, does not offer the same level of precision or the ability to independently ventilate each lung. Both inventions serve the medical field, but the Subject targets more specialized applications in thoracic surgery and critical care, potentially offering significant advantages in terms of patient safety and procedural efficiency.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the medical device in the Compared claims both focus on medical devices for intubation and ventilation, with an emphasis on continuous visualization through the use of a camera. The Subject's tracheal tube includes two ventilation lumens, with the second lumen having a camera and an opening for visualization, which aligns with the Compared's use of a camera lumen and a separate camera for visualization within an endotracheal tube. Both devices are designed to be connected to ventilators, indicating a shared operational role in respiratory support. The Subject's design includes specific features like dual lumens of different lengths and cuffs, while the Compared's design focuses on a single tube with a slidable camera lumen and additional features like a transmission lumen for sound. The methodologies and designs in both patents aim to enhance patient monitoring and care during intubation, with the Subject focusing on detailed structural configurations and the Compared emphasizing flexibility and additional functionalities like sound transmission. The core interactions in both involve the camera's field of view through an opening or window, essential for the device's purpose in medical settings, particularly in intensive care or surgical environments. The practical applications of both devices are primarily in clinical settings for intubation and ventilation with enhanced monitoring capabilities.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.8164 indicates a high degree of similarity between the Subject and Compared claims. Both patents describe medical devices for intubation with integrated camera systems for visualization, which is a significant overlap in functionality and purpose. The Subject's tracheal tube with dual lumens and a camera positioned opposite an opening shares a strong conceptual similarity with the Compared's endotracheal tube with a camera lumen and a separate camera. The operational role of both devices in respiratory support and patient monitoring during intubation further reinforces the overlap. However, the Subject's detailed structural configurations and the Compared's additional features like a slidable camera lumen and sound transmission lumen suggest some differences in design and additional functionalities.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US10149602B2**Endobronchial tube with integrated image sensor and a cleaning nozzle arrangement  
**Inventor: DAHER ELIAS  
Assignee: ETVIEW LTD  
Priority Date: 07-11-2011  
Publication Date: 12-11-2018  
CPC: A61B1/00  
IPV™ Rating: 6.7955  
Inferred Equivalence: High**

[Lens: https://www.lens.org/lens/patent/061-378-468-342-661/frontpage?l=en](https://www.lens.org/lens/patent/061-378-468-342-661/frontpage?l=en)

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The primary function of the Compared invention (A61B1/00) is to provide a means for continuous monitoring and visualization of the Tracheal Carina during respiratory procedures. This is achieved through an endobronchial tube equipped with an integrated image sensor, such as a CCD or CMOS camera, and a light source, which allows for real-time observation and confirmation of the tube's correct placement within the trachea and bronchi. The system also includes a cleaning mechanism to maintain a clear field of view, addressing the challenge of maintaining visibility in the presence of blood or secretions.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated high overlap between the Subject and Compared patents, given their shared focus on respiratory intubation and visualization. Both patents describe devices intended for the operational role of managing air flow and providing visual feedback within the respiratory system, with applications in medical settings for patient care. The potential commercial impact of each patent could be significant, as they address critical needs in respiratory care and could compete in the market for medical devices used in intubation and respiratory monitoring.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of optical visualization and continuous monitoring. The core components include a double-lumen endobronchial tube, an integrated image sensor, a light source, and a cleaning system. The image sensor and light source are housed within a dedicated lumen within the tube's wall, allowing for direct visualization of the Tracheal Carina. The cleaning system, comprising cleaning nozzles, ensures the field of view remains unobstructed by directing fluid to clear any buildup. The tube's design facilitates energy conversion from electrical to optical for illumination and motion transfer for fluid delivery in the cleaning process. The system's purpose is to enhance the safety and efficacy of respiratory procedures by providing real-time feedback on tube placement and maintaining airway patency.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integrated camera system within the tracheal tube, specifically designed for aiding in the placement of the endobronchial tube. Unlike the Compared invention, which focuses on continuous monitoring, the Subject invention emphasizes the initial placement accuracy. The Subject's camera is embedded in the wall of the second ventilation lumen, offering a different approach to visualization compared to the Compared's dedicated lumen for the image sensor. Both inventions address the challenge of maintaining visibility, but the Subject's approach to integrating the camera directly into the ventilation lumen and its focus on initial placement rather than continuous monitoring sets it apart. The Subject's design also includes unique features like fluid delivery for camera maintenance, which enhances its mechanical functionality in terms of energy efficiency and structural integrity. Both inventions target the medical field, specifically respiratory procedures, but the Subject's innovation lies in its integrated approach to visualization and placement accuracy, potentially offering a competitive advantage in procedures requiring precise initial tube positioning.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the endobronchial tube in the Compared claims share several similarities in design and functionality, particularly in the context of respiratory intubation and visualization within the respiratory system. Both devices feature dual lumens for ventilation, with the Subject's tracheal tube having a first and second ventilation lumen, and the Compared's endobronchial tube having a first and second lumen. Both incorporate imaging technology, with the Subject's tracheal tube featuring a camera and the Compared's endobronchial tube utilizing an image sensor, both aimed at providing visual feedback during intubation or respiratory management. The Subject's tracheal tube includes an opening in the second ventilation lumen for the camera's field of view, which is conceptually similar to the Compared's use of a dedicated image sensor lumen and cleaning nozzles to maintain the field of view of the image sensor. Both devices also use inflatable cuffs, with the Subject's tracheal tube having a first and second cuff, and the Compared's endobronchial tube similarly equipped, indicating a shared purpose in sealing off sections of the respiratory tract during use. The operational role of both devices is centered around respiratory support and visualization, with applications in medical settings for intubation and patient monitoring. The underlying functions involve air passage management and visual monitoring, with essential components like lumens, cuffs, and imaging devices. Core interactions include the interaction between the lumens and the patient's respiratory system, and the interaction of the imaging components with the environment inside the respiratory tract. The internal dynamics of both devices involve the flow of air through the lumens and the transmission of visual data from the imaging components to external monitoring systems.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.7955 indicates a high degree of similarity between the Subject and Compared claims. The overlap is significant, as both devices are designed for respiratory intubation and include dual lumens, imaging technology, and inflatable cuffs. The Subject's tracheal tube and the Compared's endobronchial tube share a strong conceptual and functional overlap, particularly in their use of imaging for visualization and the management of air flow through multiple lumens. The presence of similar components and the shared purpose of respiratory support and monitoring suggest a notable degree of overlap in their design and application.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US9352112B2**Shaped evacuation port for a multi-lumen tracheal tube  
**Inventor: SEDERSTROM DONN  
Assignee: SEDERSTROM DONN  
Priority Date: 12-13-2011  
Publication Date: 05-31-2016  
CPC: A61M16/00  
IPV™ Rating: 7.8672  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/068-198-933-229-194/frontpage?l=en](https://www.lens.org/lens/patent/068-198-933-229-194/frontpage?l=en)

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The Compared invention, described under CPC code A61M16/00, primarily functions as a tracheal tube with a shaped evacuation port designed to enhance suction efficiency. From a mechanical engineering perspective, this involves optimizing the geometry of the evacuation port to minimize air channel formation within the suction lumen, thereby improving the suctioning force and efficiency. This design aims to facilitate the removal of secretions from the patient's airway, which is crucial for maintaining clear airways during intubation.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between the Subject and Compared patents, there is a moderate possibility of overlap due to the shared focus on tracheal tubes for respiratory support. However, the Subject patent's emphasis on dual-lumen technology with integrated visualization capabilities and the Compared patent's focus on single-lumen design with suction for secretion management indicate distinct approaches to addressing respiratory needs. The Subject patent's potential commercial impact could be significant in specialized medical fields requiring advanced diagnostic tools, whereas the Compared patent's impact might be more widespread in general respiratory care settings due to its focus on maintaining airway clearance. Overall, the patents cater to different aspects of respiratory care, suggesting a low possibility of direct competition but potential for complementary use in clinical settings.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the Compared invention revolves around the mechanical design of the suction lumen and its evacuation port. The underlying function is to create a negative pressure environment within the suction lumen to draw secretions into the lumen through the port. Essential components include the conduit defining the passageway, the inflatable balloon cuff for sealing, and the suction lumen with its uniquely shaped evacuation port. The core interactions involve the interaction between the suction lumen and the secretions, where the shaped port reduces air channel formation, enhancing the suction efficiency. Internally, the dynamics of the system are governed by the flow dynamics within the suction lumen, influenced by the geometry of the evacuation port, which is designed to optimize the suction force and minimize air ingress.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus within a multi-lumen tracheal tube, specifically designed for endobronchial intubation. This differs from the Compared invention, which focuses on optimizing the suction efficiency through a shaped evacuation port. The Subject's design includes a unitary assembly for the camera, which enhances the ease of intubation and visualization, a feature not present in the Compared invention. From a mechanical engineering perspective, the Subject's innovation lies in its mechanical system for accurate placement and visualization, while the Compared invention's innovation is in the mechanical design for improved suction efficiency. The overlap between the two inventions is minimal, as they address different aspects of tracheal tube functionality; the Subject focuses on placement and visualization, whereas the Compared focuses on secretion management. The Subject's design approaches involve the integration of electronic components and a camera within the tube structure, while the Compared's design involves optimizing the geometry of the evacuation port. Both inventions serve the medical field, but the Subject targets more specifically the needs of bronchial intubation, potentially impacting surgical procedures and patient outcomes, while the Compared aims to improve patient care by enhancing airway clearance.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from both Subject and Compared patents focus on medical devices used for respiratory support, specifically involving a conduit or lumen system for gas delivery to a patient's lungs. The Subject patent describes a tracheal tube with dual ventilation lumens, one of which is longer and includes a camera and an opening for visualization, aimed at enhancing patient monitoring and treatment precision. The camera's placement and the dual-lumen design suggest a focus on improving diagnostic capabilities within the respiratory system, particularly in the context of bronchial intubation. The Compared patent, on the other hand, emphasizes a tracheal tube with a single conduit, an inflatable cuff, and a suction lumen designed for secretion management, with specific attention to the geometry and positioning of the evacuation port to optimize suction efficiency. Both patents address the operational role of facilitating gas exchange and patient care, but they diverge in their approach: the Subject patent focuses on visualization and dual-lumen functionality, while the Compared patent concentrates on secretion management and single-lumen design. The methodologies and designs differ significantly, with the Subject patent incorporating advanced imaging technology and the Compared patent focusing on the physical characteristics of the suction system. The underlying functions of both patents are to support respiratory function, but the essential components and core interactions vary, with the Subject patent involving camera technology and dual-lumen interaction, and the Compared patent involving suction lumen dynamics and cuff inflation. The internal dynamics of the Subject patent revolve around visual feedback and dual gas flow, whereas the Compared patent centers on suction and secretion removal. In terms of applied context, the Subject patent is likely used in scenarios requiring detailed bronchial visualization, such as in critical care or surgical settings, while the Compared patent is more suited for general respiratory support with a focus on maintaining airway clearance. The practical applications of the Subject patent could extend to specialized medical procedures, whereas the Compared patent's applications are more aligned with routine respiratory care.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.8672 indicates a high degree of similarity between the claims of the Subject and Compared patents. However, upon detailed analysis, the overlap is primarily in the general concept of tracheal tubes for respiratory support. The Subject patent's focus on dual ventilation lumens with a camera for visualization and the Compared patent's emphasis on a single conduit with a suction lumen for secretion management represent distinct approaches to respiratory care. While both patents address the operational role of facilitating gas exchange, the methodologies, designs, and specific functionalities diverge significantly. The Subject patent's dual-lumen system and camera technology do not directly overlap with the Compared patent's single-lumen system and suction-focused design. Therefore, despite the high claim\_score, the actual overlap in terms of specific features and functionalities is moderate.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US9352112B2) Claim number: 5 and Subject Claim: 12**

Both claims discuss the positioning of a suction lumen within a tracheal tube. The Compared claim specifies that the evacuation port of the suction lumen is positioned to open towards the dorsal side of the patient, which is a specific orientation detail not mentioned in the Subject claim. The Subject claim, on the other hand, mentions the suction lumen terminating in a port located proximal to a first cuff, which provides a different detail about the location of the port relative to other components of the tracheal tube. The similarity lies in the inclusion of a suction lumen and its port, but the scope differs in the specific positioning and orientation details provided.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: EP2440275B1**ENDOTRACHEAL TUBE WITH DEDICATED EVACUATION PORT  
**Inventor: LI YOUZHI  
Assignee: COVIDIEN LP  
Priority Date: 06-08-2009  
Publication Date: 04-12-2017  
CPC: A61M16/00  
IPV™ Rating: 7.8456  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/013-681-359-517-769/frontpage?l=en](https://www.lens.org/lens/patent/013-681-359-517-769/frontpage?l=en)

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The Compared invention, described under CPC code A61M16/00, is a tracheal tube designed for suctioning accumulated mucus secretions from the airway of intubated patients. From a mechanical engineering perspective, the primary function involves the use of multiple suction lumens and ports strategically placed to facilitate effective mucus removal both above and below the cuff. The design aims to mitigate the risk of ventilator-associated pneumonia by ensuring efficient clearance of secretions, which is critical in maintaining patient health during prolonged intubation.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a moderate possibility of overlap between the patents as they both address tracheal tubes for ventilation and secretion management. However, the specific features and designs differ significantly. Subject's patent focuses on advanced visualization with a camera and a dual-lumen system, which is not present in Compared's patent. Compared's patent emphasizes effective secretion management and cuff positioning, which are not detailed in Subject's patent. The operational role of both patents is centered around respiratory support, but the methodologies and specific designs vary. The potential commercial impact of Subject's patent may be higher due to the innovative camera feature, which could enhance patient monitoring and care. Compared's patent may have a more focused impact on improving secretion management and cuff stability, which is crucial for patient safety and comfort.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention revolve around the systemic principles of fluid dynamics and suction technology. The tracheal tube features a tubular body with an open distal end for ventilation and a cuff to seal against the trachea wall. Two suction lumens extend along the tube, terminating in ports located above and below the cuff. The underlying function is to create a negative pressure environment within the lumens to aspirate mucus secretions. Essential components include the cuff, suction lumens, and ports, which interact to form a closed system for suctioning. The internal dynamics involve the flow of air and secretions through the lumens, driven by external suction devices. This system is designed to operate within the context of medical ventilation, focusing on improving patient outcomes by reducing infection risks.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces a novel approach by integrating a camera into the tracheal tube, which significantly enhances the precision of bronchial intubation. This feature distinguishes it from the Compared invention, which focuses on mucus suctioning without visual aids. From a mechanical engineering perspective, the Subject's design involves complex electronic components and a unitary assembly, which are not present in the Compared invention. The integration of the camera requires considerations for energy efficiency, structural integrity, and the management of electronic components within a medical device. The Subject's multi-lumen design with a camera contrasts with the Compared's focus on suction lumens and ports, indicating minimal overlap in their methodologies and designs. The Subject's innovation lies in its potential to improve procedural outcomes through enhanced visualization, while the Compared invention aims to address post-intubation complications through effective mucus management. Both inventions target the medical field, specifically respiratory care, but serve different purposes within this domain. The Subject's technology could revolutionize bronchial intubation procedures, offering a competitive advantage in terms of accuracy and safety, whereas the Compared invention focuses on improving patient outcomes by reducing infection risks associated with prolonged intubation.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from Subject and Compared share some common elements related to the design and functionality of tracheal tubes used in medical ventilation. Both sets of claims mention a tubular body or lumens designed for ventilating a patient, indicating a shared purpose in respiratory support. Subject's claims focus on a dual-lumen design with specific features like a camera and an opening for visualization, which are not directly mentioned in Compared's claims. However, both sets of claims address the need for managing secretions through suction lumens, although the configurations differ. Subject's claims include a camera for visual monitoring, which is a unique feature not found in Compared's claims. Compared's claims emphasize the positioning and orientation of suction lumens and ports, as well as a shoulder to secure the cuff, which are not detailed in Subject's claims. The operational role of both sets of claims is centered around respiratory support and secretion management, but the methodologies and specific designs vary significantly. Subject's claims are more focused on advanced visualization and dual-lumen functionality, while Compared's claims emphasize effective secretion management and cuff positioning.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.8456 suggests a potential for significant overlap. However, upon detailed analysis, the overlap between the claims from Subject and Compared is moderate. Both sets of claims address tracheal tubes for ventilation and secretion management, but the specific features and designs differ. Subject's claims introduce a camera and dual-lumen system, which are not present in Compared's claims. Conversely, Compared's claims focus on the positioning of suction lumens and a shoulder for cuff security, which are not detailed in Subject's claims. The overlap is primarily in the general purpose of tracheal tubes for ventilation and secretion management, but the specific methodologies and designs show notable differences.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (EP2440275B1) Claim number: 1 and Subject Claim: 12**

Both claims describe a tracheal tube with a suction lumen. The Compared claim details a more complex system with two suction lumens and specific positioning relative to a cuff and a shoulder, aimed at preventing contact with the trachea. The Subject claim, while simpler, also mentions a suction lumen but with less detail on its positioning and function. The Compared claim's focus on preventing contact with the trachea and the detailed positioning of elements suggests a more refined design for safety and efficacy. The Subject claim's broader description might allow for more flexibility in implementation but lacks the specific safety features of the Compared claim.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US7581541B2**Multilumen tracheal catheter  
**Inventor: MADSEN EDWARD B  
Assignee: KIMBERLY CLARK CO  
Priority Date: 08-08-2005  
Publication Date: 09-01-2009  
CPC: A61M16/04  
IPV™ Rating: 7.8322  
Inferred Equivalence: Medium**

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The primary function of the Compared invention (A61M16/04) is to facilitate mechanical ventilation of a patient's lungs and to manage secretions that accumulate above the inflatable cuff of a tracheal tube. From a mechanical engineering perspective, this involves the design and integration of a suction system within the tracheal tube to evacuate secretions, thereby reducing the risk of infection. The system includes a ventilation lumen for air passage and multiple suction lumens arranged radially around the ventilation lumen, with a rotatable suction port collar to selectively connect to a suction source.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

Overall, there is a moderate possibility of overlap between the Subject and Compared patents. Both patents focus on improving patient outcomes during ventilation but through different operational roles: the Subject patent on visualization and the Compared patent on suctioning. The Subject patent's camera system could potentially enhance the functionality of the Compared patent's suction system by providing visual feedback during suctioning procedures, suggesting a complementary rather than overlapping relationship. The potential commercial impact of the Subject patent lies in its application in surgical and critical care settings where visualization is crucial, while the Compared patent's impact would be significant in intensive care units where effective airway management is essential. The integration of both technologies could lead to a more comprehensive tracheal tube system, enhancing patient care across various medical scenarios.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention revolve around the systemic integration of suction and ventilation functionalities within a tracheal tube. The underlying function is to maintain a clear airway by evacuating secretions, which is achieved through the essential components of multiple suction lumens and a rotatable suction port collar. The core interactions involve the selective alignment of the suction port collar with suction ports to enable fluid communication with a suction source, while the internal dynamics include the pressure management within the suction lumens to prevent damage to the tracheal mucosa. The mechanical system's operational role is to facilitate the transfer of air for ventilation and the removal of secretions, ensuring effective mechanical ventilation and reducing infection risks.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through the integration of a camera within the tracheal tube, specifically designed for visualizing the placement of the tube into the bronchus. This differs from the Compared invention, which focuses on suction capabilities to manage secretions. The Subject's design includes a multi-lumen structure with unequal lengths to facilitate independent ventilation of the lungs, a feature not present in the Compared invention. The camera's placement and the use of a fenestration in the second ventilation lumen for visualization represent a significant departure from the mechanical control systems and dedicated hardware logic of the Compared invention, which centers on suction management. The Subject's approach to force distribution and energy efficiency is tailored to the needs of visualization and precise tube placement, while the Compared invention focuses on maintaining structural integrity and optimizing suction efficiency. The Subject's potential applications in bronchial intubation and visualization contrast with the Compared invention's focus on managing secretions in mechanical ventilation, indicating different mechanical engineering markets and industries.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tubes described in both Subject and Compared patents are designed for medical applications, specifically for intubation and ventilation purposes. The Subject patent focuses on a dual-lumen tracheal tube with integrated camera technology for visualization within the trachea and bronchi, which is particularly useful for procedures requiring direct observation of the respiratory tract. The camera's placement and the design of the lumens, including the fenestration and the positioning of the camera opposite to the opening, suggest a focus on enhancing visibility and functionality during intubation and ventilation. The operational role of this tracheal tube involves not only the traditional function of air passage but also the advanced function of visual monitoring, which can be crucial in surgical or critical care settings.  
  
In contrast, the Compared patent emphasizes a tracheal tube with multiple suction lumens and a rotatable suction port collar, designed to manage secretions and maintain airway patency. The design includes a complex system of lumens and ports for suctioning, which is essential for clearing the airway and preventing complications like pneumonia. The operational role here is centered around effective suctioning and airway management, which is vital in long-term ventilation scenarios.  
  
Both patents share the common goal of improving patient outcomes during ventilation but approach it through different methodologies. The Subject patent's focus on visualization and the Compared patent's emphasis on suctioning represent distinct but complementary aspects of tracheal tube functionality. The underlying functions of both involve facilitating respiration, but the essential components and core interactions differ significantly. The Subject patent's camera and dual-lumen design interact to provide visual feedback, while the Compared patent's suction system and rotatable collar interact to manage secretions. The internal dynamics of the Subject patent involve the transmission of visual data, whereas the Compared patent's dynamics revolve around the flow and control of suction.  
  
In terms of practical applications, the Subject patent could be particularly beneficial in surgical settings or for patients requiring bronchoscopic procedures, while the Compared patent would be more applicable in intensive care units where long-term ventilation and airway management are critical.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.8322 indicates a high degree of similarity between the Subject and Compared patents. However, the overlap in terms of specific features and functionalities is moderate. Both patents deal with tracheal tubes, but the Subject patent's focus on visualization through a camera system and the Compared patent's emphasis on suctioning via multiple lumens and a rotatable collar represent distinct technological approaches. While both aim to enhance patient care during ventilation, the methodologies, designs, and operational roles are different. The Subject patent's camera and dual-lumen design for visualization do not directly overlap with the Compared patent's suction system and rotatable collar for airway management. Therefore, despite the high claim\_score, the overlap in specific features and functionalities is described as moderate.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US7581541B2) Claim number: 1 and Subject Claim: 12**

Both claims relate to tracheal tubes with suction capabilities. The Compared claim describes a more complex system with multiple suction lumens and ports, controlled by a suction port collar, and includes an inflatable cuff for sealing the trachea. The Subject claim, on the other hand, mentions a single suction lumen terminating near a cuff. The scope of the Compared claim is broader, encompassing a detailed system for managing multiple suction ports, while the Subject claim focuses on a simpler suction mechanism. The similarity lies in the use of suction for tracheal tubes, but the Compared claim's system is more advanced and detailed.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US7581541B2) Claim number: 3 and Subject Claim: 8**

Both claims discuss additional lumens in tracheal tubes. The Compared claim specifies an inflation or irrigation lumen, while the Subject claim details two inflation lumens associated with different cuffs. The scope of the Compared claim is broader as it includes both inflation and irrigation options, whereas the Subject claim is more specific to inflation. The similarity lies in the use of additional lumens for specific functions, but the Compared claim offers more options.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US7581541B2) Claim number: 4 and Subject Claim: 12**

The Compared claim describes the arrangement of multiple suction lumens around a specific surface, while the Subject claim mentions a single suction lumen terminating near a cuff. The scope of the Compared claim is more specific to the arrangement of lumens, whereas the Subject claim focuses on the termination of a single lumen. The similarity is in the use of suction lumens, but the Compared claim provides a detailed arrangement not specified in the Subject claim.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US7581541B2) Claim number: 8 and Subject Claim: 12**

The Compared claim describes multiple suction ports each providing access to multiple suction lumens, while the Subject claim mentions a single suction lumen terminating near a cuff. The scope of the Compared claim is broader, detailing a system with multiple ports and lumens, whereas the Subject claim focuses on a simpler suction mechanism. The similarity lies in the use of suction for tracheal tubes, but the Compared claim's system is more complex and detailed.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US10596338B2**Tracheal tube and suction device  
**Inventor: WANG BENJAMIN R  
Assignee: NEVAP INC  
Priority Date: 10-10-2013  
Publication Date: 03-24-2020  
CPC: A61M16/04  
IPV™ Rating: 7.8182  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/040-327-055-764-899/frontpage?l=en](https://www.lens.org/lens/patent/040-327-055-764-899/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate the removal of secretions and other matter from the trachea using a tracheal tube system equipped with a second tube that applies negative pressure. This system includes a first tube with an inflatable balloon and a second tube positioned on the exterior of the first tube, designed to suction out fluids and prevent the spread of pathogens, thereby reducing the risk of Ventilator Associated Pneumonia (VAP).

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between Subject and Compared, there is a moderate anticipated overlap of the patent. Both patents focus on tracheal tubes for respiratory support, but with different operational roles: Subject's device is designed for visualization and differential ventilation, while Compared's device is designed for suction and fluid evacuation. The purpose within their applied contexts, such as intensive care units and clinical settings for managing secretions, respectively, indicates distinct applications. The potential commercial impact of Subject's patent could be significant in markets requiring advanced visualization and monitoring capabilities in respiratory care, whereas Compared's patent may have a strong impact in markets focused on airway management and secretion control. Overall, there is a low possibility of direct overlap due to the distinct functionalities and applications of each patent.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of suction to remove secretions from the trachea. The system includes a first flexible and hollow tube with an inflatable balloon that seals against the tracheal wall. The second tube, which is also hollow and has multiple holes along its sidewall, is positioned partially around the inflatable balloon and perpendicular to the first tube. When the system is inserted into the trachea and the balloon is inflated, negative pressure applied to the second tube by a suction device draws fluids and matter away from the tracheal wall. This mechanism aims to prevent the accumulation of secretions above and around the balloon, reducing the risk of pathogens entering the lungs. The core interactions involve the sealing of the tracheal wall by the inflatable balloon and the application of negative pressure through the second tube to facilitate suction.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces a novel approach by integrating a camera apparatus within a multi-lumen tracheal tube specifically designed for bronchial intubation. This contrasts with the Compared invention, which focuses on suctioning secretions using a second tube. The Subject's camera enhances visualization, aiding in the accurate placement of the tube, which is crucial for procedures like thoracic surgery where precise positioning is necessary. The Compared invention, while effective in managing secretions, does not incorporate visualization technology. The Subject's design includes unique features like the camera's placement opposite an opening in the second lumen, and the use of light emitting diodes and a fluid delivery system to maintain camera functionality, which are not present in the Compared invention. These elements contribute to the Subject's novelty in improving the precision and safety of intubation procedures. Both inventions address different mechanical challenges within the medical field; the Subject focuses on visualization and precise placement, while the Compared invention targets secretion management and infection prevention.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from Subject and Compared show similarities in the context of medical devices used for respiratory support, but with distinct structural and functional differences. Subject's claims focus on a tracheal tube with dual ventilation lumens, one of which is longer and includes a camera for visualization, aimed at facilitating intubation and monitoring within the respiratory system. The camera's placement and associated components like LEDs and cuffs suggest a design intended for enhanced visualization and isolation within the trachea and bronchi. The operational role of Subject's tracheal tube involves energy conversion in the form of converting ventilator pressure into airflow, and motion transfer through the movement of air and camera orientation, applied in contexts like intensive care units for patient monitoring and ventilation.  
  
In contrast, Compared's claims describe a tracheal tube system with a primary focus on suction and fluid evacuation from the trachea, featuring a first tube for ventilation and a second tube for suction, equipped with multiple holes and an inflatable balloon. The design emphasizes the removal of fluids from the trachea, with the second tube positioned to contact the tracheal wall upon inflation of the balloon. The operational role here involves motion transfer through the suction mechanism and load-bearing capacity of the balloon against the tracheal wall, applied in clinical settings for managing secretions and maintaining airway patency.  
  
The methodologies and designs differ significantly; Subject's tracheal tube employs a camera and dual lumens for visualization and differential ventilation, while Compared's system uses a suction mechanism and a single ventilation tube with an external suction tube. The underlying functions of Subject's device are centered around visualization and differential ventilation, whereas Compared's device focuses on suction and fluid management. Essential components in Subject's claims include the camera, dual lumens, and cuffs, while in Compared's claims, the inflatable balloon and suction tube with holes are crucial. Core interactions in Subject's device involve the camera's field of view through the opening and the differential airflow between lumens, while in Compared's device, the interaction is between the suction tube and the tracheal wall to evacuate fluids. Internal dynamics of Subject's device relate to the camera's orientation and the airflow dynamics within the dual lumens, while Compared's device dynamics involve the pressure changes due to suction and the balloon's inflation against the trachea.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.8182 suggests a potential for significant overlap between the claims of Subject and Compared. However, upon detailed analysis, the overlap is found to be moderate. Both sets of claims relate to tracheal tubes used in respiratory support, but the specific functionalities and structural designs differ. Subject's claims focus on visualization and differential ventilation, while Compared's claims emphasize suction and fluid evacuation. The methodologies, designs, and operational roles, such as energy conversion, motion transfer, and load-bearing capacity, are distinct between the two sets of claims. The purpose within their applied contexts also varies, with Subject's device aimed at monitoring and ventilation in intensive care, and Compared's device focused on managing secretions in clinical settings. The practical applications, therefore, show a moderate degree of overlap, as both address respiratory support but through different means.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US10596338B2) Claim number: 4 and Subject Claim: 11**

Both claims focus on the connectivity of the tracheal tube system to external devices for ventilation. The Compared claim specifies coupling to an 'artificial ventilation device', while the Subject claim lists multiple possible connections including a ventilator, bag for ventilation, and various valving systems. The scope of the Subject claim is broader as it includes multiple types of connections, whereas the Compared claim is more specific to artificial ventilation. The similarity lies in the function of connecting to external ventilation systems, but the Subject claim offers more versatility in connection options.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US10596338B2) Claim number: 2 and Subject Claim: 3**

Both claims address the structural configuration of the tracheal tube. The Compared claim specifies that the second tube is curved, which could imply a specific design for better anatomical fit or function. The Subject claim mentions a right-stem endobronchial tube, which inherently has a curved shape to align with the right bronchus. The similarity is in the curved nature of the tubes, but the Subject claim is more specific about the type of tube, indicating a narrower scope focused on a particular application.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US10596338B2) Claim number: 10 and Subject Claim: 1**

The Compared claim focuses on the flexibility of the second tube, which is a property that could affect its usability and adaptability within the trachea. The Subject claim, while not directly mentioning flexibility, describes a complex tracheal tube system with multiple lumens and a camera, which implies a design that might require flexibility for proper function and placement. The similarity is in the implied need for flexibility in both systems, but the Subject claim's scope is much broader, encompassing multiple components and functionalities.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US10596338B2) Claim number: 8 and Subject Claim: 1**

The Compared claim details the method of affixing the second tube to the first tube, which is crucial for the structural integrity and functionality of the tracheal tube system. The Subject claim, while not specifying the method of attachment, describes a system where two lumens are adjacent, implying some form of connection or integration. The similarity lies in the necessity of integrating multiple components, but the Subject claim's scope is much wider, including additional features like a camera and specific lumen configurations.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US10596338B2) Claim number: 12 and Subject Claim: 3**

Both claims mention a curved aspect of the tracheal tube system. The Compared claim specifies that the second tube is curved, similar to the previous claim 2. The Subject claim again refers to a right-stem endobronchial tube, which is inherently curved. The similarity is in the curved nature of the tubes, but the Subject claim is more specific about the type of tube, indicating a narrower scope focused on a particular application.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US8434488B2**Endotracheal tube with dedicated evacuation port  
**Inventor: LI YOUZHI  
Assignee: LI YOUZHI  
Priority Date: 06-08-2009  
Publication Date: 05-07-2013  
CPC: A61M16/04  
IPV™ Rating: 7.7789  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/020-366-173-165-105/frontpage?l=en](https://www.lens.org/lens/patent/020-366-173-165-105/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate the management of respiratory conditions by providing a tracheal tube that can be used for ventilation and suctioning of mucus secretions. From a mechanical engineering perspective, the tracheal tube is designed to be inserted into a patient's trachea, where it serves to maintain an open airway and allow for the passage of gases. The tube includes a cuff that, when inflated, seals against the tracheal wall to prevent leakage and ensure effective ventilation. Additionally, the tube is equipped with suction lumens and ports strategically placed to remove accumulated mucus secretions, particularly below the cuff, which is critical for preventing ventilator-associated pneumonia (VAP).

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall anticipated overlap between the patents in the context of tracheal tubes used for patient ventilation and airway management. The Subject's focus on a dual-lumen design with a camera for visualization and the Compared's emphasis on a suction system for secretion management indicate different operational roles within the same medical context. The Subject's patent may have a higher commercial impact due to the added functionality of visualization, which could be valuable in surgical and intensive care settings. The Compared's patent focuses on efficient secretion management, which is crucial for patient care but may have a more limited commercial scope compared to the Subject's patent. Overall, there is a medium possibility of overlap due to the shared context but distinct features and functionalities.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention revolve around the systemic and operational principles of respiratory support and secretion management. The underlying function of the tracheal tube is to provide a conduit for air and gases, facilitated by the structural integrity of the tube and the sealing mechanism of the cuff. Essential components include the tubular body, the cuff, and the suction lumens with ports. The core interactions involve the inflation of the cuff to create an airtight seal within the trachea, and the operation of the suction system to remove secretions. Internally, the dynamics of the system are governed by the pressure differentials created by the ventilator and the suction apparatus, which drive the flow of gases and secretions. The mechanical system's role is to ensure effective ventilation and secretion management, addressing the challenge of mucus accumulation in critically ill patients.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects by integrating a camera apparatus within a multi-lumen tracheal tube, specifically designed for endobronchial intubation. This differs from the Compared invention, which focuses on suctioning capabilities without visualization aids. The Subject's design allows for real-time visualization of the tracheal and bronchial pathways, enhancing the precision of tube placement and reducing the reliance on external bronchoscopes. From a mechanical engineering perspective, the Subject's innovation lies in the integration of electronic components and the design of a unitary assembly that maintains a profile suitable for comfortable intubation. The mechanical underpinnings include considerations for force distribution to ensure the camera's stability and structural integrity to accommodate the additional components. The design approaches involve specialized fabrication techniques to integrate the camera and ensure its functionality within the tracheal environment. In contrast, the Compared invention's mechanical focus is on the effective distribution of suction forces and the structural design to accommodate suction lumens and ports. The Subject and Compared inventions serve different purposes within the respiratory therapy market, with the Subject aimed at complex intubation procedures and the Compared at managing mucus secretions. The Subject's potential impact includes improved procedural accuracy and patient safety, while the Compared invention addresses the critical issue of VAP prevention through effective secretion management.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from Subject and Compared show similarities in the context of medical devices used for ventilation and secretion management in patients. Subject's claims focus on a dual-lumen tracheal tube with a camera for visualization, while Compared's claims emphasize a single-lumen tracheal tube with a suction system for secretion management. Both sets of claims mention the use of cuffs for sealing against the trachea, indicating a common operational role in maintaining airway isolation and facilitating ventilation. Subject's claims include detailed descriptions of the camera's placement and function, which is not present in Compared's claims. However, both sets of claims discuss the use of lumens for different purposes: Subject for ventilation and visualization, and Compared for ventilation and suction. The underlying function of both is to support patient ventilation and manage airway secretions, with essential components like lumens, cuffs, and in Subject's case, a camera. The core interactions involve the interaction of these components with the patient's respiratory system, and the internal dynamics relate to the flow of air and secretions. The purpose within the applied context is primarily in medical settings for patient care, with practical applications in intensive care units and surgical procedures.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the claims of Subject and Compared is primarily in the use of tracheal tubes for patient ventilation and the inclusion of cuffs for sealing against the trachea. Subject's claims introduce a camera and a dual-lumen design, which are not present in Compared's claims, indicating a significant difference in design and functionality. However, both sets of claims address the need for managing secretions, with Subject using a camera for visualization and Compared using a suction system. The claim\_score of 7.7789 suggests a strong overlap in the broader context of tracheal tube functionality, but the specific features and methodologies differ significantly between the two sets of claims.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US8434488B2) Claim number: 5 and Subject Claim: 12**

Both claims discuss a tracheal tube with a suction lumen. The Compared claim specifies that the suction lumen is configured to convey treatment modalities, which adds a functional aspect to the suction lumen not explicitly mentioned in the Subject claim. The Subject claim focuses on the location of the suction lumen's port relative to a cuff. The scope of the Compared claim extends to include treatment modalities, while the Subject claim's scope is narrower, focusing on the structural placement of the suction lumen. The similarity score reflects the commonality in the use of a suction lumen, but the difference in functional specification results in a moderate similarity score.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US8434488B2) Claim number: 3 and Subject Claim: 12**

Both claims refer to a tracheal tube with a port on the suction lumen. The Compared claim specifies the orientation of the port on the posterior side of the tubular body post-intubation, which is a detail not mentioned in the Subject claim. The Subject claim focuses on the location of the port relative to a cuff. The scope of the Compared claim is more specific regarding the orientation of the port, while the Subject claim's scope is broader, focusing on the general placement of the port. The similarity score reflects the commonality in the use of a port on a suction lumen, but the difference in specificity results in a moderate similarity score.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US9327091B2**Tracheal tube and suction device  
**Inventor: WANG BENJAMIN R  
Assignee: NEVAP INC  
Priority Date: 10-10-2013  
Publication Date: 05-03-2016  
CPC: A61M15/00  
IPV™ Rating: 7.733  
Inferred Equivalence: Medium**

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The Compared invention, described under CPC code A61M15/00, primarily functions as an inhalator or nebulizer system designed to deliver medication or therapeutic agents in aerosol form to the respiratory system. From a mechanical engineering perspective, this involves the precise control of airflow and particle dispersion to ensure effective delivery of the therapeutic agent to the lungs. The system typically includes components such as a reservoir for the medication, a mechanism for aerosol generation, and a delivery conduit that interfaces with the patient's respiratory tract.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between Subject and Compared, there is an overall moderate possibility of overlap in the patent. Both patents focus on tracheal tubes for respiratory support, but with different operational roles: Subject's patent emphasizes visualization within the respiratory system, while Compared's patent focuses on fluid evacuation through suction. The purpose within their applied context is to enhance patient care in medical settings, with Subject's practical applications in critical care and surgical procedures, and Compared's in critical care and respiratory therapy. The potential commercial impact of Subject's patent could be significant in markets requiring advanced visualization for intubated patients, whereas Compared's patent could impact markets focused on effective tracheal suction and fluid management. The moderate overlap suggests that while both patents address respiratory support, their distinct functionalities and designs may cater to different needs within the medical field.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention revolve around the systemic principles of aerosol generation and delivery. The underlying function involves converting liquid or solid medication into an aerosol, which is achieved through mechanisms such as ultrasonic vibration, compressed air, or mesh technology. Essential components include the aerosol generator, a power source, and a delivery nozzle. The core interactions within the system are between the aerosol generator and the medication, ensuring consistent particle size and distribution. Internally, the dynamics involve the flow of air and aerosol through the system, which must be carefully managed to prevent aggregation of particles and ensure uniform delivery. The mechanical system's operational role is to facilitate the conversion of medication into an inhalable form, with the purpose of treating respiratory conditions within the context of medical therapy.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces significant novelty through its integration of a camera apparatus within a multi-lumen tracheal tube, specifically designed for bronchial intubation. This feature allows for direct visualization of the intubation process, which is not present in the Compared invention focused on aerosol delivery. From a mechanical engineering perspective, the Subject's design involves complex structural considerations to accommodate the camera and maintain the integrity of the ventilation system, including the use of cuffs for sealing and the precise positioning of the camera to ensure optimal field of view. The Compared invention, while mechanically sophisticated in its aerosol generation and delivery, does not address the same challenges of intubation and visualization. The Subject's design also includes considerations for energy efficiency in powering the camera and maintaining structural integrity under the stresses of intubation, which are distinct from the mechanical control systems and energy conversion processes in the Compared invention. The Subject's application in surgical settings and critical care, particularly for procedures requiring independent lung ventilation, further distinguishes it from the Compared invention's focus on respiratory therapy.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from Subject and Compared show similarities in the context of medical devices used for respiratory support, but with distinct design and functional differences. Subject's claims focus on a tracheal tube with dual ventilation lumens, one of which is longer and includes a camera and an opening for visualization within the respiratory system. The camera's placement and associated components like LEDs and cuffs are detailed, indicating a design aimed at enhancing visualization and possibly therapeutic interventions within the trachea and bronchi. The operational role of the Subject's tracheal tube involves energy conversion in the form of converting ventilator air flow into respiratory support, with motion transfer being minimal but crucial for camera orientation. The load-bearing capacity is related to the structural integrity of the tube within the respiratory tract. The underlying function is to provide ventilation while allowing for internal visualization, with essential components including the dual lumens, camera, and cuffs. Core interactions involve the interaction between the camera's field of view and the respiratory tract, while internal dynamics include the flow of air and potential fluid delivery for camera maintenance. The applied context is primarily in medical settings for intubated patients, with practical applications in critical care and surgical procedures.  
  
In contrast, Compared's claims describe a tracheal tube system with a focus on suction capabilities, featuring a first tube with an inflatable balloon and a second tube designed for suction, positioned within an indentation of the balloon. The design emphasizes fluid evacuation from the trachea, with the second tube's placement and the balloon's indentation being key design elements. The operational role here involves energy conversion through the suction device to create negative pressure, motion transfer through the positioning of the second tube against the tracheal wall, and load-bearing capacity related to the structural integrity of the tubes and balloon. The underlying function is to provide ventilation while evacuating fluids, with essential components including the inflatable balloon, first and second tubes, and the suction device. Core interactions involve the suction process and the positioning of the second tube, while internal dynamics include the flow of air and suction. The applied context is also in medical settings, particularly for patients requiring tracheal suction, with practical applications in critical care and respiratory therapy.  
  
The methodologies and designs differ significantly, with Subject focusing on visualization and Compared on suction. However, both share the common goal of enhancing patient care through tracheal tubes, albeit with different approaches to achieving this goal.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claims from Subject and Compared exhibit a moderate degree of overlap in the context of tracheal tubes used for respiratory support. Both sets of claims mention the use of tubes for ventilation, with Subject's claims detailing dual lumens and a camera for visualization, while Compared's claims focus on a system with an inflatable balloon and a suction tube for fluid evacuation. The operational roles differ, with Subject's emphasis on visualization and Compared's on suction, yet both involve energy conversion for respiratory support. The methodologies and designs are distinct, with Subject's claims involving complex components like cameras and cuffs, and Compared's claims focusing on the interaction between the balloon and suction tube. The underlying functions and essential components are different, yet both aim to improve patient care in medical settings. The core interactions and internal dynamics also vary, with Subject's claims centered around visualization and Compared's around suction. The applied contexts and practical applications are similar in that both are used in critical care, but the specific purposes within these contexts differ. Given the claim\_score of 7.733, the overlap is described as moderate due to the shared goal of respiratory support but significant differences in design and function.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US9327091B2) Claim number: 4 and Subject Claim: 1**

Both claims discuss a tracheal tube system with a first tube or lumen that is configured to be connected to a ventilation device. The Subject claim provides a detailed description of the tracheal tube, including the configuration of two ventilation lumens, their specific lengths, and the positioning of a camera and an opening. The Compared claim focuses specifically on the first tube's open end being connectable to an artificial ventilation device. The scope of the Subject claim is broader, encompassing the entire tracheal tube system with additional features like the camera and the second lumen, while the Compared claim is narrower, focusing solely on the connection aspect of the first tube. The similarity score reflects the commonality in the ventilation connection aspect.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US7478636B2**Multilumen tracheal catheter to prevent cross contamination  
**Inventor: MADSEN EDWARD B  
Assignee: KIMBERLY CLARK CO  
Priority Date: 08-08-2005  
Publication Date: 01-20-2009  
CPC: A61M16/00  
IPV™ Rating: 7.6644  
Inferred Equivalence: Medium**

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The primary function of the Compared invention (A61M16/00) is to facilitate mechanical ventilation and the administration of anesthetic gases during surgical procedures. It achieves this by using a tracheal tube equipped with an inflatable cuff to seal the trachea, preventing gas leakage and ensuring effective ventilation. The invention also addresses the risk of pneumonia by incorporating a suction system to remove pooled secretions above the cuff, thereby reducing the risk of aspiration into the lungs.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an anticipated overlap between the Subject and Compared patents due to their shared focus on tracheal tubes for respiratory support. However, the overlap is primarily in the general field rather than in specific functionalities. The Subject patent's emphasis on visualization and dual ventilation contrasts with the Compared patent's focus on fluid management and therapeutic delivery, suggesting a medium possibility of overlap. Both patents aim to enhance respiratory care but through different means, potentially impacting different segments of the medical device market. The Subject patent could have a commercial impact in areas requiring bronchial visualization, while the Compared patent might influence markets focused on fluid management and therapeutic delivery in respiratory care.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of creating a sealed environment within the trachea to enable mechanical ventilation. The inflatable cuff, when inflated, presses against the tracheal wall to form an airtight seal, which is essential for maintaining positive intrathoracic pressure during ventilation. The suction system, comprising a single lumen suction tube, is designed to evacuate secretions that accumulate above the cuff, preventing them from being aspirated into the lungs. The underlying functions include sealing the trachea, facilitating gas exchange, and managing secretions. Essential components include the tracheal tube, the inflatable cuff, and the suction tube. Core interactions involve the cuff's interaction with the tracheal wall and the suction tube's interaction with accumulated secretions. The internal dynamics focus on maintaining the cuff's pressure and ensuring effective suction without damaging the tracheal mucosa.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces significant novelty through its integration of a camera apparatus within a multi-lumen tracheal tube, specifically designed for endobronchial intubation. This feature allows for real-time visualization of the bronchial placement, which is a significant advancement over the Compared invention's reliance on a single lumen suction system for managing secretions. The Subject's design with unequal length lumens and the ability to independently ventilate one lung further distinguishes it from the Compared invention, which focuses on general tracheal intubation and secretion management. The mechanical underpinnings of the Subject include the precise control of the camera's field of view and the structural integrity required to support the camera within the tube. The design approaches involve integrating electronic components and ensuring the camera's functionality within the constrained space of the tracheal tube, which is not addressed in the Compared invention. The Subject's focus on bronchial intubation and visualization sets it apart from the Compared invention's broader application in tracheal intubation and secretion management.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from both Subject and Compared patents focus on medical devices used for respiratory support, with specific designs to enhance functionality. The Subject patent describes a tracheal tube with dual ventilation lumens, one of which is longer and includes a camera and an opening for visualization within the patient's bronchus. The camera's placement and the inclusion of light sources and cuffs suggest a focus on improving visibility and sealing within the respiratory tract. The Compared patent, on the other hand, emphasizes a tracheal tube with multiple lumens for fluid management, including ingression and egression lumens for therapeutic agent delivery and fluid removal, respectively. Both patents share the operational role of aiding respiratory functions but diverge in their specific applications: the Subject focuses on visualization and dual ventilation, while the Compared emphasizes fluid management and therapeutic delivery. The methodologies in the Subject involve camera technology and dual lumen design for ventilation, whereas the Compared uses multiple lumens for fluid dynamics and a user manipulable selector for control. The essential components in the Subject include the camera, lumens, and cuffs, while in the Compared, they are the ingression and egression lumens, cuffs, and selector mechanisms. Core interactions in the Subject involve the camera's field of view through the opening and the ventilation process, while in the Compared, they involve fluid flow management and therapeutic agent delivery. The internal dynamics of the Subject revolve around the visualization and ventilation processes, while the Compared focuses on fluid dynamics and control mechanisms. Both patents are applied in the context of medical respiratory care, with the Subject potentially used in scenarios requiring bronchial visualization and the Compared in scenarios needing fluid management and therapeutic delivery.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.6644 suggests a high degree of similarity between the claims. The Subject and Compared patents both deal with tracheal tubes, indicating a significant overlap in the general field of respiratory medical devices. However, the specific functionalities diverge: the Subject patent focuses on visualization and dual ventilation, while the Compared patent emphasizes fluid management and therapeutic delivery. The overlap in the context of tracheal tubes is strong, but the specific applications and components differ significantly, leading to a moderate overlap in terms of detailed functionality and design.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US7478636B2) Claim number: 1 and Subject Claim: 6**

Both claims describe tracheal tubes with multiple lumens and cuffs. The Compared claim specifies an inflatable cuff and separate ingression and egression lumens with specific ports and inlets/outlets for fluid management, while the Subject claim mentions two cuffs, one around both lumens and another around only the second lumen. The scope of the Compared claim focuses on fluid management and therapeutic agent introduction, whereas the Subject claim emphasizes the configuration of the cuffs around the lumens. The similarity score reflects the commonality in the use of multiple lumens and cuffs, but the specific functionalities differ.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: EP3055013B1**TRACHEAL TUBE AND SUCTION DEVICE  
**Inventor: WANG BENJAMIN R  
Assignee: NEVAP INC  
Priority Date: 10-10-2013  
Publication Date: 03-06-2019  
CPC: A61M16/04  
IPV™ Rating: 7.5831  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/152-753-744-851-325/frontpage?l=en](https://www.lens.org/lens/patent/152-753-744-851-325/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to provide an effective airway for patients requiring respiratory support, such as those undergoing mechanical ventilation. From a mechanical engineering perspective, this involves designing a system that can be inserted into the trachea to facilitate the passage of air or other gases into the lungs. The system must maintain an airtight seal to prevent leakage and ensure efficient ventilation, while also allowing for the removal of secretions to minimize the risk of infections like Ventilator Associated Pneumonia (VAP).

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a moderate possibility of overlap between the Subject and Compared patents due to their shared context in tracheal tube systems for ventilation. However, the Subject patent's focus on visualization and differential ventilation through a dual lumen system with a camera contrasts with the Compared patent's emphasis on suction and fluid management. The Subject patent's potential commercial impact lies in enhancing medical diagnostics and patient monitoring, while the Compared patent's impact is centered on improving patient safety and comfort by managing airway secretions. Overall, while both patents operate within the medical field, their specific applications and primary functions suggest a low possibility of significant overlap in their commercial applications.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of a tracheal tube system with a primary channel for air delivery and a secondary system for suctioning secretions. The underlying function is to maintain an open airway and clear secretions, which is achieved through the following mechanisms:

- **Underlying Functions**: The primary channel (107) delivers air from a mechanical ventilator to the patient's lungs, while a secondary lumen connected to a suction device removes secretions from around the inflatable balloon.

- **Essential Components**: The system includes a first tube with an open distal end (122) for air delivery, a second tube for suctioning, and an inflatable balloon to create an airtight seal within the trachea.

- **Core Interactions**: The interaction between the inflatable balloon and the tracheal wall ensures an effective seal, while the negative pressure in the suction lumen removes secretions, reducing the risk of infection.

- **Internal Dynamics**: The dynamics involve the flow of air through the primary channel and the suctioning action in the secondary lumen, both of which are critical for the system's operation. The system's design must consider the mechanical properties of the materials used to ensure flexibility, durability, and biocompatibility.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces several novel aspects compared to the Compared invention:

- **Camera Integration**: The inclusion of a camera within the tracheal tube for real-time visualization is a significant advancement, allowing for more precise placement and monitoring, which is not present in the Compared invention.

- **Endobronchial Tube Design**: The Subject's focus on an endobronchial tube with unequal lumen lengths for independent lung ventilation is distinct from the Compared invention's broader tracheal tube system.

- **Mechanical Underpinnings**: The Subject's design involves complex mechanical integration of electronic components like cameras and LEDs, which requires careful consideration of force distribution and structural integrity to ensure the tube's functionality and safety.

- **Design Approaches**: The Subject employs specific design approaches to integrate visualization technology into a compact medical device, which differs from the Compared invention's focus on suctioning and airway maintenance.

- **Protocols**: The Subject's protocols for use involve advanced visualization techniques, which are not part of the Compared invention's operational protocols.

The overlap between the two inventions is primarily in the use of tracheal tubes for respiratory support. However, the Subject's focus on visualization and endobronchial intubation sets it apart from the Compared invention's emphasis on suctioning and general airway management. The Subject and Compared inventions target different aspects of respiratory care, with the Subject aimed at more specialized procedures involving bronchial intubation and visualization.

**Practical Applications**: The Subject invention is particularly useful in surgical settings where precise placement of the tube in the bronchus is critical, such as during thoracic surgery. It can improve patient outcomes by reducing the risk of misplacement and enhancing the ability to monitor the procedure. The Compared invention, on the other hand, is more broadly applicable to patients requiring mechanical ventilation and focuses on maintaining airway hygiene to prevent infections.

**Market and Industry**: The Subject invention targets the medical device market, specifically within the fields of anesthesiology and thoracic surgery, where visualization aids are crucial. The Compared invention is aimed at a wider market within respiratory care, including intensive care units and emergency medicine, where maintaining an effective airway and preventing infections are primary concerns.

**Potential Impacts**: The Subject invention could revolutionize bronchial intubation procedures by providing real-time visual feedback, potentially reducing complications and improving surgical outcomes. The Compared invention's focus on suctioning could lead to reduced rates of VAP, improving patient safety and outcomes in ventilated patients. Both inventions address real-world challenges in respiratory care, with the Subject focusing on precision and the Compared on hygiene and infection control.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from the Subject and Compared patents share some conceptual similarities but differ significantly in their design and operational roles. The Subject patent focuses on a tracheal tube with dual ventilation lumens, one of which is longer and includes a camera and an opening for visualization within the bronchus. This design is intended for enhanced visualization and possibly differential ventilation, with applications in medical diagnostics and treatment, particularly in scenarios requiring detailed internal observation. The camera's placement and the dual lumen system suggest a focus on improving patient monitoring and care during ventilation. The Compared patent, however, describes a tracheal tube system with a single main tube and an additional suction tube designed to evacuate fluid from the trachea. This system is primarily aimed at managing secretions and maintaining airway clearance, with a focus on patient safety and comfort during ventilation. The operational role of the Compared patent is centered around suction and fluid management, contrasting with the Subject's emphasis on visualization and differential ventilation. Both patents are intended for use in medical settings, particularly in critical care, but their core functions and components serve different primary purposes.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.5831 suggests a potential for overlap between the Subject and Compared patents. However, upon detailed analysis, the overlap is moderate. Both patents deal with tracheal tubes used in ventilation, but the Subject patent's focus on visualization and dual ventilation lumens contrasts with the Compared patent's emphasis on suction and fluid evacuation. The methodologies and designs differ significantly, with the Subject patent incorporating a camera and specific lumen configurations for medical visualization, while the Compared patent includes a suction tube and an inflatable balloon for fluid management. The operational roles, underlying functions, essential components, core interactions, and internal dynamics of the two patents are distinct, leading to a moderate level of overlap in their applied contexts within medical and critical care settings.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (EP3055013B1) Claim number: 4 and Subject Claim: 11**

Both claims discuss the coupling of the tracheal tube to external devices for ventilation. The Compared claim specifically mentions an 'artificial ventilation device', while the Subject claim lists multiple possible devices including a ventilator, which aligns with the concept of an artificial ventilation device. The scope of the Subject claim is broader as it includes various types of ventilation devices, whereas the Compared claim is more specific. The similarity lies in the functionality of connecting the tracheal tube to a device for ventilation purposes.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (EP3055013B1) Claim number: 3 and Subject Claim: 12**

Both claims involve a suction mechanism within the tracheal tube system. The Compared claim describes a system where a lumen in the first tube is connected to a suction device, creating negative pressure in the second tube. The Subject claim mentions a suction lumen with a port near a cuff. The scope of the Compared claim includes the effect of negative pressure across tubes, while the Subject claim focuses on the location of the suction port. The similarity is in the use of suction within the tracheal tube system.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (EP3055013B1) Claim number: 1 and Subject Claim: 6**

Both claims describe the positioning of elements around the tracheal tube. The Compared claim specifies a portion of the second tube on an inflatable balloon at a junction, while the Subject claim mentions cuffs around the ventilation lumens. The scope of the Compared claim is more specific to the positioning of the second tube, whereas the Subject claim focuses on the arrangement of cuffs. The similarity is in the structural arrangement around the tracheal tube.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US9220859B2**Endotracheal tube with dedicated evacuation port  
**Inventor: LI YOUZHI  
Assignee: COVIDIEN LP  
Priority Date: 06-08-2009  
Publication Date: 12-29-2015  
CPC: A61M16/00  
IPV™ Rating: 7.5485  
Inferred Equivalence: Medium**

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The primary function of the Compared invention (A61M16/00) is to facilitate the suctioning of accumulated mucus secretions from the airway of intubated patients. From a mechanical engineering perspective, this involves the design of a tracheal tube with a suction lumen that terminates in a suction port located below the cuff, allowing for the removal of secretions that accumulate in this area. The system is designed to prevent bacterial colonization and reduce the risk of ventilator-associated pneumonia (VAP) by maintaining a clear airway.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a moderate possibility of overlap between the Subject and Compared patents, primarily in the general concept of tracheal tubes for patient ventilation and airway management. The Subject's focus on dual ventilation lumens and visualization through a camera contrasts with the Compared's emphasis on suction and pressure monitoring for secretion management. Both patents target clinical applications, but their specific operational roles and practical applications diverge. The Subject's patent may have a broader commercial impact due to its advanced visualization capabilities, potentially appealing to a wider range of medical procedures. The Compared patent's focus on detailed suction and pressure management systems could be more specialized, targeting specific needs in patient care related to secretion management.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention revolve around the mechanical system's ability to manage mucus secretions below the cuff of a tracheal tube. The underlying functions include the suctioning of secretions through a dedicated suction lumen, which is a critical component for achieving this function. Essential components include the tubular body, the cuff, the suction lumen, and the suction port. The core interactions involve the suction lumen's connection to an external suction source, which creates a negative pressure to draw secretions into the lumen. Internally, the dynamics of the system are governed by the pressure differential created by the suction, which must be carefully managed to avoid damaging the tracheal tissue. The mechanical system's operational role is to facilitate the removal of secretions, thereby maintaining airway patency and reducing the risk of infection. This system is intended for use in medical settings where patients require prolonged intubation.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus within a multi-lumen tracheal tube, specifically designed for bronchial intubation. This feature allows for real-time visualization, which is not present in the Compared invention. The Compared invention focuses on suctioning mucus secretions below the cuff, a function not addressed by the Subject. From a mechanical engineering perspective, the Subject's design involves complex integration of electronic components (camera) into the tracheal tube, which requires considerations for power supply, data transmission, and maintaining the structural integrity of the tube. The Compared invention, on the other hand, emphasizes the mechanical design of the suction system, including the placement and design of the suction port to optimize secretion removal. The Subject's approach to bronchial intubation and visualization differs significantly from the Compared's focus on secretion management, indicating minimal overlap in methodologies, designs, or architectures. The Subject's potential impact lies in improving the accuracy and safety of bronchial intubation procedures, while the Compared invention aims to enhance patient outcomes by reducing the risk of VAP through effective secretion management. Both inventions address different mechanical challenges within the medical field, with the Subject focusing on procedural accuracy and the Compared on post-intubation care.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from Subject and Compared show similarities in the context of medical devices used for ventilation and patient care, specifically in the tracheal area. Both sets of claims mention a tracheal tube with a tubular body and a cuff designed to seal against the trachea, indicating a common operational role in ventilating patients and managing airway secretions. The Subject claims focus on a dual-lumen design with a camera for visualization, which is not present in the Compared claims. However, both sets include features for suction, with the Subject mentioning a suction lumen and the Compared detailing a suction lumen with specific ports and modalities for secretion management. The methodologies and designs differ significantly; the Subject's design incorporates advanced visualization and dual ventilation capabilities, while the Compared focuses on suction and pressure monitoring. The essential components in the Subject include dual ventilation lumens, a camera, and an opening for visualization, whereas the Compared emphasizes a single tubular body, a cuff, and a suction system. The core interactions in the Subject involve ventilation through dual lumens and visual monitoring, while in the Compared, they involve suction and pressure monitoring to manage patient secretions and airway pressure. The internal dynamics of the Subject's system are centered around dual ventilation and visual feedback, contrasting with the Compared's focus on suction and pressure management. Both systems are applied in clinical settings for patient ventilation and airway management, but their practical applications diverge due to the different focuses on visualization versus secretion management.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the Subject and Compared claims is primarily in the general concept of tracheal tubes used for patient ventilation and airway management. Both include a cuff for sealing against the trachea and mention of a suction lumen, indicating some overlap in the operational role of managing patient secretions. However, the Subject's claims introduce a dual-lumen system with a camera for visualization, which is not present in the Compared claims. The Compared claims focus on detailed suction and pressure monitoring systems, which are not detailed in the Subject's claims. The methodologies, designs, and essential components differ significantly, leading to a moderate degree of overlap in the broader context of tracheal tube functionality but not in the specific features and operational dynamics.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US9220859B2) Claim number: 1 and Subject Claim: 12**

Both claims describe a tracheal tube with a suction lumen. The Compared claim specifies a tubular body with an open distal end for ventilation, a cuff for sealing, and a suction lumen terminating in a port below the cuff and proximal to the open distal end. It also includes a pressure monitoring lumen. The Subject claim mentions a suction lumen terminating in a port located proximal to a first cuff. The scope of the Compared claim is broader as it includes additional elements like the pressure monitoring lumen and specific positioning details. The Subject claim focuses solely on the suction lumen's termination. The similarity score reflects the commonality in the suction lumen feature but accounts for the differences in detail and additional elements.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US9220859B2) Claim number: 2 and Subject Claim: 12**

Both claims focus on the suction lumen of a tracheal tube. The Compared claim specifies that the suction lumen is configured to receive aspirated secretions through the suction port, indicating a specific function. The Subject claim mentions the suction lumen terminating in a port located proximal to a first cuff, focusing on the location of the port. The scope of the Compared claim is narrower, focusing on the function of the suction lumen, while the Subject claim is broader, describing the location of the port. The similarity score reflects the commonality in the suction lumen feature but accounts for the differences in focus.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US11000657B2**Respiratory apparatus for lung injury  
**Inventor: MARACAJA LUIZ  
Assignee: MARACAJA LUIZ  
Priority Date: 03-23-2017  
Publication Date: 05-11-2021  
CPC: A61M16/04  
IPV™ Rating: 7.4823  
Inferred Equivalence: Medium**

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The primary function of the Compared invention (A61M16/04) is to facilitate the intubation and ventilation of a patient's lungs using an endotracheal tube assembly. This assembly is designed to provide differential ventilation to various lung lobes, allowing for independent control of ventilation to the upper lobes and specific lower lobes of the lungs. The system includes a tracheal tube with a collapsible insertion guide that accommodates two bronchial tubes, enabling precise placement into the right intermediate bronchus and the left lower bronchus, respectively. This setup is particularly useful in scenarios requiring selective ventilation, such as in the treatment of acute respiratory distress syndrome (ARDS) or during thoracic surgeries where isolation of lung segments is necessary.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between Subject and Compared, there is a moderate possibility of overlap in the patent, primarily due to the shared focus on advanced respiratory support systems. Both patents address the need for effective ventilation but differ in their approach; the Subject focuses on integrated visualization and dual-lumen ventilation, while the Compared emphasizes selective ventilation of lung segments through multiple tubes. The operational roles of both systems involve energy conversion and motion transfer, with the Subject's system also incorporating load-bearing capacity for the camera. The purpose within their applied context is to provide advanced respiratory support in medical settings, with practical applications in surgeries, intensive care, and emergency medicine. The potential commercial impact of the Subject's patent could be significant in markets requiring real-time bronchial visualization, while the Compared's patent could impact markets needing selective lung ventilation.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention revolve around the systemic and operational principles of differential ventilation. The underlying function is to provide independent ventilation to different lung segments, which is achieved through the following mechanisms:

- **Underlying Functions**: The tracheal tube forms a tracheal lumen for ventilating the upper lobes, while the bronchial tubes provide separate lumens for ventilating specific lower lobes. This allows for asynchronous ventilation, which is crucial in managing conditions like ARDS.

- **Essential Components**: The system includes an elongated body of the tracheal tube, a collapsible insertion guide, a tracheal cuff, and two bronchial tubes. Each component plays a critical role in ensuring proper placement and sealing within the respiratory tract.

- **Core Interactions**: The tracheal cuff seals against the trachea to prevent air leakage, while the bronchial tubes interact with the collapsible insertion guide to ensure precise positioning within the desired bronchi. The interaction between these components enables the system to maintain ventilation without compromising the integrity of the respiratory system.

- **Internal Dynamics**: The dynamics involve the flow of gases through the different lumens, controlled by the positioning and sealing of the tubes. The collapsible insertion guide facilitates the insertion and removal of the bronchial tubes, allowing for adjustments based on the patient's needs.

The mechanical system's intended operational role is to facilitate energy conversion from the ventilator to the patient's lungs, ensuring efficient gas exchange while minimizing the risk of complications such as hypoxia or overventilation.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects in the field of tracheal intubation by integrating a camera apparatus directly into the tracheal tube, which enhances visualization and precision during bronchial intubation. This feature distinguishes it from the Compared invention, which relies on a collapsible insertion guide and separate bronchial tubes for differential ventilation but does not include an integrated visualization system. The Subject's use of a camera allows for real-time monitoring and adjustment during placement, potentially reducing the risk of misplacement and improving patient outcomes. From a mechanical engineering perspective, the Subject's design focuses on force distribution and structural integrity to accommodate the camera and electronic components without compromising the tube's functionality. The Compared invention, while innovative in its approach to differential ventilation, does not address the same level of visualization and placement accuracy. Both inventions target the medical field, specifically respiratory therapy, but the Subject's integration of advanced visualization technology offers a competitive advantage in scenarios requiring precise bronchial intubation. The practical applications of the Subject invention include thoracic surgeries and critical care settings where accurate placement is crucial, while the Compared invention is more suited for managing conditions like ARDS where differential ventilation is necessary. The Subject's potential impact lies in improving the safety and efficiency of intubation procedures, whereas the Compared invention's impact is in enhancing the management of respiratory conditions through selective ventilation.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the endotracheal tube assembly in the Compared claims both focus on advanced respiratory support systems, specifically designed for intubation and ventilation. The Subject's tracheal tube features dual ventilation lumens, with the second lumen being longer and designed to align with the upper bronchus, incorporating a camera for visualization through an opening in the second lumen. This design aims to enhance the precision of ventilation and monitoring within the respiratory system, particularly useful in surgical or critical care settings where real-time visualization of the bronchial tree is beneficial. The Compared's endotracheal tube assembly, on the other hand, includes a tracheal tube with a collapsible insertion guide and two separate bronchial tubes for independent ventilation of different lung lobes, which is crucial for selective lung ventilation in complex medical scenarios. Both systems address the need for effective ventilation but differ in their approach; the Subject focuses on integrated visualization and dual-lumen ventilation, while the Compared emphasizes selective ventilation of lung segments through multiple tubes. The operational roles of both systems involve energy conversion (from mechanical to respiratory energy) and motion transfer (of air into the lungs), with the Subject's system also incorporating load-bearing capacity for the camera and lumens. The underlying functions include air delivery and monitoring, with essential components like lumens, cuffs, and in the Subject's case, a camera. Core interactions involve the interaction of air with the lumens and the patient's respiratory system, while internal dynamics include the flow of air and, in the Subject's case, the operation of the camera. Both systems are applied in medical contexts, specifically in respiratory care, with practical applications in surgeries, intensive care, and emergency medicine.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.4823 suggests a potential for overlap between the Subject and Compared claims. The Subject's focus on a dual-lumen tracheal tube with an integrated camera for visualization aligns with the Compared's emphasis on selective ventilation of lung lobes through multiple tubes. However, the methodologies differ significantly; the Subject's system integrates visualization directly into the ventilation process, while the Compared's system focuses on independent ventilation of lung segments. The designs and architectures of the two systems are distinct, with the Subject's system featuring a camera and an opening in the second lumen, and the Compared's system utilizing a collapsible insertion guide and separate bronchial tubes. The operational roles of both systems involve energy conversion and motion transfer, but the Subject's system also includes load-bearing capacity for the camera. The underlying functions, essential components, core interactions, and internal dynamics of both systems are related to ventilation and respiratory support, but the Subject's system adds the function of visualization. The applied contexts and practical applications of both systems are in medical respiratory care, but the Subject's system is more suited for scenarios requiring real-time bronchial visualization. Given these considerations, the overlap between the two systems is described as moderate.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US11000657B2) Claim number: 1 and Subject Claim: 1**

Both claims describe a tracheal or endotracheal tube system designed for ventilation purposes. The Subject claim focuses on a tracheal tube with two ventilation lumens, one of which is longer and includes a camera for visualization, aimed at aligning with an upper bronchus. The Compared claim details an endotracheal tube assembly with a tracheal tube and two bronchial tubes, designed to access different lung lobes for independent ventilation. The scope of the Subject claim is narrower, focusing on the structure and visualization capabilities of the tracheal tube, while the Compared claim has a broader scope, encompassing a system for multi-lobe ventilation. The similarity lies in the use of multiple lumens for ventilation, but the Compared claim includes additional components and functionality for more targeted lung ventilation.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US9789271B2**Medical tubes for selective mechanical ventilation of the lungs  
**Inventor: POL GUILLERMO L  
Assignee: POL GUILLERMO L  
Priority Date: 02-04-2010  
Publication Date: 10-17-2017  
CPC: A61M16/04  
IPV™ Rating: 7.3791  
Inferred Equivalence: Medium**

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The primary function of the Compared invention (A61M16/04) is to facilitate selective mechanical ventilation of the lungs using a single lumen endobronchial tube. This tube is designed to isolate and ventilate either the left or right lung independently, utilizing a series of inflatable cuffs and an aperture to control the flow of medical gas. The mechanical engineering perspective focuses on the design and operation of the tube's components, such as the cuffs and aperture, which must function reliably within the dynamic environment of the human respiratory system.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a moderate possibility of overlap between the Subject and Compared patents due to the shared concept of using cameras in medical tubes, but the overall design, functionality, and application contexts differ significantly. The Subject's focus on dual-lumen ventilation with visual monitoring contrasts with the Compared's emphasis on selective lung ventilation through a single lumen with multiple sealing mechanisms. The potential commercial impact of the Subject's patent could be significant in critical care settings requiring dual-lumen ventilation with visual feedback, while the Compared's patent may have a strong impact in surgical settings needing precise control over lung ventilation.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of a single lumen with multiple inflatable cuffs and an aperture to achieve selective ventilation. The underlying functions include the expansion of the tracheal and bronchial cuffs to create seals against the trachea and bronchi, respectively, which is crucial for isolating the lungs. Essential components include the medical tube, the inflatable cuffs, and the aperture with a mechanism for controlling gas flow. The core interactions involve the inflation and deflation of cuffs to direct gas flow, while the internal dynamics focus on maintaining the structural integrity of the tube and ensuring the proper operation of the sealing mechanisms. The invention's purpose within its applied context is to provide a means of one-lung ventilation in surgical or critical care settings, where precise control over lung ventilation is necessary.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus within a multi-lumen tracheal tube, which is not present in the Compared invention. This feature allows for enhanced visualization during intubation, potentially improving the accuracy and safety of the procedure. The Compared invention focuses on selective ventilation using a single lumen with multiple cuffs, which differs from the Subject's approach of using multiple lumens for independent ventilation. The Subject's design also includes a fenestration and a fluid delivery system for the camera, which are unique elements not found in the Compared invention. From a mechanical engineering perspective, the Subject's design addresses challenges related to visualization and placement accuracy, while the Compared invention focuses on the mechanical control of gas flow and lung isolation. Both inventions serve the medical field, but the Subject's technology may offer advantages in surgical settings where visual guidance is critical, whereas the Compared invention is tailored for scenarios requiring precise control over lung ventilation.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims features a dual-lumen design, with the second lumen being longer and having an opening and a camera for visualization, which is a significant departure from the single-lumen design of the Compared claims. The Subject's design focuses on providing ventilation to both lungs with an additional feature for visual monitoring, while the Compared's design is centered around a single lumen for selective ventilation of either the left or right lung, controlled by multiple inflatable cuffs and a balloon blocker. Both patents mention the use of cameras, but the Subject's camera is specifically positioned to view through an opening in the second lumen, whereas the Compared's camera is embedded within the tube wall without specific positioning details. The Subject's claims also discuss additional features like cuffs, light emitting diodes, and fluid delivery systems for camera maintenance, which are not detailed in the Compared's claims. The operational role of the Subject's device is primarily for dual-lumen ventilation with visual feedback, while the Compared's device focuses on selective lung ventilation with multiple sealing mechanisms. The underlying functions of the Subject's device involve dual ventilation and monitoring, while the Compared's device is about controlled ventilation of specific lung sections. Essential components in the Subject include dual lumens, a camera, and cuffs, while the Compared includes a single lumen, multiple cuffs, and a balloon blocker. Core interactions in the Subject involve ventilation through two lumens and visual monitoring, while in the Compared, it involves selective sealing and ventilation control. The internal dynamics of the Subject's device are centered around dual airflow and visual feedback, while the Compared's device focuses on dynamic sealing and ventilation control. The practical applications of the Subject's device are in scenarios requiring dual-lumen ventilation with visual monitoring, such as in critical care settings, while the Compared's device is applicable in surgical settings requiring selective lung ventilation.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.3791 suggests a potential for overlap, but upon detailed analysis, the overlap between the Subject and Compared claims is moderate. The Subject's dual-lumen design with a camera for visualization through an opening in the second lumen contrasts with the Compared's single-lumen design focused on selective ventilation with multiple sealing mechanisms. While both mention cameras, the positioning and purpose differ significantly. The Subject's additional features like light emitting diodes and fluid delivery systems for camera maintenance further differentiate it from the Compared's focus on ventilation control. The operational roles, underlying functions, essential components, core interactions, and internal dynamics of the two devices are distinct, leading to a moderate overlap in the context of medical ventilation devices.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US9789271B2) Claim number: 4 and Subject Claim: 4**

Both claims incorporate a camera into the tube structure, which is a key similarity. The Compared claim mentions a 'built-in video camera embedded within the common tube wall' of an endobronchial tube, while the Subject claim specifies the camera's location as 'embedded in the wall of the second ventilation lumen' of a tracheal tube. The scope of both claims focuses on enhancing visualization within the respiratory system, but the Subject claim's specification of the second ventilation lumen provides a more detailed placement. The similarity score reflects the shared concept of camera integration but accounts for the different tube structures and specific camera placements.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US9789271B2) Claim number: 10 and Subject Claim: 4**

Both claims incorporate a camera into the tube structure, which is a key similarity. The Compared claim mentions a 'built-in video camera embedded within the common tube wall' of an endobronchial tube, while the Subject claim specifies the camera's location as 'embedded in the wall of the second ventilation lumen' of a tracheal tube. The scope of both claims focuses on enhancing visualization within the respiratory system, but the Subject claim's specification of the second ventilation lumen provides a more detailed placement. The similarity score reflects the shared concept of camera integration but accounts for the different tube structures and specific camera placements.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US9119926B2**Subglottic suctioning system  
**Inventor: CUEVAS BRIAN J  
Assignee: CUEVAS BRIAN J  
Priority Date: 07-31-2009  
Publication Date: 09-01-2015  
CPC: A61M16/04  
IPV™ Rating: 7.29  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/127-534-167-215-241/frontpage?l=en](https://www.lens.org/lens/patent/127-534-167-215-241/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate mechanical ventilation of a patient's lungs by providing a conduit for gases to be introduced into the lungs. This is achieved through a tracheal tube equipped with an inflatable cuff that seals the trachea to prevent gas leakage. The tube also includes a suction lumen to remove secretions above the cuff, reducing the risk of ventilator-associated pneumonia.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a moderate possibility of overlap between the Subject and Compared patents, primarily in the basic structure and purpose of tracheal tubes for respiratory support. The Subject's focus on a dual-lumen system with a camera for visualization and specific lumen and cuff configurations contrasts with the Compared's emphasis on subglottic suctioning and valve mechanisms for managing suction and rinsing fluid. The operational roles differ, with the Subject aimed at advanced monitoring and the Compared at effective secretion management. Both patents have potential commercial impact in the medical field, with the Subject offering innovative visualization capabilities and the Compared providing enhanced suction management for patient care.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of mechanical ventilation, where gases are forced into the lungs through a central lumen of the tracheal tube. The inflatable cuff, located near the distal end of the tube, seals the trachea to maintain pressure and prevent gas escape. The suction lumen, connected to a vacuum source, removes secretions that accumulate above the cuff, mitigating the risk of infection. The underlying functions include gas delivery, sealing, and secretion management. Essential components are the ventilation lumen, cuff inflation lumen, suction lumen, and a valve system for suction control. Core interactions involve the interaction between the cuff and tracheal wall for sealing, and the suction system's interaction with accumulated secretions. Internal dynamics include the pressure dynamics within the trachea and the flow dynamics of gases and secretions.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through the integration of a camera apparatus within the tracheal tube, specifically designed for endobronchial intubation. This feature allows for real-time visualization during placement, which is not present in the Compared invention. The Subject's multi-lumen design with unequal lengths for independent lung ventilation and the use of electronic components for visualization distinguish it from the Compared invention, which focuses on general tracheal intubation and secretion management. The Subject's design addresses the mechanical challenge of precise tube placement, potentially improving patient outcomes in thoracic surgeries, while the Compared invention focuses on reducing infection risks through secretion management. Both inventions serve the respiratory therapy market but target different aspects of tracheal tube functionality and application.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from Subject and Compared share similarities in the context of medical devices used for respiratory support, specifically involving tracheal tubes with multiple lumens. Both sets of claims mention a tracheal tube with a respiratory lumen and an inflatable cuff, indicating a common purpose in sealing the trachea for effective ventilation. The Subject's claims focus on a dual-lumen design with a camera for visualization, which is not present in the Compared claims. However, both sets include a suction lumen and an inflation lumen, suggesting a shared operational role in managing secretions and maintaining cuff inflation. The Subject's claims detail a more complex system with a camera and specific positioning of lumens and cuffs, while the Compared claims emphasize a subglottic suctioning system with a valve body for managing suction and rinsing fluid. The methodologies and designs differ significantly, with the Subject focusing on visualization and the Compared on suction management. The essential components in both include the tracheal tube, lumens, and cuffs, but the core interactions and internal dynamics vary, with the Subject involving camera operations and the Compared involving suction and rinsing fluid management. Both are applied in the context of medical respiratory care, but their practical applications diverge, with the Subject potentially used for more advanced monitoring and the Compared for effective secretion management.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claims from Subject and Compared show some overlap in the use of tracheal tubes with multiple lumens and inflatable cuffs for respiratory support. However, the Subject's claims introduce a camera system and specific lumen configurations not found in the Compared claims, which focus on subglottic suctioning and valve mechanisms for managing suction and rinsing fluid. The overlap is primarily in the basic structure and purpose of the tracheal tube, but the detailed functionalities and operational roles differ significantly. The claim\_score of 7.29 suggests a moderate degree of overlap, as the core concept of tracheal tubes for respiratory support is shared, but the specific implementations and additional features diverge.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US9119926B2) Claim number: 2 and Subject Claim: 12**

Both claims discuss a tracheal tube with a port related to a suction lumen. The Compared claim specifies that the port is elongated circumferentially around the cannula, which provides a specific design detail not mentioned in the Subject claim. The Subject claim mentions the port's location relative to a first cuff, which is not specified in the Compared claim. The scope of the Compared claim is narrower due to the specific design of the port, while the Subject claim's scope is broader as it does not specify the port's design. The similarity score reflects the commonality in the use of a port for suction but differs in the detailed description of the port.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US8584678B2**Medical tubes for selective mechanical ventilation of the lungs  
**Inventor: POL GUILLERMO L  
Assignee: POL GUILLERMO L  
Priority Date: 02-04-2010  
Publication Date: 11-19-2013  
CPC: A61M16/04  
IPV™ Rating: 7.2883  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/169-603-864-884-774/frontpage?l=en](https://www.lens.org/lens/patent/169-603-864-884-774/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate selective mechanical ventilation of a patient's lungs using a single lumen endobronchial tube. This tube is designed to isolate one lung while ventilating the other, utilizing a tracheal portion and a bronchial portion with a common single lumen. The tube includes mechanisms such as inflatable cuffs and an aperture to control the flow of medical gas, ensuring effective ventilation and isolation of the lungs.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

The overall anticipated overlap between the Subject and Compared patents is moderate, primarily due to the shared use of visualization technology within medical tubes. However, the Subject patent's focus on dual-lumen ventilation and monitoring for general respiratory management contrasts with the Compared patent's specialization in one-lung ventilation for thoracic procedures. The Subject patent's dual-lumen system offers versatility in respiratory care, potentially impacting a broader range of medical applications, while the Compared patent's single-lumen design with precise gas control is tailored for specific surgical interventions, suggesting a more targeted commercial impact in thoracic surgery.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of a single lumen endobronchial tube to achieve one-lung ventilation. The underlying functions include the sealing of the trachea and bronchus using inflatable cuffs, which are essential components for creating an airtight seal. The functional processes involve the expansion of these cuffs to isolate the lungs, and the control of gas flow through an aperture, managed by a mechanism within the tube wall. The internal dynamics of the system focus on the interaction between the cuffs, the aperture, and the control mechanism to ensure precise ventilation and isolation. This system is intended to operate within the context of medical ventilation, specifically for surgical procedures requiring one-lung ventilation.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus within a multi-lumen tracheal tube, which is not present in the Compared invention. This feature enhances the precision of tube placement and monitoring during bronchial intubation. The Subject's use of a double-lumen design for independent lung ventilation differs from the single lumen approach of the Compared invention, offering a different methodology for achieving ventilation. The mechanical underpinnings of the Subject include the distribution of forces across the multi-lumen structure, which may provide improved structural integrity and flexibility compared to the single lumen design. The design approaches of the Subject, such as the integration of electronic components for visualization, distinguish it from the Compared invention, which focuses on mechanical control of gas flow. Both inventions address the mechanical challenge of lung ventilation, but the Subject's approach offers potential advantages in terms of visualization and dual-lumen functionality, potentially impacting surgical practices in thoracic procedures. The Compared invention, on the other hand, may be more suited for specific one-lung ventilation scenarios, offering a simpler and potentially more cost-effective solution.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject patent includes dual ventilation lumens, with specific configurations for ventilation and monitoring, including a camera for visualization. The Compared patent focuses on a single lumen endobronchial tube designed for one-lung ventilation, with mechanisms for controlling gas flow and multiple inflatable cuffs for sealing. Both patents mention the use of cameras for visualization, but the Subject patent integrates the camera within a dual-lumen system, while the Compared patent embeds it within a single lumen system. The Subject patent's dual-lumen design allows for differential ventilation and monitoring, whereas the Compared patent's single lumen design is tailored for isolating one lung during ventilation. The operational roles differ significantly; the Subject patent focuses on dual-lumen ventilation with integrated monitoring, suitable for complex respiratory management, while the Compared patent is designed for one-lung ventilation, typically used in thoracic surgeries. The essential components in the Subject patent include dual lumens, cuffs, and a camera, while the Compared patent includes a single lumen, multiple cuffs, and a mechanism for controlling gas flow. The core interactions in the Subject patent involve dual-lumen ventilation and camera visualization, while in the Compared patent, they involve single-lumen ventilation with controlled gas flow and sealing mechanisms. The internal dynamics of the Subject patent revolve around managing two separate ventilation paths, while the Compared patent focuses on managing one-lung ventilation with precise control over gas delivery. Both patents serve critical roles in respiratory care but are applied in different contexts; the Subject patent is more versatile for general respiratory management, while the Compared patent is specialized for thoracic procedures.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the Subject and Compared patents is primarily centered around the use of cameras for visualization within medical tubes. However, the Subject patent's dual-lumen system and the Compared patent's single-lumen system with a mechanism for controlling gas flow represent distinct approaches to respiratory management. The Subject patent's focus on dual-lumen ventilation and monitoring contrasts with the Compared patent's emphasis on one-lung ventilation and precise gas control. While both patents address respiratory care, their methodologies, designs, and operational roles are sufficiently different to suggest a moderate degree of overlap, primarily due to the shared use of visualization technology.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US8584678B2) Claim number: 7 and Subject Claim: 4**

Both claims describe a tracheal or endobronchial tube with an embedded camera. The Compared claim specifies a 'built-in video camera' within the 'common tube wall', while the Subject claim mentions a camera 'embedded in the wall of the second ventilation lumen'. The scope of both claims focuses on the integration of a camera within the tube structure for visualization purposes. The similarity score reflects the close alignment in the concept of embedding a camera within the tube's wall, though the Subject claim specifies a second ventilation lumen, which adds a slight variation in the structural detail.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US8584678B2) Claim number: 1 and Subject Claim: 6**

The Compared claim describes a single lumen endobronchial tube with multiple components including cuffs for sealing and mechanisms for gas control, aimed at isolating and ventilating lungs. The Subject claim, on the other hand, mentions a tracheal tube with two ventilation lumens and two cuffs, one around both lumens and another around the second lumen only. The scope of the Compared claim is broader, covering isolation and ventilation functionalities, while the Subject claim focuses on the structural arrangement of cuffs and lumens. The similarity score reflects the common use of cuffs for sealing, though the structural and functional details differ significantly.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US6513527B1**Bibronchial double lumen tube  
**Inventor: ABDEL-AZIZ AHMED  
Assignee: UNIV MISSISSIPPI MEDICAL CT  
Priority Date: 06-13-2000  
Publication Date: 02-04-2003  
CPC: A61M16/04  
IPV™ Rating: 7.2464  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/173-931-080-949-661/frontpage?l=en](https://www.lens.org/lens/patent/173-931-080-949-661/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate the ventilation of a patient's lungs through a breathing tube system. This system typically includes a single or double lumen tube designed to be inserted into the trachea or bronchi, with inflatable cuffs to create an airtight seal. The tube is connected to a respirator or other air supply mechanism to introduce air into the lungs, allowing for controlled ventilation of one or both lungs as needed in medical procedures.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an anticipated overlap between the Subject and Compared patents, primarily in their operational role of ventilating the lungs using dual tubes or lumens. Both systems are designed for use in clinical settings to support respiratory function, with the Subject offering additional diagnostic capabilities through the integration of a camera. The potential commercial impact of the Subject patent could be higher due to its added functionality for visual monitoring, which could be advantageous in critical care settings. The Compared patent, while focused on effective ventilation, may have a broader application in standard ventilatory support without the added diagnostic feature. Overall, there is a medium possibility of overlap, with the Subject patent potentially offering a competitive edge in the market due to its enhanced capabilities.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of controlled ventilation through a double lumen tube system. The underlying functions include the delivery of respiratory gases to the lungs via separate lumens, which can be independently controlled to isolate or ventilate specific lung sections. Essential components include the lumens themselves, inflatable balloon cuffs that create seals within the trachea or bronchi, and mechanisms for inflating and deflating these cuffs. Core interactions involve the interaction between the tube and the respiratory system, where the cuffs engage with the tracheal or bronchial walls to prevent air leakage. The internal dynamics of the system involve the flow of air through the lumens and the pressure exerted by the cuffs to maintain the seal, ensuring effective ventilation and isolation of lung sections as required.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects by integrating a camera into the tracheal tube, specifically within the second ventilation lumen, to facilitate visualization during bronchial intubation. This feature distinguishes it from the Compared invention, which lacks such integrated visualization technology. The Subject's design also includes a specific configuration where the second lumen extends into a bronchial stem, and the camera's placement opposite an opening enhances its functionality for precise placement. In contrast, the Compared invention focuses on the mechanical aspects of ventilation and sealing without integrated visualization aids. The Subject's use of a camera and its specific lumen configuration for bronchial intubation represent significant advancements in terms of mechanical engineering, particularly in force distribution and structural integrity to accommodate the camera and maintain the tube's functionality. Both inventions target the medical field, specifically respiratory therapy, but the Subject's integration of electronic components and visualization technology offers a competitive advantage in terms of accuracy and safety during intubation procedures. The practical applications of the Subject invention include improved patient safety and procedural efficiency in thoracic surgeries and other medical scenarios requiring precise lung ventilation, while the Compared invention's applications are more focused on general ventilation and lung isolation without the added benefit of integrated visualization.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the breathing tube in the Compared claims share several similarities in design and function, particularly in the context of ventilating a patient's lungs. Both systems feature dual lumens or tubes designed to be inserted into the trachea, with one tube being longer than the other to facilitate differential ventilation or positioning within the bronchial system. The Subject's first and second ventilation lumens are analogous to the Compared's first and second tubes, both designed to be coupled to a ventilator or respirator, indicating a shared operational role in energy conversion for respiratory support. The presence of cuffs in both systems, as mentioned in Subject claims 6 and 7 and Compared claims 1 and 2, serves a similar purpose of sealing the airways to prevent air leakage and ensure effective ventilation. The methodologies and designs in both patents focus on the precise positioning and sealing within the respiratory tract, with the Subject's camera and opening in the second lumen providing a visual aid for positioning, which is not directly mirrored in the Compared but aligns with the need for accurate placement. The essential components, such as the lumens/tubes and cuffs, and core interactions, like the connection to ventilators, are central to both systems' functionality. The internal dynamics involve the flow of air through the tubes and the inflation/deflation of cuffs, which are critical for their applied context in medical ventilation. The practical applications of both systems are primarily in clinical settings for patient ventilation, with the Subject offering additional diagnostic capabilities through the camera.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.2464 suggests a significant degree of similarity between the Subject and Compared claims. The overlap is evident in the dual tube/lumen design, the use of cuffs for sealing, and the overall purpose of ventilating the lungs. However, the Subject's inclusion of a camera and specific positioning features for the second lumen introduces elements not directly present in the Compared, indicating a moderate degree of overlap in terms of specific features and functionalities. The core function of ventilating the lungs and the use of dual tubes for this purpose show a strong overlap, but the additional diagnostic capabilities in the Subject differentiate it to some extent.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US6513527B1) Claim number: 2 and Subject Claim: 6**

Both claims describe the use of cuffs in a breathing or tracheal tube system. The Compared claim specifies a second inflation cuff around the second tube, detailing its inflation mechanism and functionality. The Subject claim also mentions a second cuff but around the second ventilation lumen, without specifying the inflation mechanism. The similarity lies in the use of a second cuff specifically around the second tube/lumen, but the Subject claim lacks detail on the inflation mechanism. The scope of the Compared claim is broader as it includes the mechanism for inflation and deflation, whereas the Subject claim focuses on the placement of the cuffs.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US6513527B1) Claim number: 11 and Subject Claim: 1**

Both claims describe a dual-lumen or dual-tube system for ventilating a patient. The Compared claim focuses on the structural arrangement of two tubes with specific lengths and attachments, including wires and a spring structure for positioning. The Subject claim also describes two ventilation lumens with specific lengths and positioning, but adds a camera and an opening for visualization. The similarity is in the dual-lumen/tube concept and their relative lengths, but the Subject claim introduces additional features like a camera, which the Compared claim does not mention. The scope of the Compared claim is more mechanical and structural, while the Subject claim extends into visualization technology.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US6513527B1) Claim number: 15 and Subject Claim: 1**

Both claims discuss the configuration of dual tubes or lumens. The Compared claim specifies an angle between the tubes when one is linearly oriented, focusing on the structural positioning. The Subject claim also mentions the relative lengths of the lumens but adds a camera and an opening for visualization. The similarity lies in the dual-tube/lumen concept and their relative positioning, but the Subject claim introduces additional features not present in the Compared claim. The scope of the Compared claim is narrower, focusing on the angle between tubes, while the Subject claim encompasses both structural and functional elements.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: EP3056237B1**SUBGLOTTIC SUCTIONING SYSTEM  
**Inventor: CUEVAS BRIAN J  
Assignee: AVENT INC  
Priority Date: 07-31-2009  
Publication Date: 05-01-2019  
CPC: A61M16/04  
IPV™ Rating: 7.2433  
Inferred Equivalence: Medium**

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The primary function of the Compared invention (A61M16/04) is to facilitate mechanical ventilation of a patient's lungs by providing a sealed pathway for gas delivery. This is achieved through a tracheal tube equipped with an inflatable cuff that seals the trachea, preventing gas leakage and ensuring effective ventilation. The tube also includes a suction lumen to remove secretions above the cuff, reducing the risk of ventilator-associated pneumonia.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between 'Subject' and 'Compared', there is a moderate anticipated overlap of the patent. Both patents focus on tracheal tubes for respiratory support, but they serve different operational roles: 'Subject' focuses on dual ventilation and visualization, while 'Compared' emphasizes suctioning and fluid management. The purpose within their applied contexts differs, with 'Subject' aimed at surgical or critical care settings and 'Compared' at long-term ventilation to prevent infections. The potential commercial impact of 'Subject' could be significant in markets requiring advanced visualization and dual ventilation capabilities, while 'Compared' could have a strong impact in markets focused on infection prevention in long-term ventilation scenarios. Overall, there is a low possibility of direct overlap due to the distinct functionalities and applications of each patent.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of creating an airtight seal within the trachea using an inflatable cuff, which is essential for maintaining the necessary pressure for mechanical ventilation. The underlying function involves the delivery of gases through the central lumen of the tracheal tube into the patient's lungs. Essential components include the flexible cannula, the inflatable cuff, and the suction lumen with associated valves. Core interactions involve the inflation of the cuff to engage the tracheal wall, the flow of gases through the respiratory lumen, and the suction mechanism to remove secretions. Internally, the dynamics include the pressure management within the cuff and the suction system's operation to prevent backflow of secretions into the lungs.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel features in the design of the suction lumen, specifically its bent oval or bean-shaped cross-section, which differs from the typical round, oval, or elliptical shapes found in the Compared invention. This unique shape may enhance the efficiency of suction and the management of secretions. Additionally, the Subject invention includes a check valve for rinsing fluid application, which is not present in the Compared invention, providing a more comprehensive approach to maintaining the cleanliness of the suction system. The fail-safe mechanism of the suction valve in the Subject invention further distinguishes it by ensuring that the suction system remains operational even if user intervention ceases. These innovations address mechanical challenges such as improving the structural integrity of the suction lumen and optimizing the energy efficiency of the suction process. The Subject and Compared inventions both target the respiratory therapy market, particularly in the context of mechanical ventilation and infection prevention, but the Subject invention offers enhanced functionality and safety features that could influence industry practices and provide competitive advantages in managing patient care.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from 'Subject' and 'Compared' both focus on medical devices used for respiratory support, but they diverge significantly in their design and functionality. The 'Subject' claims describe a tracheal tube with dual ventilation lumens, one of which is longer and designed to align with the upper bronchus, featuring an opening and a camera for visualization. This design emphasizes the ability to monitor and ventilate different parts of the respiratory system independently, with specific applications in scenarios requiring detailed internal visualization, such as during surgeries or critical care. The camera's placement and the use of additional components like cuffs and LEDs suggest a focus on enhancing visibility and functionality within the respiratory tract.  
  
In contrast, the 'Compared' claims detail a tracheal tube designed for subglottic suctioning, with a single respiratory lumen and a dedicated suction lumen for removing secretions above the cuff. This design includes a complex valve system for managing suction and rinsing fluid, indicating a focus on maintaining airway hygiene and preventing ventilator-associated pneumonia. The 'Compared' tracheal tube's design is tailored for applications where suctioning and fluid management are critical, such as in long-term ventilation scenarios.  
  
The methodologies and designs differ significantly: 'Subject' focuses on dual ventilation and visualization, while 'Compared' emphasizes suctioning and fluid management. The operational roles also differ, with 'Subject' aimed at energy conversion (ventilation) and motion transfer (camera movement), and 'Compared' focused on load-bearing capacity (suctioning and fluid flow). The underlying functions of 'Subject' involve dual ventilation and monitoring, while 'Compared' involves suctioning and fluid management. Essential components in 'Subject' include dual lumens, a camera, and cuffs, whereas 'Compared' includes a suction lumen, valves, and a port. Core interactions in 'Subject' are between the camera and the respiratory system, while in 'Compared', they are between the suction system and the respiratory tract. The internal dynamics of 'Subject' involve air flow and camera operation, while 'Compared' involves suction and fluid flow. The applied contexts for 'Subject' are primarily in surgical or critical care settings, while 'Compared' is used in long-term ventilation scenarios to prevent infections.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claims from 'Subject' and 'Compared' show a moderate degree of overlap in the context of tracheal tubes used for respiratory support. Both sets of claims mention the use of tracheal tubes, but the specific functionalities and components differ significantly. 'Subject' focuses on dual ventilation and visualization, while 'Compared' emphasizes suctioning and fluid management. The overlap is primarily in the general application of tracheal tubes in medical settings, but the detailed design and operational roles are distinct. The claim\_score of 7.2433 suggests a potential for overlap, but the differences in design and function indicate that the overlap is not significant.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (EP3056237B1) Claim number: 3 and Subject Claim: 12**

Both claims describe a tracheal tube with a suction lumen and a port located proximal to a cuff. The Compared claim provides a more detailed description, including a flexible cannula with multiple lumens, an inflatable cuff, and a valve system with a suction valve and a check valve for managing rinsing fluid. The Subject claim, while less detailed, also mentions a suction lumen and a port, but lacks the specifics on the valve system and the multiple lumens. The similarity lies in the basic structure of the tracheal tube with a suction system, but the Compared claim extends the scope by detailing the valve system and the integration of rinsing fluid management.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US11147442B2**Medical devices and methods of placement  
**Inventor: MOLNAR ROBERT  
Assignee: WM & DG INC  
Priority Date: 08-08-2014  
Publication Date: 10-19-2021  
CPC: A61B1/267  
IPV™ Rating: 7.2386  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/064-976-631-400-171/frontpage?l=en](https://www.lens.org/lens/patent/064-976-631-400-171/frontpage?l=en)

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The primary function of the Compared invention (A61B1/267) is to provide a visualization device for intubation and continuous monitoring of a patient's airway. From a mechanical engineering perspective, this involves the design and integration of a camera within a camera tube that can be inserted into various medical devices, such as oral airway devices, to facilitate real-time visualization and remote monitoring. The camera tube is designed to be adjustable and reusable, enhancing its utility across different medical applications.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a moderate possibility of overlap between the tracheal tube and the oral airway device, primarily due to their shared use of cameras for visualization in medical procedures. The tracheal tube is designed for more specialized applications within the trachea and bronchi, while the oral airway device offers a more versatile solution for general airway management. Both devices aim to improve patient care through enhanced visualization, but their structural and operational differences limit the extent of overlap. The potential commercial impact of the tracheal tube may be focused on specialized medical markets, such as bronchoscopy and intubation, where precise visualization is critical. In contrast, the oral airway device could have a broader commercial impact due to its versatility in airway management, potentially appealing to a wider range of medical professionals and settings.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of a camera within a sealed camera tube to provide continuous visualization. The underlying functions include the transmission of visual data from the camera to external monitoring systems, which requires the integration of electronic components such as wires and a transparent seal at the distal end of the camera tube. Essential components include the camera, the camera tube, and the transparent material at the distal end. Core interactions involve the camera capturing images and transmitting them through the wire to a monitoring device. The internal dynamics focus on maintaining the camera's position within the tube and ensuring the integrity of the seal to prevent contamination. The mechanical system's operational role is to facilitate the accurate placement of medical devices and monitor the patient's airway, which is crucial in medical contexts such as intubation and post-intubation care.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its multi-lumen design specifically tailored for endobronchial intubation, which differs from the Compared invention's focus on a universal visualization device for various medical applications. The Subject's camera is integrated into the tracheal tube itself, providing a unitary assembly for bronchial intubation, whereas the Compared invention's camera is designed to be removable and reusable across different devices. From a mechanical engineering perspective, the Subject's design involves unique challenges in force distribution and structural integrity due to the integration of the camera within the tube's wall, as opposed to the Compared invention's simpler integration into a separate camera tube. The Subject's design also addresses specific mechanical challenges related to the smaller lumen diameters and the need for an airtight seal, which are not directly addressed by the Compared invention. The practical applications of the Subject invention are primarily in thoracic surgery and critical care, where precise bronchial intubation is required, while the Compared invention serves a broader range of medical procedures involving airway management. Both inventions aim to improve patient care through visualization, but they target different aspects of respiratory care and offer distinct advantages in their respective fields.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from Subject and the oral airway device claims from Compared share similarities in the use of a camera for visualization purposes within a medical device. In Subject, the tracheal tube includes a camera attached to the second ventilation lumen, aimed at providing a field of view through an opening in the lumen wall. This camera setup is designed to assist in visualizing the upper bronchus of a patient, which is crucial for precise medical procedures such as intubation or bronchoscopy. The camera's location and orientation are specified to ensure optimal visualization, and additional features like light emitting diodes and fluid delivery systems are included to enhance the camera's functionality and maintain its clarity. In contrast, the oral airway device in Compared incorporates a camera within a camera tube, which is part of a two-part tubal body. This camera is used for continuous visualization during patient ventilation and can be adjusted in position, offering flexibility in its application. The camera in the oral airway device is sealed with a transparent material at the distal end, ensuring a clear view while maintaining sterility. Both devices aim to improve patient care through enhanced visualization, but they differ in their structural design and operational flexibility. The tracheal tube focuses on a fixed camera position within a dual-lumen system, while the oral airway device offers an adjustable camera within a modular, two-part system. The underlying function of both devices is to facilitate medical procedures by providing visual feedback, but the tracheal tube is more specialized for tracheal and bronchial applications, whereas the oral airway device is designed for broader airway management, including intubation and ventilation. The essential components in both include the camera and the lumens, but the tracheal tube includes additional elements like cuffs and multiple lumens for different purposes, while the oral airway device focuses on adjustability and integration with other medical tools like a bougie. The core interactions in the tracheal tube involve the camera's field of view through the lumen's opening, while in the oral airway device, the interaction involves the camera's adjustability and its integration with the bougie for intubation. The internal dynamics of the tracheal tube are centered around maintaining a clear view of the bronchus, while the oral airway device's dynamics involve the movement and positioning of the camera and bougie. Both devices are applied in medical contexts, specifically in respiratory care, but the tracheal tube is more suited for specialized procedures in the trachea and bronchi, while the oral airway device is versatile for general airway management. The practical applications of the tracheal tube include bronchoscopy and intubation guidance, while the oral airway device is used for intubation, ventilation, and continuous monitoring of the airway.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.2386 indicates a significant degree of similarity between the tracheal tube and the oral airway device, particularly in their use of cameras for visualization. The tracheal tube's camera is fixed and designed to view through an opening in the second ventilation lumen, while the oral airway device's camera is adjustable and part of a modular system. Both devices aim to enhance medical procedures through visual feedback, but the tracheal tube is more specialized for tracheal and bronchial applications, whereas the oral airway device offers broader airway management capabilities. The overlap in the use of cameras for visualization is notable, but the differences in design and application suggest a moderate degree of overlap overall.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US11147442B2) Claim number: 1 and Subject Claim: 1**

Both claims describe devices used for ventilating a patient and incorporating a camera for visualization. The Subject claim details a tracheal tube with two ventilation lumens, one of which is longer and has an opening and a camera for viewing through the opening. The Compared claim describes an oral airway device with a two-part tubal body, a camera tube, and a camera for continuous visualization. The scope of the Subject claim is focused on the specific configuration of the tracheal tube with two lumens and a camera for direct visualization through an opening. The Compared claim's scope is broader, encompassing an adjustable two-part tubal body and a camera system that can be inserted and removed, aimed at continuous visualization during ventilation. The similarity lies in the use of a camera for visualization during ventilation, but the structural and operational details differ significantly.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US10342944B2**Airway device with camera  
**Inventor: MOLNAR ROBERT  
Assignee: WM & DG INC  
Priority Date: 06-01-2012  
Publication Date: 07-09-2019  
CPC: A61M16/04  
IPV™ Rating: 7.2101  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/171-239-835-999-576/frontpage?l=en](https://www.lens.org/lens/patent/171-239-835-999-576/frontpage?l=en)

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The Compared invention, described under CPC A61M16/04, is a laryngeal mask airway designed to facilitate breathing in patients by providing an airway passage. It features a tube that can be connected to a ventilator for assisted breathing and includes a cuff to seal the airway, preventing aspiration and ensuring proper ventilation. The primary function from a mechanical engineering perspective involves the design of the tube and cuff to conform to the patient's anatomy, ensuring minimal trauma during insertion and effective sealing for ventilation.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an anticipated overlap between the Subject and Compared patents, primarily due to their shared focus on airway management and the use of camera systems for visual guidance. However, the differences in design, such as the dual-lumen approach in the Subject's tracheal tube versus the separate camera lumen in the Compared's airway device, suggest a moderate level of overlap. Both devices aim to facilitate ventilation and intubation, with the Subject's device emphasizing dual-lumen ventilation and the Compared's device focusing on a combined ventilating and intubating function. The potential commercial impact of each patent could be significant in the medical device market, particularly in settings where airway management is critical. The Subject's tracheal tube may appeal to markets requiring dual-lumen ventilation, while the Compared's airway device could be more suitable for applications needing a combined ventilating and intubating solution.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of a flexible tube that can adapt to the curvature of the patient's pharynx, and an inflatable cuff that seals the airway. The underlying functions include the tube's ability to maintain an open airway, the cuff's role in sealing the esophagus to prevent aspiration, and the overall system's capacity to facilitate both spontaneous and assisted ventilation. Essential components include the tube, the cuff, and the dome structure at the tube's end. Core interactions involve the tube's interaction with the patient's anatomy, the cuff's inflation to create a seal, and the potential for an endotracheal tube to be inserted through the laryngeal mask airway. The internal dynamics focus on the tube's flexibility and the cuff's ability to conform to the patient's anatomy, ensuring effective ventilation and minimal trauma.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its multi-lumen design and integrated camera system, which allows for precise visualization and placement during bronchial intubation. This contrasts with the Compared invention, which lacks such a visualization system and focuses on a single tube with a cuff for sealing. The Subject's design addresses the mechanical challenge of ensuring correct placement in the bronchial stem, which is not addressed by the Compared invention. The Subject's use of a camera and multi-lumen structure for independent lung ventilation represents a significant advancement in tracheal tube technology, offering improved precision and functionality over the Compared invention. The practical applications of the Subject invention are primarily in thoracic surgery and critical care, where precise bronchial intubation is crucial, whereas the Compared invention is more suited for general airway management. Both inventions aim to improve patient care in respiratory therapy, but the Subject's technology offers a competitive advantage in scenarios requiring precise bronchial intubation.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the airway device in the Compared claims both involve medical devices designed for airway management and ventilation, which are crucial in medical contexts such as emergency care, surgery, and intensive care units. Both devices incorporate a camera system for visual monitoring, which is essential for guiding the insertion and ensuring proper placement within the patient's airway. The Subject's tracheal tube features dual ventilation lumens, with one lumen specifically designed to align with the upper bronchus and includes an opening for the camera's field of view. In contrast, the Compared's airway device uses a single ventilating tube and an intubating tube, with a separate camera lumen that includes a clear window for visibility. Both devices utilize cameras for visual guidance, but the Subject's design integrates the camera directly into the ventilation lumen, while the Compared's design uses a separate lumen for the camera, which can be removed and replaced. The Subject's tracheal tube also includes additional features like cuffs for sealing and light sources for enhanced visibility, which are similarly present in the Compared's airway device, albeit with different configurations such as a dome and an inflatable cuff. The operational role of both devices focuses on facilitating ventilation and intubation, with the Subject's device emphasizing dual-lumen ventilation and the Compared's device focusing on a combined ventilating and intubating function. The underlying functions of both devices involve ensuring effective airway management and patient monitoring, with essential components like lumens, cameras, and sealing mechanisms. Core interactions include the interaction between the device and the patient's airway, as well as the interaction between the camera and the medical professional for guidance. The internal dynamics of both devices involve the flow of air through the lumens and the transmission of visual data from the camera. The practical applications of these devices are primarily in clinical settings where airway management is critical, such as in hospitals and emergency medical services.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.2101 suggests a significant degree of similarity between the Subject and Compared claims. Both devices are designed for airway management and include a camera system for visual guidance, which indicates a strong overlap in their intended use and functionality. However, the specific design and implementation of these features differ, with the Subject's tracheal tube using dual lumens and integrated camera placement, while the Compared's airway device uses separate lumens for ventilation and camera placement. The presence of additional features like cuffs, lights, and specific configurations for ventilation and intubation further differentiates the devices, yet the core purpose of facilitating airway management and patient monitoring remains consistent. This indicates a moderate to high level of overlap in terms of their operational role and underlying functions, but the differences in design and implementation suggest a moderate degree of overlap overall.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US10342944B2) Claim number: 1 and Subject Claim: 1**

Both claims describe devices for airway management with integrated camera systems. The Subject claim details a tracheal tube with two ventilation lumens, one of which is longer and has a camera and an opening for viewing. The Compared claim describes an airway device with a ventilating tube and an intubating tube, where a separate camera lumen is attached to the tube, and the camera is removable and viewable through a clear window. The scope of the Subject claim focuses on the dual-lumen configuration and the specific placement of the camera and opening, while the Compared claim emphasizes the modularity of the camera system and the integration of an intubating tube within a ventilating tube. The similarity lies in the use of cameras for visualization within the airway, but the structural and functional details differ significantly.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US10342944B2) Claim number: 4 and Subject Claim: 5**

Both claims incorporate lighting elements near the camera in airway devices. The Subject claim specifies the use of LEDs near the camera in a tracheal tube, while the Compared claim mentions at least one light mounted on the tube near the camera lumen in an airway device. The scope of the Subject claim is focused on the specific use of LEDs for illumination, whereas the Compared claim's scope is broader, mentioning any type of light. The similarity is in the use of lighting to aid camera functionality, but the types of lights and their integration differ.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US6443156B1**Separable double lumen endotracheal tube  
**Inventor: NIKLASON LAURA E  
Assignee: NIKLASON LAURA E  
Priority Date: 08-02-2000  
Publication Date: 09-03-2002  
CPC: A61M16/04  
IPV™ Rating: 7.1895  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/126-546-683-808-467/frontpage?l=en](https://www.lens.org/lens/patent/126-546-683-808-467/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to provide a separable double lumen endotracheal tube that allows for the independent ventilation of each lung during surgical procedures. This device is designed to mitigate the risks associated with conventional double lumen endotracheal tubes, such as bronchial damage and vocal cord scarring, by allowing the removal of one lumen while the other remains in place. From a mechanical engineering perspective, the invention focuses on the structural integrity and modularity of the tube system, ensuring that the separation and removal of one lumen do not compromise the functionality of the remaining lumen.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

The overall anticipated overlap between the Subject and Compared patents is moderate. Both patents focus on the operational role of managing patient airways through dual-lumen tubes, but they diverge significantly in their specific designs and functionalities. The Subject's integration of a camera system for visualization purposes contrasts with the Compared's emphasis on the structural separability of the tube for flexibility in medical procedures. The potential commercial impact of the Subject's patent could be significant in settings where visual monitoring of the airways is critical, such as in intensive care units or during complex surgeries. Conversely, the Compared's patent might have a broader impact in surgical and critical care settings where the ability to adjust and remove parts of the tube post-intubation is advantageous. Given the differences in focus and application, there is a low possibility of direct overlap in their commercial applications.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention revolve around the modularity and separability of the double lumen endotracheal tube. The underlying functions include the ability to independently ventilate each lung, which is achieved through the use of two separate tubular members, each defining a lumen. Essential components include the first tubular member (bronchial lumen) and the second tubular member (tracheal lumen), which are removably affixed to each other. Core interactions involve the separation and withdrawal of one lumen while the other remains in place, facilitated by a sheath or other mechanical means. The internal dynamics of the system are centered around maintaining an airtight seal and ensuring that the remaining lumen can function alone for positive pressure ventilation. The mechanical system's operational role is to provide a safe and efficient means of ventilating patients during surgical procedures, particularly when post-operative ventilatory support is anticipated.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects by integrating a camera apparatus into the tracheal tube, which significantly enhances the visualization and accuracy of bronchial intubation. This differs from the Compared invention, which focuses on the separability of the double lumen endotracheal tube for post-operative ventilatory support. The Subject's use of electronic components and a unitary assembly for camera positioning represents a distinct mechanical engineering approach, focusing on improving the procedural aspect of intubation rather than the post-operative management. Overlapping aspects include the use of multi-lumen designs and the focus on independent lung ventilation, but the Subject's emphasis on visualization technology sets it apart. From a mechanical engineering perspective, the Subject's design addresses challenges related to force distribution and structural integrity by ensuring that the camera and associated components do not compromise the tube's functionality. The design approaches and protocols, such as the integration of electronic components and the use of a unitary assembly, further distinguish the Subject's mechanical identity. Both inventions aim to improve patient care in respiratory therapy, but they target different aspects of the procedure and post-operative care, with the Subject focusing on procedural accuracy and the Compared invention on post-operative flexibility.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims features a dual-lumen design with a camera integrated into the second ventilation lumen, aimed at providing visual access to the upper bronchus. This design is intended for use in medical settings, specifically for intubation and ventilation procedures, enhancing the ability to monitor and manage patient airways. The camera's placement and the inclusion of an opening in the second lumen are critical for its operational role in visualizing the bronchial area, which is essential for accurate placement and monitoring during medical procedures. The Subject also mentions various configurations of the camera and additional components like cuffs and lumens for fluid delivery, which are designed to improve the functionality and safety of the tracheal tube in clinical applications.  
  
In contrast, the Compared claims focus on a separable double lumen endotracheal tube, which emphasizes the ability to separate the two lumens for different medical needs, such as independent ventilation of the lungs. The design includes mechanisms like a sheath or tongue-and-groove connections for separation, which are not present in the Subject's claims. The Compared's focus is on the structural and operational flexibility of the tube, allowing for adjustments during and after intubation, which is crucial in surgical and critical care settings. The presence of cuffs in both sets of claims indicates a common purpose in sealing the airways, but the Compared's approach to cuff placement and the ability to remove parts of the tube post-intubation differ significantly from the Subject's integrated camera system.  
  
Both sets of claims address the operational role of managing patient airways, but they diverge in their methodologies and designs. The Subject's emphasis on visualization through a camera system contrasts with the Compared's focus on structural separability and adaptability. The underlying functions of both involve airway management, but the essential components and core interactions differ, with the Subject relying on visual feedback and the Compared on physical separation and reconfiguration.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.1895 suggests a potential for significant overlap between the Subject and Compared claims. However, upon detailed analysis, the overlap is primarily in the general concept of using dual-lumen tubes for airway management in medical settings. The Subject's claims focus on integrating a camera for visualization, which is not mentioned in the Compared claims. Conversely, the Compared's emphasis on the separability of the lumens and the use of specific connection mechanisms like sheaths and tongue-and-groove connections is absent from the Subject's claims. While both sets of claims mention the use of cuffs for sealing the airways, the configurations and purposes differ, with the Subject using cuffs to support the camera system and the Compared using them to facilitate the separation and removal of tube sections. Therefore, despite the high claim\_score, the actual overlap in specific design elements and functionalities is moderate at best.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US6443156B1) Claim number: 12 and Subject Claim: 1**

Both claims describe a medical device used for intubation, involving multiple lumens. The Compared claim outlines a method of using a separable double lumen endotracheal tube, where one lumen serves as a bronchial tube and the other as a tracheal tube, with the ability to remove one of the tubes. The Subject claim details a tracheal tube with two ventilation lumens, one longer than the other, and includes a camera for visualization. The scope of the Compared claim is focused on the method of intubation and the ability to separate the tubes, while the Subject claim's scope includes the structural details of the tracheal tube and the addition of a camera. The similarity lies in the use of dual lumens for ventilation, but the Subject claim adds a visualization component not present in the Compared claim.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US6443156B1) Claim number: 6 and Subject Claim: 6**

Both claims involve the use of cuffs in a tracheal tube setup. The Compared claim mentions a single tracheal cuff in a separable double lumen endotracheal tube, while the Subject claim describes two cuffs, one around both lumens and another around only the second lumen. The scope of the Compared claim is narrower, focusing on the presence of a single cuff, whereas the Subject claim's scope includes the configuration of two cuffs. The similarity is in the use of cuffs for sealing purposes, but the Subject claim provides a more detailed arrangement.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US8434486B2**Supraglottic fixation device for endotracheal tubes  
**Inventor: WOOD LOCKETT E  
Assignee: WOOD LOCKETT E  
Priority Date: 12-18-2009  
Publication Date: 05-07-2013  
CPC: A61M16/00  
IPV™ Rating: 7.1603  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/016-767-464-458-525/frontpage?l=en](https://www.lens.org/lens/patent/016-767-464-458-525/frontpage?l=en)

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The primary function of the Compared invention (A61M16/00) is to facilitate artificial respiration by providing a sealed airway for the delivery of gases to a patient's lungs. From a mechanical engineering perspective, this involves the design of a tubular body that can be inserted into the trachea and secured in place to maintain a high-quality seal against the tracheal passageway. The device must be capable of withstanding the pressures generated by ventilators and must be designed to minimize patient discomfort and complications such as ulceration or unintended movement.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between the Subject and Compared, there is an overall moderate possibility of overlap in the patents. Both patents focus on the mechanical system's intended operational role of facilitating ventilation within the trachea, but they diverge in their specific designs and functionalities. The Subject's tracheal tube is designed for differential ventilation and includes a camera for visualization, which could be particularly useful in surgical or diagnostic applications within the respiratory system. The Compared's endotracheal tube ventilating device, on the other hand, emphasizes secure and stable positioning within the trachea, which is crucial for general ventilation scenarios. The potential commercial impact of the Subject's patent could be significant in specialized medical fields requiring both ventilation and visual monitoring, while the Compared's patent could have a broader impact in general respiratory care due to its focus on secure positioning. Overall, while there is some overlap in their basic function of ventilation, the distinct features and applications of each patent suggest a low possibility of direct competition.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve systemic principles of sealing and anchoring within the trachea. The underlying function is to create an airtight seal using a cuff or similar mechanism, which is essential for effective ventilation. The essential components include the tubular body, a sealing cuff, and an anchoring device, which may be mechanical or inflatable. The core interactions involve the interface between the tube and the tracheal wall, where the cuff expands to create a seal, and the anchoring device secures the tube's position. Internally, the dynamics include the pressure management within the cuff to maintain the seal without causing tissue damage, and the structural integrity of the tube to resist deformation under ventilatory pressures. The operational role of this system is to enable controlled gas delivery and removal, crucial for patient respiration in medical settings.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its multi-lumen design and integrated camera system, which are not present in the Compared invention. The multi-lumen configuration allows for independent ventilation of each lung, a feature not addressed by the single-lumen design of the Compared invention. The camera apparatus provides a significant advancement in visualization technology, enabling precise placement of the tube within the bronchial system, which is a departure from the anchoring mechanisms used in the Compared invention. From a mechanical engineering perspective, the Subject's design involves complex force distribution to maintain the integrity of the dual lumens and the camera system, as well as energy efficiency considerations for the electronic components. The design approaches and protocols for the Subject include specialized fabrication techniques to integrate the camera and ensure its functionality within the tracheal environment, distinguishing it from the simpler mechanical anchoring and sealing mechanisms of the Compared invention. The Subject's focus on bronchial intubation and visualization sets it apart, targeting a more specialized segment of respiratory care compared to the broader application of the Compared invention in general artificial respiration.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the endotracheal tube ventilating device in the Compared claims both involve medical devices designed for respiratory support, specifically for insertion into the trachea of a patient. The Subject's tracheal tube features dual ventilation lumens, with one lumen longer and designed to align with the upper bronchus, and includes a camera for visualization through an opening in the second lumen. This design focuses on providing ventilation and visual monitoring within the respiratory system. In contrast, the Compared's endotracheal tube ventilating device emphasizes secure positioning within the trachea through an anchoring device that contacts the hypopharynx and epiglottis without sealing these areas, and includes a sealing cuff and an inflatable region for stability. The operational role of both devices is centered around facilitating ventilation, but the Subject's device additionally supports diagnostic visualization, while the Compared's device focuses on secure and stable positioning. The underlying functions of the Subject's device include ventilation and visual monitoring, with essential components like the dual lumens, camera, and opening, whereas the Compared's device's functions are primarily ventilation and secure positioning, with components like the tubular body, sealing cuff, and anchoring device. The core interactions in the Subject's device involve the interaction between the camera and the opening for visualization, and the dual lumens for differential ventilation, while in the Compared's device, the interactions are between the anchoring device and the patient's anatomy for positioning, and the tubular body with the ventilator for ventilation. The internal dynamics of the Subject's device involve the flow of air through the lumens and the visual field of the camera, while the Compared's device involves the dynamics of the anchoring device's positioning and the inflation of cuffs. Both devices are applied in the context of medical respiratory care, with the Subject's device potentially used in scenarios requiring both ventilation and visual monitoring, and the Compared's device used in scenarios requiring stable and secure ventilation. The practical applications of the Subject's device could extend to surgical or diagnostic procedures within the respiratory system, while the Compared's device would be applied in general ventilation scenarios where secure positioning is critical.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.1603 suggests a potential for overlap between the Subject and Compared claims. However, upon detailed analysis, the overlap is found to be moderate. The Subject's tracheal tube and the Compared's endotracheal tube ventilating device both aim to facilitate ventilation within the trachea, and both are connected to a ventilator, indicating a functional similarity. However, the Subject's device includes unique features such as dual ventilation lumens with one lumen designed for alignment with the upper bronchus and a camera for visualization, which are not present in the Compared's device. Conversely, the Compared's device features an anchoring mechanism for secure positioning within the hypopharynx and epiglottis, which is not described in the Subject's claims. The methodologies, designs, and architectures differ significantly, with the Subject focusing on differential ventilation and visualization, and the Compared focusing on secure positioning and stability. The operational roles, underlying functions, essential components, core interactions, and internal dynamics of the two devices are distinct, leading to a moderate overlap in their overall purpose and application within the context of respiratory care.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US8844534B2**Tracheal tube with lumen for tracheal pressure measurement and technique for using the same  
**Inventor: BEHLMAIER MARK R  
Assignee: BEHLMAIER MARK R  
Priority Date: 06-30-2009  
Publication Date: 09-30-2014  
CPC: A61M16/04  
IPV™ Rating: 7.1563  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/163-453-601-503-192/frontpage?l=en](https://www.lens.org/lens/patent/163-453-601-503-192/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate the controlled delivery of gases to a patient's lungs through a tracheal tube, which may include an inflatable cuff to create an airtight seal within the trachea. This system is designed to manage the flow of air or other gases, ensuring precise control over the type and amount of substances entering and exiting the patient's respiratory system. The invention aims to provide a reliable method for ventilating patients, particularly those requiring intubation, by maintaining an effective seal and allowing for adjustments based on airway pressure measurements.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a moderate possibility of overlap between the Subject and Compared patents due to their shared focus on tracheal tubes for medical ventilation. However, the Subject patent's emphasis on visualization and multi-functional support through a camera and additional lumens contrasts with the Compared patent's focus on pressure monitoring and cuff design. The operational roles of both patents involve facilitating ventilation, but their specific purposes within the medical context differ. The Subject patent's potential commercial impact could be significant in areas requiring visual diagnostics and multi-functional support in tracheal tubes, while the Compared patent's impact would be more focused on improving pressure monitoring and cuff design in medical ventilation systems. Overall, there is a low possibility of significant overlap due to the distinct functionalities and applications of each patent.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the Compared invention involves the use of an inflatable cuff associated with the tracheal tube to create a seal within the trachea. The underlying function is to control the flow of gases by ensuring that the only pathway for substances is through the tube itself. Essential components include the tracheal tube, the inflatable cuff with a distal and proximal shoulder, and a pressure monitoring lumen. The cuff's inflation mechanism, typically connected to a first lumen, allows for the expansion of the cuff into the trachea, creating an airtight seal. The pressure monitoring lumen, connected to a second lumen, enables the measurement of airway pressure, which is crucial for adjusting ventilator settings. The internal dynamics involve the interaction between the cuff's inflation and the tracheal wall, ensuring a secure seal, while the pressure monitoring system provides feedback on the effectiveness of the ventilation process. This system is intended to operate within the context of medical ventilation, where precise control over gas delivery is essential for patient care.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects by incorporating a sealed second lumen and a pressure transducer, which enhance the precision of pressure monitoring within the tracheal space. This differs from the Compared invention, which focuses on the general functionality of tracheal tubes and the use of an inflatable cuff for sealing. The Subject's sealed second lumen allows for a more accurate measurement of pressure changes, as it responds to external forces applied to the distal shoulder, a feature not present in the Compared invention. The integration of a pressure transducer directly into the tracheal tube further distinguishes the Subject, providing real-time pressure data that can be used to adjust ventilator settings more effectively. From a mechanical engineering perspective, the Subject's design involves advanced force distribution and energy efficiency, as the sealed lumen and pressure transducer work together to optimize the ventilation process. The design approaches and protocols, such as the sealing mechanism and the use of a pressure transducer, define the Subject's operation and set it apart from the Compared invention, which relies on more traditional sealing and pressure measurement methods. The Subject's innovations could lead to improved patient outcomes by providing more accurate and responsive ventilation control.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from both Subject and Compared patents focus on medical devices used for ventilation and monitoring within a patient's respiratory system. The Subject patent emphasizes a dual-lumen tracheal tube with a camera for visualization, specifically designed for alignment with the upper bronchus and equipped with various configurations for the camera and additional lumens for different functionalities like fluid delivery and suction. The Compared patent, on the other hand, focuses on a tracheal tube with an inflatable cuff and lumens for pressure monitoring and cuff inflation, aimed at measuring tracheal pressure. Both patents share the common goal of improving patient care through advanced tracheal tube designs, but they diverge in their specific methodologies and applications. The Subject patent's design includes a camera and multiple lumens for various purposes, while the Compared patent's design centers around pressure monitoring and cuff design for accurate tracheal pressure measurement. The operational roles of both patents involve facilitating ventilation and monitoring, but the Subject patent's focus is on visual inspection and additional functionalities, whereas the Compared patent's focus is on pressure dynamics and cuff design. The underlying functions of the Subject patent include visualization and multi-functional support, while the Compared patent's functions revolve around pressure monitoring and cuff inflation. Essential components in the Subject patent include dual lumens, a camera, and various additional lumens, while the Compared patent includes a conduit, inflatable cuff, and pressure monitoring lumens. Core interactions in the Subject patent involve camera visualization and fluid management, while in the Compared patent, they involve pressure measurement and cuff interaction with the trachea. The internal dynamics of the Subject patent involve the coordination of multiple lumens and camera operation, while the Compared patent's dynamics focus on pressure changes within the cuff and lumens. Both patents are applied in the context of medical ventilation, but the Subject patent's applications extend to visual diagnostics and multi-functional support, while the Compared patent's applications are centered on pressure monitoring and cuff design optimization.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the Subject and Compared patents is primarily in the general concept of tracheal tubes used for ventilation. However, the specific features and functionalities differ significantly. The Subject patent's focus on a camera and multiple lumens for various purposes does not directly overlap with the Compared patent's emphasis on pressure monitoring and cuff design. The claim\_score of 7.1563 suggests a potential for overlap, but the detailed analysis indicates that the overlap is moderate at best, as the patents address different aspects of tracheal tube functionality.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US10881823B2**Medical tubes for selective mechanical ventilation of the lungs  
**Inventor: POL GUILLERMO L  
Assignee: POL GUILLERMO L  
Priority Date: 02-04-2010  
Publication Date: 01-05-2021  
CPC: A61M16/04  
IPV™ Rating: 7.138  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/098-041-469-581-305/frontpage?l=en](https://www.lens.org/lens/patent/098-041-469-581-305/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate selective mechanical ventilation of the lungs using a single lumen endobronchial tube. This tube is designed to isolate one lung while ventilating the other, which is crucial in procedures such as one-lung ventilation (OLV). The tube includes a medical tube with a single lumen, cuffs for sealing against the trachea and bronchus, and mechanisms for controlling gas flow through an aperture, allowing for precise control over ventilation to either lung.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an anticipated overlap between the Subject and Compared patents, primarily in the area of medical visualization and airway management. Both patents focus on the operational role of managing patient airways, with the Subject emphasizing simultaneous ventilation and observation through a dual-lumen system, and the Compared focusing on selective lung ventilation with potential visualization. The potential commercial impact of the Subject patent lies in its ability to provide real-time bronchial observation during ventilation, which could be valuable in surgical and critical care settings. The Compared patent's method for selective lung ventilation could have significant impact in thoracic surgery and other procedures requiring one-lung ventilation. Overall, while there is a medium level of overlap, the distinct approaches suggest a low possibility of direct competition but a potential for complementary use in medical practice.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the Compared invention involves the use of a single lumen endobronchial tube to achieve selective ventilation. The underlying functions include the ability to isolate one lung by sealing the tube's lumen with a balloon blocker, while allowing ventilation of the other lung through an aperture controlled by a mechanism within the tube wall. Essential components include the medical tube itself, the tracheal and bronchial inflatable cuffs, the aperture, and the mechanism for controlling gas flow. The core interactions involve the expansion of cuffs to create seals against the trachea and bronchus, and the operation of the mechanism to control the aperture's opening, which enables the tube to switch between ventilating the left or right lung. Internally, the dynamics involve the pressure management within the tube to ensure effective ventilation and isolation, which is critical for procedures like OLV in thoracic surgery.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces significant novelty through its multi-lumen design and integrated camera apparatus, which are not present in the Compared invention. The multi-lumen configuration allows for independent ventilation of each lung, a feature not achievable with the single lumen design of the Compared invention. The camera apparatus enhances the precision of tube placement, addressing the challenge of correct intubation and bronchial stem placement, which is a critical improvement over the Compared invention's reliance on external visualization tools like bronchoscopes. From a mechanical engineering perspective, the Subject's design involves more complex force distribution and energy management due to the dual lumens and integrated electronics, offering improved structural integrity and operational efficiency. The practical applications of the Subject invention are primarily in thoracic surgery and critical care, where precise control over lung ventilation is essential, potentially offering advantages in terms of patient safety and procedural efficiency. In contrast, the Compared invention is focused on one-lung ventilation, suitable for specific surgical procedures but lacking the versatility and advanced visualization capabilities of the Subject invention.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims features a dual-lumen design with integrated camera technology for visualization, specifically tailored for medical applications such as ventilation and bronchial observation. The first ventilation lumen and the second, longer ventilation lumen are designed to be connected to a ventilator, with the second lumen having an opening and a camera for viewing through this opening. The camera's placement and the use of cuffs for sealing are critical components for the operational role of the tracheal tube in medical settings, particularly in managing patient airways and providing visual feedback during procedures. The Compared claims detail a method for one-lung ventilation using a single lumen endobronchial tube, which includes inflatable cuffs and a balloon blocker for selective lung ventilation. The method also mentions a potential for a built-in video camera, which aligns with the Subject's focus on visualization. Both patents emphasize the importance of visualization and airway management, but they differ in their approach: the Subject focuses on a dual-lumen system with a camera for direct bronchial observation, while the Compared focuses on a method using a single lumen with selective ventilation capabilities. The underlying functions of both involve airway management and ventilation, but the essential components and core interactions differ, with the Subject's system designed for simultaneous ventilation and observation, and the Compared's method designed for selective lung ventilation with potential visualization.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the Subject and Compared claims is primarily in the area of medical visualization and airway management. Both mention the use of cameras for visualization, which indicates a significant overlap in the context of medical procedures requiring visual feedback. However, the Subject's dual-lumen design and the Compared's single lumen method for selective ventilation represent different approaches to achieving similar goals. The claim\_score of 7.138 suggests a strong overlap in the conceptual and functional aspects of visualization and airway management, but the methodologies and designs differ significantly, leading to a moderate degree of overlap in practical application.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US10569038B2**Dual lumen endobronchial tube device  
**Inventor: HOFTMAN NIR  
Assignee: UNIV CALIFORNIA  
Priority Date: 07-06-2012  
Publication Date: 02-25-2020  
CPC: A61M16/04  
IPV™ Rating: 7.0704  
Inferred Equivalence: Medium**

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The primary function of the Compared invention (A61M16/04) is to provide a dual lumen endobronchial tube that facilitates independent ventilation of each lung, with a universal design suitable for insertion into either the left or right mainstem bronchus. This device is crucial in surgical settings where lung isolation is necessary, such as during thoracic surgery, to maintain immobility of one lung and to allow for differential ventilation. The mechanical engineering perspective focuses on the design's ability to navigate the anatomical curvature of the human airway while maintaining structural integrity and ensuring effective sealing with balloon cuffs.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a moderate possibility of overlap between the Subject and Compared patents, primarily due to the shared use of dual lumens for ventilation, which is central to their operational role in energy conversion and motion transfer within the respiratory system. However, the Subject patent's focus on visualization through a camera and specific opening differentiates it from the Compared patent, which emphasizes structural design and sealing with balloon cuffs. The Subject patent's potential commercial impact could be significant in medical diagnostics and procedures requiring real-time visualization, while the Compared patent's impact might be more focused on surgical and intensive care applications where efficient ventilation and sealing are critical. Overall, while there is some overlap, the patents cater to different specific needs within the broader context of respiratory support systems.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of a dual lumen system separated by a flexible semilunar membrane, which allows for equal distribution of airflow to each lung. The functional principles include the use of balloon cuffs to create an airtight seal within the trachea and bronchus, ensuring independent ventilation. The underlying functions are supported by the structural design of the tube, which includes a pre-bent shaft to match the airway's curvature, and the use of a lubricant layer to facilitate insertion and reduce friction. Essential components include the tracheal and bronchial lumens, the semilunar membrane, and the balloon cuffs. Core interactions involve the interaction between the tube's external surface and the patient's airway, as well as the internal dynamics of airflow management through the dual lumens. The mechanical system's role is to provide a reliable pathway for ventilation while minimizing the risk of airway injury.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects by integrating a camera system directly into the tracheal tube, which is not present in the Compared invention. This addition allows for real-time visualization during intubation, significantly improving the accuracy and safety of the procedure. The Subject's design also includes a second cuff with an S-shape, which differs from the cylindrical shape of the Compared invention's cuffs, potentially offering better sealing and positioning. From a mechanical engineering perspective, the Subject's use of a camera and specific cuff design enhances the tube's functionality in terms of force distribution and structural integrity, as the camera system requires additional considerations for durability and protection within the tube's structure. The Compared invention focuses on the mechanical aspects of dual lumen design and airway navigation, whereas the Subject emphasizes visualization and precision in placement. Both inventions target the medical field, specifically respiratory therapy, but the Subject's integration of electronic components and advanced cuff design sets it apart, potentially offering competitive advantages in terms of procedural efficiency and patient safety.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject patent includes a dual ventilation lumen system with a camera and an opening in the second lumen, designed for visualization within the respiratory system. The Compared patent also features a dual lumen system, specifically a universal dual lumen endobronchial device, with a tracheal and bronchial lumen, and balloon cuffs for sealing. Both patents focus on respiratory support systems but differ in their specific design and functionalities. The Subject patent's camera and opening in the second lumen provide a means for direct visualization, which is not present in the Compared patent. However, both patents share the concept of dual lumens for ventilation, which is crucial for their operational role in energy conversion (ventilation) and motion transfer (airflow). The Subject patent's camera and opening serve to enhance the internal dynamics by allowing for real-time monitoring, which could be applied in medical diagnostics or procedures. The Compared patent's design with balloon cuffs and specific lumen configurations aims at efficient ventilation and sealing, applicable in surgical or intensive care settings. The methodologies in both patents involve the use of lumens for air passage, but the Subject patent includes additional components like the camera for enhanced functionality, while the Compared patent focuses on the structural design of the lumens and cuffs for optimal performance.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.0704 indicates a potential for significant overlap between the Subject and Compared patents. The overlap primarily stems from the shared concept of dual lumens for ventilation, which is fundamental to both patents' operational roles in energy conversion and motion transfer within the respiratory system. However, the Subject patent's inclusion of a camera and specific opening for visualization introduces a unique feature not found in the Compared patent, which instead focuses on the structural design and sealing capabilities with balloon cuffs. This difference in focus suggests that while there is a foundational overlap in the use of dual lumens, the specific applications and additional components diverge, leading to a moderate degree of overlap overall.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US7258120B2**Endotracheal tube apparatus and method for using the same to reduce the risk of infections  
**Inventor: MELKER RICHARD  
Assignee: UNIV FLORIDA  
Priority Date: 05-29-2002  
Publication Date: 08-21-2007  
CPC: A61M16/00  
IPV™ Rating: 7.0435  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/016-260-176-202-047/frontpage?l=en](https://www.lens.org/lens/patent/016-260-176-202-047/frontpage?l=en)

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The primary function of the Compared invention (A61M16/0486) is to provide a double lumen endotracheal tube apparatus that facilitates ventilation and suctioning for patients requiring mechanical ventilation. This apparatus is designed to allow for the replacement or cleaning of the inner tube without re-intubating the patient, thereby reducing the risk of ventilator-associated pneumonia (VAP) and minimizing tracheal injury through the use of inward curves at the distal end of the second tube.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an anticipated overlap between the Subject and Compared patents, primarily in their operational role within medical ventilation and patient care. Both patents focus on providing respiratory support through intubation, with systems designed to manage ventilation and secretions. The Subject's inclusion of a camera and specific configurations of lumens and cuffs adds unique functionalities, suggesting a moderate overlap in specific features but a strong overlap in the broader context of medical applications. The potential commercial impact of the Subject patent could be higher due to the added visualization capability, which could enhance patient care and procedural efficiency in medical settings. The Compared patent, while lacking these specific features, still offers a robust solution for ventilation and suction, with potential applications in long-term intubation scenarios.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of a tube-in-tube design, where the inner tube is responsible for ventilation and can be removed, cleaned, or replaced while the outer tube remains in place. This design facilitates continuous or intermittent suction between the tubes to remove secretions and reduce the risk of VAP. The system includes multiple connectors for ventilation and suction, and inflatable cuffs to ensure a proper seal within the trachea. The underlying functions involve gas exchange through the inner tube, suction through the channel formed between the inner and outer tubes, and the use of inward curves at the distal end to minimize tracheal injury. Essential components include the first and second tubes, connectors, suction channels, and inflatable cuffs. Core interactions involve the flow of gases and secretions, while internal dynamics focus on maintaining a balance between ventilation and suction to prevent complications.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through the integration of a camera apparatus within the tracheal tube, which allows for real-time visualization during intubation, particularly for endobronchial placement. This feature is not present in the Compared invention, which focuses on a tube-in-tube design for ventilation and suction. The Subject's use of a camera enhances the precision of tube placement, reducing the risk of incorrect intubation and potential damage to the trachea or bronchi. The Compared invention, while innovative in its approach to reducing VAP through replaceable inner tubes, does not incorporate visualization technology. Both inventions address different aspects of mechanical engineering challenges in respiratory care: the Subject focuses on precision and visualization, while the Compared invention emphasizes infection prevention and ease of maintenance. The Subject's design may influence industry practices by improving the accuracy of intubation procedures, whereas the Compared invention could offer competitive advantages in long-term ventilation scenarios by reducing the need for re-intubation. The practical applications of the Subject are primarily in surgical and critical care settings where precise intubation is crucial, while the Compared invention targets prolonged ventilation scenarios in intensive care units.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the double lumen endotracheal tube apparatus in the Compared claims share several similarities in their design and operational roles, particularly in the context of medical ventilation and patient care. Both systems are designed for intubation and ventilation, with multiple lumens to facilitate different functions such as ventilation and suction. The Subject's tracheal tube includes a first and second ventilation lumen, with the second lumen having an opening and a camera for visualization, which aligns with the Compared's use of multiple tubes for ventilation and suction, though without a camera. Both systems utilize cuffs to ensure a seal within the trachea, with the Subject specifying two cuffs and the Compared detailing a first and second inflatable cuff. The operational role of both systems involves energy conversion in the form of converting mechanical ventilation into respiratory support, and motion transfer through the flow of gases and fluids within the tubes. The underlying function of both is to provide effective ventilation and manage secretions, with essential components like lumens, cuffs, and connectors. Core interactions include the interaction between the lumens and the patient's respiratory system, and internal dynamics involve the flow and pressure management within the tubes. In their applied context within medical settings, both systems aim to support patients requiring respiratory assistance, with practical applications in intensive care and surgical settings. However, the Subject's inclusion of a camera and specific configurations of lumens and cuffs provide additional functionalities not explicitly mentioned in the Compared claims.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.0435 suggests a significant degree of overlap between the Subject and Compared claims. The overlap is primarily in the design and function of the ventilation systems, both utilizing multiple lumens for different purposes, and the use of cuffs to ensure a proper seal. However, the Subject's claims introduce a camera and specific configurations of lumens and cuffs that are not present in the Compared claims, indicating a moderate degree of overlap in terms of specific features and functionalities. The overlap in the broader context of medical ventilation and patient care is strong, but the specific features and operational details show a moderate level of similarity.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US10682480B2**Shaped evaluation port for a multi-lumen tracheal tube  
**Inventor: SEDERSTROM DONN  
Assignee: COVIDIEN LP  
Priority Date: 12-13-2011  
Publication Date: 06-16-2020  
CPC: A61M16/04  
IPV™ Rating: 7.0284  
Inferred Equivalence: Medium**

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The primary function of the Compared invention (A61M16/04) is to facilitate the evacuation of secretions from the tracheal area of a patient. From a mechanical engineering perspective, this involves the design of a tracheal tube with an integrated suction lumen and an ovoid opening strategically positioned to enhance the efficiency of suctioning. The ovoid opening, with a larger inner diameter than the suction lumen, is designed to reduce air channel formation within the suction lumen, thereby improving the suctioning force and efficiency. This design aims to manage the accumulation of secretions around the seal of the cuff, preventing their migration into the lungs.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a moderate possibility of overlap between the Subject and Compared patents due to their shared focus on tracheal tubes for patient ventilation. However, the Subject patent's emphasis on dual-lumen design with a camera for visualization and differential ventilation, suitable for specialized medical procedures, contrasts with the Compared patent's focus on a single-lumen design with an optimized suction system for general ventilation needs. The Subject patent could have a significant commercial impact in critical care and surgical settings where advanced monitoring is required, while the Compared patent may impact the market for general ventilation equipment by improving patient safety and comfort during long-term ventilation. Overall, the patents cater to different needs within the medical field, suggesting a low possibility of direct competition but a potential for complementary use in different clinical scenarios.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention revolve around the mechanical principles of fluid dynamics and suction. The underlying function is to create a negative pressure within the suction lumen to draw secretions into the lumen through the ovoid opening. Essential components include the tracheal tube, the suction lumen, and the ovoid opening. The core interactions involve the flow of secretions into the suction lumen, facilitated by the shape and size of the ovoid opening, which minimizes air channel formation. Internally, the dynamics of the system are governed by the pressure differential created by the suction mechanism, which drives the movement of secretions. The mechanical system's operational role is to enhance the efficiency of secretion removal, thereby improving patient safety and comfort in respiratory therapy.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects in the field of tracheal tubes by integrating a camera apparatus for real-time visualization during bronchial intubation. This feature significantly enhances the precision of tube placement, addressing the mechanical challenge of correct intubation within the trachea and bronchus. In contrast, the Compared invention focuses on improving the efficiency of secretion evacuation through a specifically shaped ovoid opening. The overlap between the two inventions is minimal, as the Subject's emphasis on visualization and dual-lumen design for independent ventilation differs from the Compared's focus on secretion management. From a mechanical engineering perspective, the Subject's design involves complex integration of electronic components and optical systems, while the Compared's design centers on optimizing fluid dynamics and suction efficiency. The Subject's approach to mechanical control systems and dedicated hardware logic for camera operation distinguishes it from the Compared's simpler mechanical design focused on force distribution and energy efficiency in suctioning.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from Subject and Compared share some common elements related to the design and functionality of tracheal tubes, but they diverge significantly in their specific features and operational roles. The Subject claims focus on a dual-lumen tracheal tube with a camera and specific configurations for ventilation and observation within the patient's airway. The camera's placement and the dual-lumen design are intended for enhanced visualization and differential ventilation, which could be applied in scenarios requiring detailed monitoring of the bronchial system, such as in critical care or surgical settings. The inclusion of cuffs, light sources, and fluid delivery systems further indicates a focus on maintaining clear visibility and managing secretions, which is crucial for prolonged intubation scenarios.  
  
In contrast, the Compared claims emphasize a single-lumen tracheal tube with an inflatable cuff and a suction system designed to manage secretions and reduce air channel formation during suctioning. The ovoid opening and specific dimensions of the suction lumen suggest a focus on optimizing the suction process to prevent complications like atelectasis, which is particularly relevant in long-term ventilation scenarios in intensive care units. The design aims to improve patient comfort and safety by minimizing the risk of airway damage.  
  
The methodologies and designs differ in their approach to patient care: the Subject's design is geared towards advanced monitoring and differential ventilation, while the Compared's design focuses on effective secretion management and patient safety during suctioning. The operational roles diverge, with the Subject's tube potentially used in more specialized medical procedures, and the Compared's tube being more suited for general ventilation needs with an emphasis on suction efficiency.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the Subject and Compared claims is moderate. Both sets of claims deal with tracheal tubes and their application in patient ventilation, but the specific features and intended uses differ significantly. The Subject's focus on dual-lumen design with a camera for visualization and differential ventilation contrasts with the Compared's emphasis on a single-lumen design with an optimized suction system. While both address aspects of patient care in ventilation scenarios, the methodologies, designs, and operational roles are distinct, leading to a moderate degree of overlap in their broader context of tracheal tube functionality.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US8757159B2**Apparatus and method for selective ventilation of a patient  
**Inventor: NIERICH ARNO PETER  
Assignee: NIERICH ARNO PETER  
Priority Date: 05-02-2007  
Publication Date: 06-24-2014  
CPC: A61M16/00  
IPV™ Rating: 7.0058  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/034-252-332-191-726/frontpage?l=en](https://www.lens.org/lens/patent/034-252-332-191-726/frontpage?l=en)

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The primary function of the Compared invention (A61M16/00) is to facilitate selective ventilation of one or both lungs of a patient using a dual-tube system. This system includes an endotracheal tube for tracheal intubation and an endobronchial tube that extends into a bronchus, allowing for independent ventilation of each lung. The mechanical engineering aspect involves the design and operation of the dual-tube system, which must ensure proper sealing within the trachea and bronchus, and the ability to adjust the positioning of the endobronchial tube for precise placement.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a moderate possibility of overlap between the Subject and Compared claims, primarily due to their shared goal of enhancing respiratory care. The Subject's tracheal tube focuses on visualization and dual-lumen ventilation, which could be seen as complementary to the Compared's emphasis on selective ventilation and precise positioning within the trachea. Both systems aim to improve patient outcomes in respiratory care but through different operational roles and methodologies. The potential commercial impact of the Subject's patent could be significant in medical fields requiring precise visualization during ventilation, such as in critical care or surgical settings. The Compared's patent could have a broad impact in scenarios requiring selective lung ventilation, potentially affecting anesthesia and respiratory therapy markets.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of positioning means to accurately place the endobronchial tube within the desired bronchus. These positioning means are designed to be movable between a retracted position, allowing passage through the endotracheal tube, and an extended operative position for co-action with the trachea wall. The system operates on the principle of selective ventilation, where the positioning means, often asymmetrical and adapted to interact with the trachea wall, help guide the endobronchial tube to the correct bronchial stem. The underlying functions include the ability to control the depth and direction of the endobronchial tube, ensuring an airtight seal in both the trachea and the bronchus. Essential components include the dual tubes, positioning means, and balloons for sealing. Core interactions involve the mechanical movement of the positioning means and the sealing action of the balloons. The internal dynamics focus on the fluid dynamics of air flow through the tubes and the mechanical forces exerted by the positioning means on the trachea wall.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects by integrating a camera apparatus into the tracheal tube, which is not present in the Compared invention. This camera allows for direct visualization of the intubation process, enhancing the precision of placement within the bronchus. The Compared invention relies on mechanical positioning means without visual aids, which can lead to inaccuracies and longer placement times. The Subject's use of a multi-lumen design to accommodate the camera and its unitary assembly for camera positioning represents a significant departure from the Compared invention's dual-tube system. From a mechanical engineering perspective, the Subject's design focuses on improving the force distribution and structural integrity of the tracheal tube to accommodate the camera, while the Compared invention emphasizes the mechanical control of tube positioning. The Subject's approach to intubation through visual feedback offers a competitive advantage in terms of accuracy and ease of use, potentially impacting the medical field by reducing the need for additional visualization tools like bronchoscopes.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims focuses on a dual-lumen design with integrated camera technology for visualization within the respiratory system. The first and second ventilation lumens are designed to be coupled to a ventilator, with the second lumen extending longer and aligning with the upper bronchus. The camera, positioned opposite an opening in the second lumen, allows for direct visualization of the bronchial area, which is crucial for precise medical interventions. The tracheal tube also includes various configurations such as cuffs, light sources, and fluid delivery systems to enhance functionality and maintain camera clarity. In contrast, the Compared claims detail a device and method for selective ventilation of one or both lungs, utilizing an endotracheal and endobronchial tube system. This system includes positioning means to guide the endobronchial tube into a specific bronchus, using tactile feedback and asymmetrical positioning aids like balloons or deformable members. The operational role of the Subject's tracheal tube is centered around visualization and dual ventilation, while the Compared's device focuses on selective ventilation and precise positioning within the trachea. Both systems aim to improve respiratory care but through different methodologies and operational roles. The Subject's system is more focused on direct visualization and dual-lumen ventilation, whereas the Compared's system emphasizes selective ventilation and precise positioning within the trachea.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.0058 suggests a potential for overlap between the Subject and Compared claims. The Subject's tracheal tube with its dual-lumen design and camera system for visualization shares a conceptual similarity with the Compared's focus on selective ventilation and precise positioning within the respiratory system. Both systems are designed to enhance respiratory care, with the Subject focusing on visualization and the Compared on selective ventilation. However, the methodologies and operational roles differ significantly; the Subject's system is more about direct visualization and dual-lumen ventilation, while the Compared's system emphasizes selective ventilation and precise positioning. The overlap is moderate due to the shared goal of improving respiratory care but through different means and focuses.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: EP2142240B1**APPARATUS AND METHOD FOR SELECTIVE VENTILATION OF A PATIENT  
**Inventor: NIERICH ARNO PETER  
Assignee: GELANUS B V  
Priority Date: 05-02-2007  
Publication Date: 03-04-2015  
CPC: A61M16/04  
IPV™ Rating: 6.9993  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/183-848-334-099-35X/frontpage?l=en](https://www.lens.org/lens/patent/183-848-334-099-35X/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate selective intubation and ventilation of a patient's lungs using a double-lumen tube system. This system includes an endotracheal tube for the trachea and an endobronchial tube that extends into one of the bronchi, allowing for independent ventilation of each lung. The mechanical engineering aspect involves the design and integration of two tubes of different lengths, with balloons for sealing and a Y-guide for positioning, ensuring precise placement within the patient's airways.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a moderate possibility of overlap between the Subject and Compared patents due to their shared context in respiratory care. However, the focus of the Subject on dual lumens with visualization capabilities and the Compared's emphasis on precise positioning and selective ventilation suggest distinct operational roles and applications. The Subject's tracheal tube is designed for enhanced visualization and dual ventilation, primarily used in critical care settings, while the Compared's ventilating device is tailored for surgical or intensive care scenarios requiring selective lung ventilation. The potential commercial impact of the Subject's patent could be significant in markets focused on advanced respiratory care and visualization, whereas the Compared's patent might impact markets needing precise control over lung ventilation, such as in thoracic surgery or specialized intensive care units.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of a double-lumen tube system where the shorter tube terminates in the trachea and the longer tube extends into a bronchus. The system employs balloons to create airtight seals in the trachea and bronchus, enabling independent ventilation. The positioning mechanism, a Y-guide connected to a spring-loaded stylet, facilitates accurate placement by feel along the trachea and into the desired bronchus. The underlying functions include the transfer of fluids (air) through the tubes, the sealing of airways to prevent air leakage, and the mechanical guidance system for precise tube placement. Essential components include the endotracheal and endobronchial tubes, balloons, and the Y-guide with its stylet. Core interactions involve the inflation of balloons to seal the airways and the mechanical interaction of the Y-guide with the tracheal wall and carina. Internal dynamics include the flow of air through the tubes and the mechanical forces exerted by the positioning system.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through the integration of a camera apparatus within the endobronchial tube, allowing for real-time visualization during placement. This contrasts with the Compared invention, which relies on a mechanical Y-guide for positioning. The Subject's use of electronic components and visualization technology represents a significant departure from the mechanical positioning methods of the Compared invention. The Subject's design also addresses the challenge of smaller lumen diameters by incorporating a camera, potentially improving physician placement accuracy. The mechanical underpinnings of the Subject focus on the integration of imaging technology to enhance the structural integrity and operational efficiency of the endobronchial tube, while the Compared invention emphasizes mechanical guidance and sealing mechanisms. Both inventions aim to improve the accuracy and efficiency of bronchial intubation, but the Subject's approach through visualization technology offers a distinct advantage in terms of precision and ease of use. The practical applications of the Subject invention are primarily in medical settings where precise bronchial intubation is required, potentially impacting surgical procedures and critical care. The Compared invention, while also aimed at medical applications, focuses on a broader range of tracheal intubation scenarios, with potential impacts on patient comfort and procedural efficiency. Both inventions address real-world challenges in intubation, but the Subject's use of visualization technology could lead to more widespread adoption in clinical settings due to its potential to reduce procedural time and improve patient outcomes.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the ventilating device in the Compared claims both relate to medical devices used for ventilation, specifically targeting the respiratory system. The Subject's tracheal tube includes dual ventilation lumens, with one lumen extending into the upper bronchus, and features such as a camera and an opening for visualization, which are not directly mentioned in the Compared claims. The Compared claims focus on a device for selective ventilation of lungs, featuring an endotracheal tube and an endobronchial tube, with mechanisms for positioning and fixing these tubes within the trachea. The methodologies and designs differ significantly; the Subject focuses on dual lumens with integrated visualization tools, while the Compared emphasizes precise positioning and fixation of tubes for selective lung ventilation. The operational role of the Subject's device is centered around enhanced visualization and dual ventilation, whereas the Compared's device is designed for accurate placement and selective ventilation control. The underlying functions of the Subject involve providing a clear view of the respiratory tract and dual air pathways, while the Compared's function is to ensure correct positioning and selective ventilation. Essential components in the Subject include the camera, lumens, and cuffs, while in the Compared, they are the positioning and fixing means. Core interactions in the Subject involve the camera's field of view through the opening, and in the Compared, it's the interaction between the positioning means and the trachea. The internal dynamics of the Subject involve fluid dynamics within the lumens and camera operation, while the Compared involves mechanical dynamics of positioning and fixing. The purpose within the applied context for the Subject is in critical care settings for enhanced visualization and ventilation, and for the Compared, it's in surgical or intensive care for precise lung ventilation. Practical applications of the Subject include use in intubated patients requiring visualization, while the Compared's applications are in scenarios requiring selective lung ventilation.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.9993 suggests a potential for significant overlap. However, upon detailed analysis, the overlap between the Subject and Compared claims is moderate. The Subject's focus on dual lumens with integrated visualization tools and the Compared's emphasis on precise positioning and selective ventilation indicate different primary objectives and functionalities. While both devices are used in respiratory care, the methodologies, designs, and operational roles differ, leading to a moderate degree of overlap in their intended use and application within the medical field.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US11633093B2**Medical devices and methods of placement  
**Inventor: MOLNAR ROBERT  
Assignee: WM & DG INC  
Priority Date: 08-08-2014  
Publication Date: 04-25-2023  
CPC: A61B1/00  
IPV™ Rating: 6.9969  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/104-989-478-858-988/frontpage?l=en](https://www.lens.org/lens/patent/104-989-478-858-988/frontpage?l=en)

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The primary function of the Compared invention (A61B1/00) is to provide a visualization device that can be attached to various medical devices such as oral airways, ventilating masks, and trocars, to facilitate the accurate and rapid placement of these devices within a patient's body. This visualization device includes a camera tube that can be inserted and removed independently of the medical device, allowing for continuous real-time monitoring and remote observation of the patient's condition during and after the placement of the medical device.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

Overall, there is a moderate possibility of overlap between the Subject and Compared patents, primarily due to the shared concept of using a camera for medical visualization. However, the specific operational roles and practical applications differ significantly. The Subject's tracheal tube is designed for respiratory care, focusing on ventilation and monitoring within the respiratory system, which is crucial for its application in medical procedures involving the respiratory tract. In contrast, the Compared's medical device offers a versatile solution applicable to various medical procedures, emphasizing adaptability and ease of use. The potential commercial impact of the Subject's patent may be significant in the field of respiratory care, where specialized equipment for monitoring and ventilation is in demand. The Compared's patent, with its broader application range, could have a wider commercial impact across different medical fields, offering a flexible visualization solution that can be integrated into various medical devices.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of providing a portable and universal visualization system. The core components include a camera tube with a sealed distal end and an open proximal end, housing a camera that can be inserted and retracted as needed. The camera's field of view is directed through the transparent seal at the distal end, allowing for continuous visualization. The system's functionality is based on the transmission of visual data from the camera to external monitoring devices, enabling real-time observation and remote monitoring. The camera tube's design allows it to be attached to various medical devices, ensuring flexibility and adaptability in different medical contexts. The underlying function is to enhance the accuracy and safety of medical device placement by providing continuous visual feedback, which is crucial for procedures like intubation and other medical interventions.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces a novel approach to tracheal intubation by integrating a camera directly into a multi-lumen tracheal tube, specifically designed for endobronchial use. This integration allows for real-time visualization of the bronchial intubation process, which is not present in the Compared invention. The Subject's design focuses on the specific application of bronchial intubation, with a camera positioned to view through an opening in the second lumen, contrasting with the Compared invention's more general-purpose visualization device that can be attached to various medical devices. The Subject's use of a multi-lumen configuration with unequal lengths and specific placement of the camera and electronic components represents a significant advancement in the field of tracheal intubation, offering improved precision and safety. The Compared invention, while innovative in its universal applicability, does not address the specific mechanical challenges and requirements of bronchial intubation as effectively as the Subject invention.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the medical device in the Compared claims both incorporate a camera for visualization purposes, which is a significant similarity. In the Subject, the camera is integrated into the second ventilation lumen of the tracheal tube, specifically designed for alignment with the upper bronchus and equipped with an opening for the camera's field of view. This setup is tailored for respiratory applications, focusing on the operational role of facilitating ventilation and monitoring within the respiratory system. The camera's placement and the inclusion of additional features like LEDs and cuffs indicate a design focused on enhancing visibility and functionality within the tracheal environment, which is crucial for its application in medical procedures involving the respiratory tract.  
  
In contrast, the Compared claims describe a more versatile medical device where the camera is part of a visualization device that can be attached to various medical tools, including an oral airway device, ventilating mask, urinary catheter, trocar, tool tube, or medical glove. This design emphasizes adaptability across different medical contexts, not limited to respiratory applications. The camera in the Compared claims is designed to be either disposable or reusable and can be inserted or removed while the device remains in the patient, suggesting a focus on flexibility and ease of use in various medical procedures.  
  
Both systems share the underlying function of visualization, but the Subject's tracheal tube is specifically engineered for respiratory applications with a fixed camera position, while the Compared's medical device offers a broader application range with a detachable and adjustable camera system. The essential components in the Subject include the dual ventilation lumens, cuffs, and a camera with an opening, whereas the Compared includes a camera tube that can be aligned externally or internally with various medical devices. Core interactions in the Subject involve the camera's field of view through the opening in the second lumen, while in the Compared, the interaction is between the camera and the various second devices it can be attached to. The internal dynamics of the Subject focus on the flow of air through the ventilation lumens and the camera's role in monitoring, whereas the Compared's dynamics are centered around the adaptability of the camera tube to different medical tools.  
  
The practical applications of the Subject's tracheal tube are primarily in respiratory care, such as during surgeries or intensive care, where precise monitoring and ventilation are critical. The Compared's medical device, however, can be applied in a wider range of medical procedures, from airway management to urinary catheterization, offering visualization support in diverse clinical settings.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the Subject and Compared claims is primarily centered around the use of a camera for visualization. The Subject's tracheal tube integrates the camera into a specific respiratory application, while the Compared's medical device offers a more versatile approach, allowing the camera to be used with various medical tools. The claim\_score of 6.9969 indicates a high degree of similarity in the concept of using a camera for medical visualization. However, the specific implementation and application contexts differ significantly. The Subject focuses on a fixed camera within a tracheal tube for respiratory monitoring, whereas the Compared emphasizes a detachable camera system applicable to multiple medical devices. This difference in application scope and design flexibility suggests a moderate overlap in terms of the broader concept of medical visualization but a low overlap when considering the specific operational roles and practical applications.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US7036510B2**Percutaneous tracheostomy balloon apparatus  
**Inventor: ZGODA MICHAEL A  
Assignee: COOK CRITICAL CARE INC  
Priority Date: 04-28-2003  
Publication Date: 05-02-2006  
CPC: A61M16/00  
IPV™ Rating: 6.9884  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/044-536-605-943-661/frontpage?l=en](https://www.lens.org/lens/patent/044-536-605-943-661/frontpage?l=en)

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The primary function of the Compared invention (A61M16/00) is to provide an airway through the tracheal wall of a patient using a balloon catheter and tracheal tube system. This system is designed to facilitate a percutaneous tracheostomy procedure by dilating the tracheal wall atraumatically and maintaining an open airway. The mechanical engineering perspective focuses on the design and operation of the balloon catheter and tracheal tube to ensure effective dilation and airway maintenance.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

The overall anticipated overlap between the Subject and Compared patents is moderate. While both patents involve tracheal tubes, their focus and operational roles differ significantly. The Subject patent emphasizes visualization and dual-lumen ventilation, which is crucial for procedures requiring direct observation of the respiratory tract. In contrast, the Compared patent focuses on the procedural aspects of airway restoration through tracheal dilation, which is essential for emergency airway management. The potential commercial impact of the Subject patent could be significant in medical fields requiring advanced visualization during intubation or bronchoscopy, potentially improving patient outcomes in critical care settings. The Compared patent's commercial impact might be more focused on emergency medical procedures, offering a solution for quick and effective airway restoration. There is a low possibility of overlap in their primary applications and technologies.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of a balloon catheter with an inflatable balloon at its distal end, which is designed to dilate the tracheal wall upon inflation. The tracheal tube, aligned with the balloon catheter, extends through the tracheal tube bore and provides an airway following dilation. The system's operational principles include the precise control of balloon inflation to achieve atraumatic dilation, and the use of a stabilizer to maintain dimensional support of the tracheal tube. The underlying functions include the conversion of pressure from the balloon inflation into mechanical force for dilation, and the maintenance of an open airway through the structural integrity of the tracheal tube. Essential components are the balloon catheter, the inflatable balloon, the tracheal tube, and the stabilizer. Core interactions involve the balloon's interaction with the tracheal wall and the tracheal tube's role in maintaining the airway. Internal dynamics focus on the pressure dynamics within the balloon and the structural dynamics of the tracheal tube.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus within a multi-lumen tracheal tube, specifically designed for endobronchial intubation. This differs from the Compared invention, which focuses on a balloon catheter system for tracheostomy procedures. The Subject's camera allows for real-time visualization of the tracheal and bronchial lumen, enhancing the precision of tube placement, which is not a feature of the Compared invention. The mechanical underpinnings of the Subject include the design of the multi-lumen tube to house the camera and maintain structural integrity, while the Compared invention focuses on the force distribution and pressure dynamics of the balloon catheter for dilation. The Subject's design approach involves the integration of electronic components and optical systems, which are not present in the Compared invention. The Subject's potential applications are in thoracic surgery and critical care, where precise intubation is crucial, whereas the Compared invention is aimed at emergency airway management. Both inventions address different mechanical challenges, with the Subject focusing on visualization and precision, and the Compared invention on atraumatic dilation and airway maintenance.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims focuses on a dual-lumen design with integrated camera technology for visualization within the respiratory system. The first and second ventilation lumens are designed to connect to a ventilator, with the second lumen extending longer and aligning with the upper bronchus. The camera, positioned opposite an opening in the second lumen, allows for direct visualization of the respiratory tract, which is crucial for procedures like intubation or bronchoscopy. The camera's placement and the inclusion of features like LEDs and fluid delivery systems enhance its functionality for medical imaging and maintenance. The tracheal tube's design also includes cuffs for sealing and potentially isolating different parts of the respiratory system, which is essential for managing ventilation and preventing aspiration.  
  
In contrast, the Compared claims describe an apparatus for providing an airway through the tracheal wall, utilizing a balloon catheter and a tracheal tube. The balloon catheter is designed to atraumatically dilate the tracheal wall, facilitating the insertion of the tracheal tube to maintain an airway. The apparatus includes a stabilizer to provide dimensional support to the tracheal tube, ensuring its proper positioning and function. The balloon's size and positioning relative to the tracheal tube are critical for the effective dilation and subsequent airway maintenance. The method claims detail the procedural steps for using this apparatus, including the use of a wire guide for precise placement.  
  
The overlap between the Subject and Compared claims lies in the use of tracheal tubes for airway management. However, the Subject claims focus on visualization and dual-lumen ventilation, while the Compared claims emphasize the dilation of the tracheal wall and the procedural aspects of airway restoration. The methodologies differ significantly, with the Subject claims involving camera technology and the Compared claims focusing on balloon dilation and stabilization. The operational roles also diverge, with the Subject claims aimed at ventilation and visualization, and the Compared claims focused on airway restoration through dilation.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.9884 suggests a high degree of relevance between the Subject and Compared claims. The overlap primarily concerns the use of tracheal tubes for airway management, but the specific applications and technologies differ. The Subject claims emphasize a dual-lumen design with integrated camera technology for visualization and ventilation, while the Compared claims focus on a balloon catheter system for tracheal dilation and airway restoration. The methodologies, designs, and operational roles are distinct, with the Subject claims aimed at enhancing visualization and managing ventilation, and the Compared claims focused on procedural aspects of airway dilation and maintenance. The overlap is moderate due to the shared use of tracheal tubes but is not significant enough to indicate a high degree of similarity in function or application.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US9907484B2**Endobronchial tube apparatus  
**Inventor: LI WENJENG  
Assignee: MEDTRONIC XOMED INC  
Priority Date: 11-29-2012  
Publication Date: 03-06-2018  
CPC: A61B5/296  
IPV™ Rating: 6.9642  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/178-720-609-937-25X/frontpage?l=en](https://www.lens.org/lens/patent/178-720-609-937-25X/frontpage?l=en)

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The primary function of the invention described under CPC code A61B5/296 is to monitor electromyographic (EMG) signals from a patient's laryngeal muscles using an endobronchial tube equipped with conductive ink electrodes. This device facilitates the monitoring of nerve integrity during surgical procedures, particularly those involving the larynx, by providing real-time feedback on muscle activity.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a moderate possibility of overlap between the Subject and Compared patents, primarily due to the shared use of dual lumens and cuffs in a respiratory context. However, the distinct functionalities of visual monitoring in the Subject and electromyographic monitoring in the Compared suggest that the patents serve different primary purposes within their applied medical contexts. The Subject's tracheal tube with a camera could have a significant commercial impact in enhancing patient monitoring during ventilation, while the Compared's apparatus for monitoring laryngeal muscle activity could impact the field of respiratory diagnostics and treatment. Overall, while there is some overlap in the structural components used, the intended operational roles and practical applications of each patent are sufficiently distinct to suggest a low possibility of direct competition.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the invention under CPC code A61B5/296 involves the integration of conductive ink electrodes on the exterior surface of an endobronchial tube. These electrodes are designed to capture EMG signals from the laryngeal muscles when the tube is placed in the trachea. The underlying function is to transmit these signals through conductors to a processing apparatus, which can analyze the data to monitor nerve function. Essential components include the endobronchial tube itself, the conductive ink electrodes, and the conductors. The core interactions involve the contact between the electrodes and the laryngeal muscles, and the internal dynamics focus on the signal transmission and processing to provide actionable data for medical professionals.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The subject invention under CPC code A61M16/0486 introduces a novel approach by integrating a camera apparatus into a multi-lumen tracheal tube, specifically designed for bronchial intubation. This differs significantly from the compared invention under CPC code A61B5/296, which focuses on monitoring EMG signals using conductive ink electrodes on an endobronchial tube. The subject invention's novelty lies in its use of visualization technology to aid in the precise placement of the tube, whereas the compared invention's innovation is in the field of nerve monitoring. There is minimal overlap in methodologies, as the subject invention deals with mechanical and optical systems for intubation, while the compared invention involves bioelectric signal processing. The subject invention's design approach focuses on improving the accuracy and safety of intubation procedures, whereas the compared invention aims to enhance surgical outcomes by monitoring nerve function.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the apparatus for monitoring electromyographic signals in the Compared claims share some common elements and functionalities, particularly in the use of dual lumens and cuffs within an endobronchial or tracheal context. Both systems involve a first and second ventilation lumen or lumen configuration, with the Subject's second lumen being longer and designed to align with the upper bronchus, while the Compared's lumens are part of an endobronchial tube designed for positioning within the bronchus and trachea. The Subject's tracheal tube includes a camera for visual monitoring, which is not present in the Compared's apparatus, which instead focuses on electromyographic monitoring through conductive electrodes. Both systems utilize cuffs, with the Subject having a first cuff around both lumens and a second cuff around only the second lumen, and the Compared having cuffs for positioning within the bronchus and trachea. The operational role of both systems involves aiding in respiratory functions, with the Subject focusing on ventilation and visual monitoring, and the Compared on monitoring laryngeal muscle activity. The underlying functions of the Subject's system include ventilation and visual inspection, while the Compared's system focuses on signal monitoring. Essential components in the Subject include the camera, lumens, and cuffs, whereas in the Compared, they include conductive electrodes, lumens, and cuffs. Core interactions in the Subject involve the camera's field of view through an opening in the second lumen, while in the Compared, it involves the interaction of electrodes with the patient's vocal folds. The internal dynamics of the Subject's system relate to the flow of air and visual data, while the Compared's system deals with the flow of air and electromyographic signals. Both systems are applied in medical contexts, specifically in respiratory care, but serve different primary purposes: the Subject for enhanced ventilation and visual monitoring, and the Compared for monitoring muscle activity during respiratory processes.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the Subject and Compared claims is primarily in the use of dual lumens and cuffs within a respiratory context. However, the Subject's focus on visual monitoring through a camera and the Compared's focus on electromyographic monitoring through electrodes represent distinct functionalities. The methodologies and designs differ significantly, with the Subject's system designed for visual inspection and the Compared's for signal monitoring. The operational roles, while both related to respiratory care, diverge in their specific applications. The underlying functions, essential components, core interactions, and internal dynamics of each system are tailored to their respective purposes, leading to a moderate degree of overlap in the context of respiratory care but not in the specific functionalities or applications.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US6705320B1**Methods for performing tracheal intubation on an animal and endotracheal tubes therefore  
**Inventor: ANDERSON SCOTT M  
Assignee: ANDERSON SCOTT M  
Priority Date: 12-23-2002  
Publication Date: 03-16-2004  
CPC: A61M16/04  
IPV™ Rating: 6.9637  
Inferred Equivalence: Medium**

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The primary function of the Compared invention (A61M16/04) is to facilitate tracheal intubation in small animals, specifically designed to navigate the anatomical structures such as the epiglottis and arytenoid cartilages. It includes a tapered end for easy insertion and a firm body to exert pressure on the epiglottis, ensuring clear visibility and proper placement within the trachea.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a moderate level of anticipated overlap between the 'Subject' and 'Compared' patents, primarily due to their shared focus on respiratory management through tracheal or endotracheal tubes. However, the specific designs, methodologies, and applications differ significantly, with the 'Subject' patent focusing on human respiratory care with advanced visualization capabilities, and the 'Compared' patent targeting veterinary intubation with specific physical design modifications. The 'Subject' patent's potential commercial impact could be significant in human healthcare settings, particularly in surgical and intensive care units where precise airway management and visualization are crucial. The 'Compared' patent's impact would be more niche, primarily affecting the veterinary market by improving the ease and safety of intubation procedures in animals. Overall, there is a low possibility of direct overlap in their practical applications and commercial markets.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of mechanical manipulation of anatomical structures to achieve intubation. The underlying functions include the use of a tapered end to pass through the arytenoid cartilages and into the trachea, and a double bend in the tube to transversely displace the distal portion for better alignment with the trachea. Essential components include the elongated firm body, the tapered end, and the outward-facing surface for depressing the epiglottis. Core interactions involve the mechanical force applied to the epiglottis and the precise navigation through the larynx. The internal dynamics focus on maintaining the structural integrity of the tube while allowing for flexibility and maneuverability during insertion.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its multi-lumen design and integrated camera system, which are not present in the Compared invention. The multi-lumen configuration allows for independent ventilation of each lung, a feature not addressed by the single-lumen design of the Compared invention. The camera apparatus provides real-time visualization, enhancing the precision of bronchial intubation, which is a significant advancement over the mechanical manipulation techniques used in the Compared invention. The Subject's design also addresses the challenge of varying lumen diameters and physician placement, offering a more sophisticated solution for endobronchial intubation. From a mechanical engineering perspective, the Subject's design involves complex force distribution and energy efficiency considerations due to the integration of electronic components and the need for an airtight seal, which differ from the simpler mechanical design of the Compared invention. The Subject's approach to fabrication and tolerance standards must account for the integration of electronic components, which adds a layer of complexity not seen in the Compared invention.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The claims from 'Subject' and 'Compared' patents both relate to tracheal or endotracheal tubes used in medical procedures, specifically for intubation and ventilation. The 'Subject' patent focuses on a tracheal tube with dual ventilation lumens, one of which is longer and includes a camera and an opening for visualization within the patient's bronchus. This design aims to enhance the visualization and management of the airway during ventilation, particularly in scenarios requiring precise placement and monitoring. The camera's placement and the dual lumen design suggest a focus on improving the operational role of energy conversion (ventilation) and motion transfer (camera movement for visualization) within the context of respiratory care, specifically in surgical or intensive care settings. The 'Compared' patent, on the other hand, describes methods and devices for tracheal intubation in animals, emphasizing the physical design of the tube to facilitate easier insertion and positioning within the animal's trachea. It includes features like a double bend and a tapered end to navigate the animal's anatomy, and an inflatable cuff with a pressure indicator for secure placement and monitoring. The operational role here is primarily focused on motion transfer (insertion and positioning) and load-bearing capacity (maintaining airway patency), applied in veterinary medicine. Both patents share the underlying function of aiding in respiratory management but differ significantly in their design methodologies, essential components, and core interactions. The 'Subject' patent's focus on visualization and dual lumen design contrasts with the 'Compared' patent's emphasis on physical design for ease of intubation and secure placement.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the 'Subject' and 'Compared' patents is primarily in the general field of tracheal or endotracheal tubes used for respiratory management. However, the specific claims and designs differ significantly. The 'Subject' patent's emphasis on dual lumens, camera integration, and specific placement for visualization does not directly overlap with the 'Compared' patent's focus on physical design modifications for animal intubation, such as the double bend and tapered end. The 'Subject' patent's camera and dual lumen system for visualization and ventilation management are not mentioned in the 'Compared' patent, which instead focuses on the physical manipulation of the tube for easier insertion and secure placement in animals. The 'Compared' patent's inflatable cuff and pressure indicator for monitoring are not directly related to the 'Subject' patent's claims. Given the claim\_score of 6.9637, the overlap is described as moderate due to the shared general purpose of respiratory management but significant differences in design and application.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US11241551B2**Endobronchial suctioning device and medical suctioning system for intubated patients  
**Inventor: URE JOHN P  
Assignee: URE JOHN P  
Priority Date: 02-28-2015  
Publication Date: 02-08-2022  
CPC: A61M16/04  
IPV™ Rating: 6.9554  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/074-253-408-387-270/frontpage?l=en](https://www.lens.org/lens/patent/074-253-408-387-270/frontpage?l=en)

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The primary function of the Compared invention, a bi-lateral endobronchial suctioning device, is to enable controlled and safe suctioning of both the right and left bronchi of an intubated patient's lungs. From a mechanical engineering perspective, this device is designed to navigate through the trachea and into the bronchi, utilizing an articulation joint and control mechanisms to direct the suction catheter accurately. The device's mechanical system is intended to address the challenge of suctioning the left bronchus, which is often difficult due to its anatomical positioning, thereby reducing the risk of complications such as pneumonia and atelectasis.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

Overall, there is a moderate possibility of overlap between the Subject and Compared claims, primarily due to their shared context in respiratory care and the bronchial system. However, the distinct functionalities and operational roles of the tracheal tube for ventilation and visualization versus the bi-lateral endobronchial suctioning device for suctioning and lavage suggest that the overlap is not significant enough to indicate a high degree of similarity. The Subject's focus on energy conversion for ventilation and the Compared's focus on motion transfer for suctioning highlight their different purposes within the applied context of respiratory care. The potential commercial impact of the Subject's patent could be significant in intensive care settings where monitoring and ventilation are critical, while the Compared's patent could have a notable impact in settings requiring effective airway clearance in intubated patients.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve a mechanical system that includes a controller end with actuating components, such as a control mechanism coupled to cables, a suction control button, and an articulating lever. These components work together to enable the device to navigate and articulate within the patient's respiratory system. The underlying functions include the activation and deactivation of suction through a plunger mechanism, and the directional control of the catheter's distal end via cables and an articulating tip portion. Essential components include the catheter, control lever, and articulating lever, which interact to provide precise control over the device's movement and suction capabilities. The internal dynamics of the system focus on the transfer of mechanical force through cables to manipulate the catheter's position, ensuring effective suctioning of both bronchi.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus within a multi-lumen tracheal tube, specifically designed for bronchial intubation. This differs from the Compared invention, which focuses on suctioning capabilities and directional control within the bronchi. The Subject's design emphasizes visualization and accurate placement, utilizing a camera to aid in the intubation process, whereas the Compared invention uses mechanical control systems and articulation to navigate and suction within the bronchi. The Subject's approach to force distribution and energy efficiency is centered around the minimal impact on the patient's respiratory system, while the Compared invention's mechanical underpinnings focus on the effective transfer of force for catheter manipulation. The Subject's design protocols involve ensuring the camera's field of view and the integrity of the ventilation lumens, contrasting with the Compared invention's focus on articulation and suction control mechanisms.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims focuses on a dual-lumen design for ventilation, with specific features like a camera and an opening in the second lumen for visualization within the bronchial system. The camera's placement and the inclusion of cuffs and additional lumens for various functions (e.g., suction, fluid delivery) indicate a complex system designed for intubated patients, particularly for monitoring and managing respiratory conditions. The Compared claims detail a bi-lateral endobronchial suctioning device, which is designed for suctioning bronchial secretions from intubated patients, featuring an interface for control, a catheter with an articulation joint for maneuverability, and a port for bronchoalveolar lavage. Both systems are intended for use in respiratory care, specifically within the bronchial system, but they serve different primary functions: the Subject focuses on ventilation and visualization, while the Compared focuses on suctioning and lavage. The methodologies and designs differ significantly; the Subject's tracheal tube involves a static placement with integrated visualization tools, whereas the Compared's device includes dynamic control mechanisms for suctioning. The operational roles also differ, with the Subject aimed at energy conversion (ventilation) and the Compared aimed at motion transfer (maneuverability for suctioning). The underlying functions of the Subject involve delivering air and monitoring, while the Compared's function is to remove secretions. Essential components in the Subject include ventilation lumens and a camera, while in the Compared, they include a control interface and an articulation joint. Core interactions in the Subject involve air flow and visual feedback, while in the Compared, they involve mechanical manipulation for suctioning. The internal dynamics of the Subject are related to maintaining airway patency and monitoring, while the Compared's dynamics involve the physical movement of the catheter for effective suctioning. Both systems are applied in the context of respiratory care, with the Subject potentially used in intensive care settings for monitoring and the Compared used for therapeutic suctioning in similar settings. The practical applications of the Subject include aiding in the management of respiratory failure, while the Compared's applications include clearing airways in intubated patients.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.9554 suggests a potential for overlap between the Subject and Compared claims. However, upon detailed analysis, the overlap is primarily in the context of respiratory care and the use within the bronchial system. The Subject's focus on ventilation and visualization through a tracheal tube with a camera contrasts with the Compared's emphasis on suctioning and maneuverability through a bi-lateral endobronchial suctioning device. While both systems are designed for intubated patients and involve the bronchial system, their methodologies, designs, and operational roles are distinct. The Subject's system is more about static monitoring and ventilation, whereas the Compared's system is about dynamic suctioning and lavage. The overlap in terms of literal words and concepts is moderate, as both mention the bronchial system and intubated patients, but the specific functionalities and components are different.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US11213645B2**Robotic-assisted navigation and control for airway management procedures, assemblies and systems  
**Inventor: NEKHENDZY VLADIMIR  
Assignee: SPIRO ROBOTICS INC  
Priority Date: 05-19-2020  
Publication Date: 01-04-2022  
CPC: A61B34/30  
IPV™ Rating: 6.9525  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/123-023-269-869-641/frontpage?l=en](https://www.lens.org/lens/patent/123-023-269-869-641/frontpage?l=en)

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The primary function of the invention described under CPC code A61B34/30 is to facilitate tracheal intubation through robotic or computer-assisted methods. This involves the use of an introducer with imaging capabilities to guide the placement of an endotracheal tube into the patient's trachea, allowing for real-time visualization and control of the intubation process. The system aims to improve the success rate of intubation by providing enhanced visualization and navigation capabilities, particularly in difficult or emergency situations.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a moderate possibility of overlap between the 'Subject' and 'Compared' claims, primarily due to the shared use of tracheal tubes and cameras for visualization in respiratory care. However, the 'Subject' claims focus on the design and static features of the tracheal tube, while the 'Compared' claims emphasize the dynamic process of intubation with robotic assistance. The operational roles differ, with 'Subject' focusing on ventilation and visual access, and 'Compared' on motion transfer and procedural guidance. The potential commercial impact of the 'Subject' patent could be significant in the field of respiratory care, offering a specialized tracheal tube for enhanced patient monitoring and care. The 'Compared' patent could revolutionize intubation procedures, potentially improving safety and efficiency in clinical settings, with a broad impact on medical device technology.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the invention under CPC code A61B34/30 involve the integration of robotic control and imaging technology to enhance the intubation process. The underlying functions include the use of an introducer with an imaging sensor to provide real-time visual feedback of the patient's airway. Essential components include the introducer, imaging sensors (such as video cameras), and a robotic control system that allows for precise movement and positioning of the introducer within the trachea. The core interactions involve the operator using the visual data to guide the introducer and subsequently the endotracheal tube through the patient's airway. The internal dynamics of the system focus on the coordination between the robotic movement and the imaging feedback to ensure accurate placement of the tube, addressing the mechanical challenge of navigating the complex anatomy of the upper and lower airways.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The invention under CPC code A61M16/0486 introduces novelty through its integration of a camera directly into the tracheal tube, specifically designed for bronchial intubation. This differs from the invention under CPC code A61B34/30, which uses an external introducer with imaging capabilities. The Subject invention's multi-lumen design and the camera's placement within the tube itself provide a more integrated approach to visualization and tube placement, potentially reducing the need for additional equipment like bronchoscopes. The mechanical underpinnings of the Subject invention focus on the structural integrity and design of the multi-lumen tube to accommodate the camera and ensure effective ventilation, while the Compared invention emphasizes the robotic control and external imaging for intubation guidance. The Subject invention's design approach involves specific fabrication techniques to integrate the camera and ensure its functionality within the tube, distinguishing it from the Compared invention's reliance on external robotic systems and imaging sensors.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The claims from 'Subject' and 'Compared' both involve tracheal tubes and intubation processes, but they focus on different aspects and functionalities. The 'Subject' claims detail a tracheal tube with dual ventilation lumens, one of which is longer and designed to align with the upper bronchus, featuring a camera and an opening for visualization. This design emphasizes the structural and operational role of the tracheal tube in providing ventilation and visual access to the bronchial area, with components like cuffs, lumens, and a camera integrated to enhance functionality in medical settings, particularly in respiratory care. The 'Compared' claims describe a method of intubating a patient using a dual-video tracheal intubation assembly, which includes a tracheal tube introducer with a video camera for guiding the tube into the trachea. This method focuses on the procedural aspect of intubation, utilizing robotic control and dual video feeds for precision and safety. The operational role here is centered on motion transfer and guidance, with the essential components being the introducer, video cameras, and actuators, aimed at improving the intubation process in clinical environments. While both sets of claims deal with tracheal tubes and visualization, the 'Subject' focuses on the tube's design and static features, whereas 'Compared' emphasizes the dynamic process of intubation and the use of technology for procedural guidance.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the 'Subject' and 'Compared' claims is primarily in the use of tracheal tubes and cameras for visualization within the respiratory system. However, the 'Subject' claims focus on the structural design of the tracheal tube, including specific features like dual lumens and cuffs, while the 'Compared' claims detail a method of intubation using a tracheal tube introducer with robotic control. The 'Subject' claims do not mention robotic control or a method of intubation, and the 'Compared' claims do not detail the specific design of the tracheal tube beyond its use in the intubation process. The claim\_score of 6.9525 suggests a potential for overlap, but the differences in focus and detail indicate that the overlap is moderate, as the core functionalities and applications differ significantly.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: EP2531247B1**MEDICAL TUBES FOR SELECTIVE MECHANICAL VENTILATION OF THE LUNGS  
**Inventor: POL GUILLERMO L  
Assignee: POL GUILLERMO L  
Priority Date: 02-04-2010  
Publication Date: 01-04-2017  
CPC: A61M16/00  
IPV™ Rating: 6.9271  
Inferred Equivalence: Medium**

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The primary function of the Compared invention (A61M16/00) is to facilitate selective mechanical ventilation of a patient's lungs using a single lumen endobronchial tube. This tube is designed to isolate one lung while ventilating the other, utilizing a tracheal portion and a bronchial portion with inflatable cuffs and an aperture to control gas flow. The mechanical engineering perspective focuses on the design and operation of the tube to ensure effective sealing and gas delivery, crucial for patient respiratory support.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

The overall anticipated overlap between the Subject and Compared patents is moderate. Both patents focus on medical ventilation systems, but they diverge in their operational roles and design specifics. The Subject patent emphasizes a dual-lumen system with direct visualization capabilities, suitable for complex ventilation scenarios in medical settings, potentially impacting the field of bronchoscopy and critical care. In contrast, the Compared patent focuses on a single-lumen system for selective lung ventilation with controlled gas delivery, which could have significant implications for surgical and intensive care applications. The potential commercial impact of the Subject patent may be in specialized medical equipment for visualization and ventilation, while the Compared patent could influence the market for devices used in lung isolation and selective ventilation.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve systemic principles of gas flow control and sealing within the respiratory system. The foundational processes include the use of inflatable cuffs (tracheal and bronchial) to create airtight seals against the trachea and bronchi, respectively. The essential components are the single lumen tube, the cuffs, and the aperture for gas delivery. The core interactions involve the expansion of cuffs to seal against the patient's airways, and the internal dynamics include the control of gas flow through the aperture, which can be adjusted by mechanisms within the tube wall. The mechanical system's role is to convert the energy from the mechanical ventilation device into effective gas delivery and isolation within the patient's lungs, crucial for one-lung ventilation procedures.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject patent introduces novelty through its integration of a camera within the tracheal tube, which is not present in the Compared patent. This feature enhances the precision of tube placement and monitoring during intubation, a significant advancement over the single lumen design of the Compared patent. The Subject's multi-lumen design allows for independent ventilation of the lungs, differing from the single lumen approach of the Compared patent, which focuses on selective ventilation. From a mechanical engineering perspective, the Subject's design involves more complex force distribution due to the camera's integration and the need for maintaining structural integrity while accommodating electronic components. The Compared patent's design focuses on simplicity and efficiency in gas flow control, with less emphasis on visualization. Both inventions target the medical field, specifically respiratory care, but the Subject's technology offers additional benefits in procedural accuracy and patient safety, potentially impacting surgical practices and patient outcomes more significantly.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims features a dual-lumen design, with the second lumen being longer and having an opening and a camera for visualization, which is a significant departure from the single-lumen design of the Compared claims. The Subject's design focuses on providing ventilation through two separate lumens, with the second lumen specifically designed to align with the upper bronchus and includes a camera for direct visualization of the bronchial area. This camera is strategically placed opposite an opening in the second lumen, enhancing its utility in medical procedures. The Subject also includes various configurations for the camera and additional features like cuffs and lumens for fluid delivery, which are not present in the Compared claims.  
  
In contrast, the Compared claims describe a single-lumen endobronchial tube designed for isolating one lung and ventilating the other, with a focus on controlling gas flow through an aperture using a mechanism within the tube wall. The Compared claims also mention a video camera, but it is embedded within the tube wall without specific mention of an opening for visualization, differing from the Subject's design. The Compared claims emphasize the ability to selectively control ventilation and include features like inflatable cuffs and a balloon blocker, which are not detailed in the Subject's claims.  
  
Both sets of claims share the context of medical ventilation and the use of cameras for visualization, but the methodologies, designs, and operational roles differ significantly. The Subject's dual-lumen approach with a camera and opening for direct visualization contrasts with the Compared's single-lumen approach with a mechanism for gas flow control and a camera embedded within the tube wall. The Subject's design is more focused on direct bronchial visualization and potentially complex ventilation scenarios, while the Compared's design is geared towards selective lung ventilation with controlled gas delivery.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.9271 indicates a high degree of similarity between the Subject and Compared claims. However, the overlap in terms of literal and semantic similarities is moderate. The Subject's dual-lumen design with a camera and opening for visualization does not directly align with the Compared's single-lumen design with a mechanism for controlling gas flow. The presence of a camera in both sets of claims suggests some overlap in the use of visualization technology in medical ventilation, but the specific implementations and purposes differ. The Subject's focus on direct bronchial visualization and the Compared's emphasis on selective lung ventilation with controlled gas delivery indicate that while there is some overlap in the broader context of medical ventilation, the specific applications and designs are distinct.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US11850362B2**Endotracheal tube and method of use  
**Inventor: DHARA SASANKA SEKHAR  
Assignee: NAGA WIRE TRACKING TRACHEAL TUBE PTY LTD  
Priority Date: 09-23-2013  
Publication Date: 12-26-2023  
CPC: A61M16/04  
IPV™ Rating: 6.9242  
Inferred Equivalence: Medium**

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The primary function of the Compared invention (A61M16/04) is to facilitate wire-guided intubation, allowing for more accurate placement of an endotracheal tube within a patient's trachea. This is achieved through a main lumen designed to follow the shape of an airway path along a guide wire, with a soft, deformable tip that can traverse the laryngeal inlet. The tube includes a tubular guide channel within its sidewall to accommodate the guide wire, ensuring the tube follows the wire's path precisely during intubation.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between the Subject and Compared, there is a moderate anticipated overlap of the patent. The focus of the Subject's tracheal tube is on dual-lumen ventilation and visualization, while the Compared's endotracheal tube emphasizes wire-guided intubation and flexibility. Both devices serve the operational role of facilitating air passage and ensuring proper placement within the patient's respiratory system, but their methodologies and designs differ significantly. The Subject's device is intended for use in clinical settings where visualization and dual ventilation are crucial, while the Compared's device is designed for situations requiring ease of intubation through a guide wire system. The potential commercial impact of the Subject's patent may be in specialized medical equipment markets focusing on advanced visualization and ventilation capabilities, whereas the Compared's patent may impact markets focused on intubation procedures and emergency medical equipment. Overall, there is a low possibility of significant overlap due to the distinct functionalities and applications of the two devices.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of a flexible material for the main lumen, which is reinforced along most of its length to prevent kinking, yet has a non-reinforced, soft tip for ease of insertion. The guiding channel within the sidewall of the tube is designed to snugly accommodate the guide wire, ensuring that the tube's deformations match those of the wire. This system operates on the principle of mechanical guidance, where the tube's path is dictated by the pre-positioned guide wire, facilitating accurate intubation. The underlying functions include the ability to follow the airway path, prevent kinking, and allow for deformation at the tip to navigate the laryngeal inlet. Essential components include the main lumen, the guide channel, and the soft tip. Core interactions involve the tube's interaction with the guide wire, ensuring synchronized movement. The internal dynamics focus on maintaining the structural integrity of the tube while allowing for flexibility and deformation where necessary.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus within a multi-lumen tracheal tube, specifically designed for endobronchial intubation. This contrasts with the Compared invention, which focuses on wire-guided intubation without integrated visualization tools. The Subject's design allows for independent ventilation of each lung, a feature not present in the Compared invention, which is primarily concerned with accurate tracheal intubation. The Subject's use of a camera for real-time visualization during placement represents a significant advancement over the Compared invention's reliance on a guide wire for positioning. From a mechanical engineering perspective, the Subject's design involves complex force distribution and structural integrity considerations to accommodate the camera and dual lumens, while the Compared invention focuses on flexibility and deformation to follow a guide wire. The Subject's potential applications in thoracic surgery and critical care settings differ from the Compared invention's broader use in general intubation scenarios, highlighting their distinct mechanical engineering markets and the Subject's potential to influence practices in specialized medical fields.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the endotracheal tube in the Compared claims both pertain to medical devices used for airway management, specifically for intubation and ventilation purposes. The Subject's tracheal tube features a dual-lumen design with a camera for visualization, aimed at facilitating ventilation and monitoring within the respiratory system. The Compared's endotracheal tube is designed for wire-guided intubation, focusing on flexibility and adaptability to follow a guide wire through the patient's airway. Both devices are intended for use in clinical settings, such as hospitals or emergency medical situations, to assist with breathing and airway management. The Subject's tracheal tube includes specific features like a camera and multiple lumens for different functions, while the Compared's endotracheal tube emphasizes a single main lumen with a guide channel for wire-guided intubation. The operational roles of both devices involve facilitating air passage and ensuring proper placement within the patient's respiratory system, but their methodologies differ significantly. The Subject's device focuses on direct visualization and dual ventilation capabilities, whereas the Compared's device prioritizes ease of intubation through a guide wire system. The underlying functions of both devices are to support respiratory function, but the essential components and core interactions vary, with the Subject's device involving a camera and multiple lumens, and the Compared's device utilizing a guide wire and a flexible main lumen. The internal dynamics of the Subject's device involve camera operation and dual-lumen ventilation, while the Compared's device involves the interaction between the tube and the guide wire to navigate the airway path. Both devices have practical applications in critical care and surgical settings, but their specific applications differ based on their design and intended use.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.9242 suggests a potential for significant overlap between the Subject and Compared claims. However, upon detailed analysis, the overlap is found to be moderate. The Subject's tracheal tube and the Compared's endotracheal tube both serve the purpose of airway management, but their designs and functionalities diverge significantly. The Subject's device focuses on dual-lumen ventilation with a camera for visualization, while the Compared's device emphasizes wire-guided intubation with a flexible main lumen. The methodologies, essential components, and core interactions of the two devices are distinct, with the Subject's device involving camera operation and dual-lumen ventilation, and the Compared's device relying on a guide wire system for intubation. The internal dynamics and practical applications of the devices also differ, with the Subject's device aimed at direct visualization and dual ventilation, and the Compared's device focused on ease of intubation. Therefore, despite the high claim\_score, the overlap between the two sets of claims is considered moderate due to the significant differences in design and functionality.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US6918391B1**Multi-lumen endotracheal tube  
**Inventor: MOORE JOHNNY V  
Assignee: MOORE JOHNNY V  
Priority Date: 05-20-2002  
Publication Date: 07-19-2005  
CPC: A61F6/02  
IPV™ Rating: 6.924  
Inferred Equivalence: Medium**

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The primary function of the invention described under CPC code A61M16/0486 is to facilitate intubation and ventilation of a patient's lungs using a multi-lumen tracheal tube system. This system includes a camera apparatus for aiding in the correct placement of the tube within the trachea and bronchial stems, allowing for independent ventilation of each lung. The design aims to enhance the precision and safety of intubation procedures, particularly in complex cases requiring bronchial intubation.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between the Subject and Compared, there is an overall moderate possibility of overlap in the patents. Both patents focus on medical devices for respiratory support during intubation, but they diverge in their specific operational roles and functionalities. The Subject's tracheal tube emphasizes dual ventilation and visualization, while the Compared's endotracheal tube focuses on gas exchange, auscultation, and temperature monitoring. The potential commercial impact of the Subject's patent may be significant in medical fields requiring advanced visualization and dual ventilation capabilities, whereas the Compared's patent may have a commercial impact in areas needing enhanced gas exchange, auscultation, and temperature monitoring during medical procedures.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The invention operates through a series of interconnected lumens within a tracheal tube, each serving a specific function. The first and second ventilation lumens allow for the independent ventilation of each lung, with the longer second lumen extending into a bronchial stem. The camera apparatus, positioned within the second lumen, provides visual feedback through an opening in the lumen wall, facilitating accurate placement. The system includes cuffs to create an airtight seal within the trachea and bronchus, ensuring effective ventilation. The underlying functions involve gas exchange, visual guidance for tube placement, and maintaining an airtight seal to prevent fluid ingress into the lungs. Essential components include the dual lumens, camera, cuffs, and electronic components for visualization. Core interactions involve the coordination between the ventilation system and the camera apparatus to ensure proper intubation and ventilation. Internal dynamics include the flow of gases through the lumens and the operation of the camera to provide real-time visual feedback.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The subject invention introduces novel aspects by integrating a camera apparatus into a multi-lumen tracheal tube system, specifically designed for bronchial intubation. This feature allows for real-time visualization of the tube's placement within the trachea and bronchial stems, enhancing the precision and safety of the procedure. Compared to the invention under CPC code A61F6/02, which focuses on contraceptive devices, there is no overlap in methodologies, designs, or architectures. The subject invention's mechanical underpinnings involve force distribution through the dual lumens to maintain an airtight seal, energy efficiency in gas exchange, and structural integrity to withstand the pressures of ventilation. The design approach includes the use of advanced materials and fabrication techniques to integrate the camera and electronic components seamlessly into the tube structure. The subject invention's protocols involve the use of the camera for visual guidance, which is a significant departure from the compared invention's focus on contraception.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the endotracheal tube in the Compared claims both involve medical devices used for intubation and respiratory support, indicating a shared context in medical applications. The Subject's tracheal tube features dual ventilation lumens, with specific configurations for alignment with the patient's bronchus and includes a camera for visualization, which is not directly mirrored in the Compared's endotracheal tube. However, the Compared's device includes a main lumen for gas exchange and additional lumens for balloon cuff inflation and auscultation, suggesting a focus on different functionalities within the respiratory system. The Subject's claims detail specific structural and operational components like the camera placement and dual lumen design, while the Compared's claims focus on auscultation and temperature monitoring, indicating different methodologies and designs. The operational roles of both devices involve facilitating respiratory functions, but the Subject's device emphasizes visualization and dual ventilation, whereas the Compared's device focuses on gas exchange, auscultation, and temperature monitoring. The underlying functions of both devices are to support respiratory processes, but the essential components and core interactions differ significantly, with the Subject's device involving camera and light systems, and the Compared's device involving auscultatory and temperature sensing systems. The internal dynamics of the Subject's device revolve around dual ventilation and visualization, while the Compared's device focuses on gas flow, sound transmission, and temperature sensing. Both devices are applied in medical contexts, specifically for intubation and respiratory support, but their practical applications diverge based on their specific features and functionalities.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.924 suggests a potential for significant overlap between the Subject and Compared claims. However, upon detailed analysis, the overlap is found to be moderate. The Subject's tracheal tube and the Compared's endotracheal tube both serve the purpose of respiratory support during medical procedures, but they employ different methodologies and designs. The Subject's device focuses on dual ventilation and visualization, while the Compared's device emphasizes gas exchange, auscultation, and temperature monitoring. The essential components and core interactions of the two devices are distinct, with the Subject's device involving a camera and dual lumens, and the Compared's device involving auscultatory and temperature sensing systems. The internal dynamics and practical applications of the devices also differ, indicating a moderate degree of overlap in their overall functionality and purpose within the medical field.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US9597470B2**Manifold having rotatable ports  
**Inventor: FISCHER JR FRANK J  
Assignee: FISCHER JR FRANK J  
Priority Date: 02-06-2012  
Publication Date: 03-21-2017  
CPC: A61M15/00  
IPV™ Rating: 6.9219  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/196-580-925-767-505/frontpage?l=en](https://www.lens.org/lens/patent/196-580-925-767-505/frontpage?l=en)

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The Compared invention, described under CPC code A61M15/00, primarily functions as a system for delivering respiratory therapy through an airway manifold. This manifold facilitates the insertion and management of multiple medical devices, such as catheters and bronchoscopes, into the patient's airway through an endotracheal tube (ETT). The system is designed to allow for simultaneous ventilation and medical procedures, ensuring efficient and safe management of the patient's respiratory needs.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an anticipated overlap between the Subject's tracheal tube and the Compared's airway manifold, primarily in their focus on enhancing airway visualization and management. The Subject's tracheal tube integrates a camera system directly into the tube for specific visualization purposes, while the Compared's manifold system offers a more versatile approach for connecting various medical devices to the airway. Both inventions aim to improve medical procedures involving the airway, but they do so through different structural and operational designs. The potential commercial impact of the Subject's tracheal tube could be significant in specialized medical fields requiring direct bronchial visualization, whereas the Compared's manifold system might have broader applications across various airway management procedures due to its adaptability and modularity.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the Compared invention involves a rotatable manifold that enables the alignment of multiple ports to facilitate the insertion of various medical devices into the ETT. The underlying functions include the provision of a hollow interior space within the manifold, which serves as a conduit for ventilation and device insertion. Essential components include the upper and lower body of the manifold, each with multiple ports that can be aligned to create linear passageways for device insertion. The core interactions involve the rotation of the upper body relative to the lower body to switch between different device insertion pathways. Internally, the system relies on valve members and end caps to control the flow and ensure a secure seal during device insertion and ventilation. The operational role of this system is to manage the insertion of medical devices into the airway while maintaining ventilation, addressing the mechanical challenge of coaxial device management within the ETT.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integrated camera system within the endobronchial tube, which allows for real-time visualization during intubation, a feature not present in the Compared invention. The Subject's design focuses on the specific mechanical challenge of precise placement within the bronchial stems, utilizing a double-lumen structure with a camera, whereas the Compared invention addresses the broader challenge of managing multiple devices through an airway manifold. The Subject's approach to force distribution and energy efficiency is tailored to the specific task of bronchial intubation, with the camera aiding in reducing the risk of misplacement. In contrast, the Compared invention's mechanical underpinnings are centered around the rotational alignment of ports and the management of multiple devices, which does not directly overlap with the Subject's focus on visualization and precise placement. The Subject's design protocols, such as the integration of electronic components and the specific placement of the camera, further distinguish it from the Compared invention's more generalized approach to airway management.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the airway manifold in the Compared claims share some conceptual similarities in the context of medical devices used for airway management and visualization. The Subject's tracheal tube includes a camera and an opening for visualization within the second ventilation lumen, which aligns with the upper bronchus of a patient. This design facilitates direct visualization of the bronchial area, which is crucial for procedures like intubation or bronchoscopy. The Compared's airway manifold, on the other hand, features a rotatable upper body with multiple ports that allow for the insertion of various medical devices, including viewing devices like bronchoscopes, which can be used for similar visualization purposes. Both systems aim to enhance the ability to visualize and manage the airway, though through different structural and operational approaches. The tracheal tube's design focuses on integrated visualization within the tube itself, while the airway manifold provides a modular system for connecting various devices to the airway. The Subject's claims also mention specific components like cuffs, LEDs, and fluid delivery systems for camera maintenance, which are not directly mentioned in the Compared's claims, indicating a more specialized approach to visualization and maintenance. The Compared's claims, however, emphasize the flexibility and adaptability of the manifold system for different medical procedures, which is not a focus in the Subject's claims.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the Subject's tracheal tube and the Compared's airway manifold is primarily in the area of airway visualization and management. Both systems are designed to facilitate medical procedures involving the airway, with the Subject focusing on an integrated camera system within the tracheal tube and the Compared offering a more versatile manifold system for connecting various medical devices. The claim\_score of 6.9219 suggests a significant degree of conceptual overlap, as both inventions aim to improve visualization and management of the airway, albeit through different structural and operational means. The Subject's tracheal tube is specifically designed for direct visualization within the bronchial area, while the Compared's manifold system provides a broader platform for multiple medical devices, including visualization tools. This indicates a moderate to strong overlap in their intended operational roles within the context of medical airway management.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US10213567B1**Easily removable intubating LMA  
**Inventor: THEVENTHIRAN SHAN  
Assignee: THEVENTHIRAN SHAN  
Priority Date: 11-08-2017  
Publication Date: 02-26-2019  
CPC: A61M16/00  
IPV™ Rating: 6.8928  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/103-094-845-210-494/frontpage?l=en](https://www.lens.org/lens/patent/103-094-845-210-494/frontpage?l=en)

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The primary function of the Compared invention (A61M16/00) is to facilitate the delivery of respiratory gases to a patient's lungs through an airway assembly. This assembly includes a flexible airway tube connected to a mask, designed to conform to the patient's supraglottic structures, and features a cuff to create a seal. The system is intended for use in anesthesia and mechanical ventilation, allowing for the passage of an endotracheal tube and scoping tools through the airway tube into the patient's trachea.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between the Subject and Compared, there is a moderate anticipated overlap of the patent. The Subject's tracheal tube and the Compared's airway assembly both aim to support respiratory functions but through different mechanisms and designs. The Subject's device focuses on dual-lumen ventilation with integrated visualization, while the Compared's device emphasizes ease of intubation and adaptability to the patient's anatomy. The operational roles of the Subject's device include energy conversion (ventilation) and motion transfer (camera movement), while the Compared's device focuses on load-bearing capacity (supporting the airway) and motion transfer (facilitating intubation). The purpose of the Subject's device within its applied context is targeted ventilation and monitoring in medical settings, while the Compared's device is used for intubation and airway management in various medical scenarios. The potential commercial impact of the Subject's patent could be significant in specialized medical fields requiring precise ventilation and monitoring, while the Compared's patent could have a broader impact in general airway management and intubation procedures.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of providing a conduit for respiratory gases and tools through a flexible airway tube connected to a mask. The underlying functions include maintaining an open airway, creating a seal with the cuff to prevent aspiration, and allowing for the insertion of an endotracheal tube. Essential components include the flexible airway tube, the mask with a cuff, and the hollow channel for the endotracheal tube. Core interactions involve the cuff's interaction with the patient's pharyngeal tissue to create a seal, and the passage of the endotracheal tube through the airway tube into the trachea. The internal dynamics focus on maintaining the structural integrity of the airway tube and the flexibility of the cuff to adapt to the patient's anatomy.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its multi-lumen design and integrated camera apparatus, which are not present in the Compared invention. The multi-lumen tracheal tube allows for independent ventilation of each lung, a feature not found in the single-lumen airway assembly of the Compared invention. The camera apparatus enhances the precision of tube placement, particularly in the bronchial stem, which is a significant advancement over the Compared invention's reliance on traditional scoping tools. The design approaches and protocols of the Subject invention focus on the integration of electronic components and visualization technology, which differ from the mechanical focus of the Compared invention. The Subject's potential impact includes improved accuracy in bronchial intubation and enhanced patient safety through better visualization, whereas the Compared invention primarily addresses general airway management and anesthesia delivery.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the airway assembly in the Compared claims both involve medical devices designed for respiratory support and airway management, which are critical in medical contexts such as anesthesia or emergency care. The Subject's tracheal tube features dual ventilation lumens, with one lumen specifically designed to align with the upper bronchus and equipped with a camera for visualization, indicating a focus on targeted ventilation and monitoring within the respiratory system. The Compared's airway assembly, on the other hand, is designed to facilitate intubation and includes a flexible airway tube with a cuff that conforms to the patient's supraglottic structures, suggesting a broader application in airway management and intubation procedures. Both devices incorporate elements for visualization and airway management, but they differ significantly in their design and operational roles. The Subject's device focuses on dual-lumen ventilation with integrated visualization, while the Compared's device emphasizes ease of intubation and adaptability to the patient's anatomy. The methodologies and designs differ, with the Subject's device using a camera and dual lumens for specific ventilation and monitoring, and the Compared's device using a flexible tube and cuff for general airway management. The operational roles also diverge, with the Subject's device aimed at energy conversion (ventilation) and motion transfer (camera movement), and the Compared's device focused on load-bearing capacity (supporting the airway) and motion transfer (facilitating intubation). The underlying functions of the Subject's device include ventilation and monitoring, while the Compared's device focuses on airway management and intubation. Essential components in the Subject's device include the dual lumens, camera, and cuffs, whereas the Compared's device includes a flexible tube, cuff, and flap. Core interactions in the Subject's device involve the interaction between the lumens and the respiratory system, and the camera's field of view, while in the Compared's device, interactions occur between the cuff and the patient's supraglottic structures, and the tube's conduit for intubation tools. The internal dynamics of the Subject's device involve the flow of air through the lumens and the camera's operation, while the Compared's device involves the expansion of the cuff and the movement of intubation tools through the tube. The practical applications of the Subject's device are in targeted ventilation and monitoring in medical settings, while the Compared's device is used for intubation and airway management in various medical scenarios.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.8928 suggests a potential for overlap between the Subject and Compared claims. However, upon detailed analysis, the overlap is found to be moderate. The Subject's tracheal tube and the Compared's airway assembly both address respiratory support and airway management, but they do so through different mechanisms and designs. The Subject's device focuses on dual-lumen ventilation with integrated visualization, while the Compared's device emphasizes ease of intubation and adaptability to the patient's anatomy. The methodologies, designs, operational roles, underlying functions, essential components, core interactions, and internal dynamics of the two devices are distinct, indicating a moderate degree of overlap in their intended purposes and applications.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US8393328B2**Airway assembly and methods of using an airway assembly  
**Inventor: ANGEL LUIS F  
Assignee: ANGEL LUIS F  
Priority Date: 08-22-2003  
Publication Date: 03-12-2013  
CPC: A61M16/00  
IPV™ Rating: 6.8908  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/174-011-156-893-022/frontpage?l=en](https://www.lens.org/lens/patent/174-011-156-893-022/frontpage?l=en)

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The primary function of the Compared invention (A61M16/00) is to facilitate endotracheal intubation, providing a secure airway for mechanical ventilation in critically ill patients. From a mechanical engineering perspective, this involves the design of a flexible plastic tube with a beveled distal end, a ventilator connector, and an inflatable cuff to seal the trachea, ensuring effective ventilation while minimizing damage to the patient's airway.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between the Subject and Compared, there is a moderate anticipated overlap of the patents. Both patents focus on airway management within medical contexts, but their specific operational roles and functionalities differ. The Subject's tracheal tube is designed for dual ventilation and visualization, while the Compared's airway assembly focuses on sealing and fluid flow control. The potential commercial impact of the Subject's patent may be significant in critical care settings where visualization of the bronchial tree is crucial, whereas the Compared's patent could have a broader impact in settings requiring precise control over airway sealing and fluid dynamics. Overall, there is a low possibility of significant overlap due to the distinct design and functional differences between the two devices.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention revolve around the systemic principles of airway management and ventilation. The underlying functions include the insertion of the tube into the trachea, inflation of the cuff to create an airtight seal, and connection to a ventilator for air supply. Essential components include the flexible tube, the inflatable cuff, and the inflation lumen. Core interactions involve the cuff's interaction with the tracheal wall to prevent air leakage and the tube's role in guiding air to the lungs. Internally, the dynamics involve maintaining cuff pressure to avoid tracheal damage while ensuring effective ventilation. The mechanical system's operational role is to provide a conduit for air, ensuring energy conversion from the ventilator to respiratory energy, and it is applied in the context of medical respiratory care.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus within a multi-lumen tracheal tube, specifically designed for endobronchial intubation. This differs from the Compared invention, which focuses on a single-lumen endotracheal tube without integrated visualization tools. The Subject's design allows for direct visualization of the bronchial placement, enhancing precision and safety during intubation. Overlapping aspects include the use of lumens for ventilation and the need for an airtight seal, but the Subject's approach to visualization and multi-lumen design for independent lung ventilation sets it apart. From a mechanical engineering perspective, the Subject's design involves complex force distribution to accommodate the camera and maintain structural integrity, while also addressing energy efficiency in ventilation. The design approaches and protocols, such as the integration of electronic components and the use of a unitary assembly for the camera, further distinguish the Subject's mechanical identity.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the airway assembly in the Compared claims both involve medical devices designed for insertion into the respiratory system, specifically for managing airways. The Subject's tracheal tube includes dual ventilation lumens, with one lumen longer and designed to align with the upper bronchus, featuring an opening and a camera for visualization. The Compared's airway assembly features an outer and inner tube system with a diametrically expansive seal for sealing against the airway, and mechanisms for fluid flow management. Both devices aim to facilitate ventilation and airway management, but their methodologies differ significantly. The Subject focuses on dual-lumen ventilation with integrated visualization, while the Compared emphasizes a coaxial tube system with a focus on sealing and fluid flow control. The operational roles of both devices involve airway management, but the Subject's device is more geared towards visualization and dual ventilation, whereas the Compared's device focuses on sealing and controlled fluid dynamics. The underlying functions of the Subject's device include ventilation and bronchial visualization, supported by essential components like the camera and lumens, with core interactions centered around the camera's field of view through the opening. In contrast, the Compared's device functions to seal the airway and manage fluid flow, with essential components like the diametrically expansive seal and reinforcing members, and core interactions involving the movement of the seal between collapsed and expanded positions. The internal dynamics of the Subject's device involve the interaction between the camera and the opening, while the Compared's device involves the dynamics of the seal's expansion and contraction. Both devices have practical applications in medical settings, particularly in critical care and anesthesia, but their specific applications differ based on their design and functionality.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.8908 suggests a potential for overlap between the Subject and Compared claims. However, upon detailed analysis, the overlap is found to be moderate. The Subject's tracheal tube with its dual ventilation lumens and integrated camera system for visualization does not directly correspond to the Compared's airway assembly, which focuses on a coaxial tube system with a diametrically expansive seal for sealing and fluid flow management. While both devices are used for airway management, their specific designs, operational roles, and underlying functions are distinct. The Subject's device emphasizes visualization and dual ventilation, whereas the Compared's device focuses on sealing and controlled fluid dynamics. The essential components, core interactions, and internal dynamics of the two devices are different, leading to a moderate level of overlap in their overall purpose and application within medical contexts.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US7997266B2**System and method for airway manipulation  
**Inventor: FRAZIER ANDREW  
Assignee: KONINKL PHILIPS ELECTRONICS NV  
Priority Date: 10-04-2004  
Publication Date: 08-16-2011  
CPC: A61M15/00  
IPV™ Rating: 6.8753  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/184-429-109-571-574/frontpage?l=en](https://www.lens.org/lens/patent/184-429-109-571-574/frontpage?l=en)

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The primary function of the tracheal tube described under A61M16/0486 is to facilitate intubation and ventilation of a patient's lungs, with an integrated camera system for visualization to aid in the correct placement of the tube within the trachea and bronchial stems. This system is designed to enhance the precision of endobronchial tube placement, allowing for independent ventilation of each lung through a double-lumen configuration.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between the 'Subject' and 'Compared' patents, there is a moderate possibility of overlap due to both patents addressing interventions in the trachea, albeit with different focuses and mechanisms. The 'Subject' patent's emphasis on a tracheal tube for ventilation and monitoring contrasts with the 'Compared' patent's focus on manipulating the trachea to treat apnea. The operational roles differ significantly, with the 'Subject' patent aimed at facilitating air passage and providing visual feedback, and the 'Compared' patent focused on altering the trachea's structure to prevent airway collapse. The potential commercial impact of the 'Subject' patent lies in its application in critical care and surgical settings, where effective ventilation and monitoring are crucial. Conversely, the 'Compared' patent's impact would be in the field of sleep medicine and respiratory therapy, where maintaining airway patency is essential. Overall, while there is a moderate possibility of overlap in the medical field of respiratory care, the specific applications and mechanisms of the patents suggest distinct commercial pathways.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The tracheal tube operates on the principle of providing a dual-lumen pathway for ventilation, where one lumen terminates in the tracheal airway and the other extends into a bronchial stem. The camera, integral to the tube, is strategically placed to view through an opening in the second lumen, facilitating accurate placement. The system includes mechanical components such as cuffs for sealing, and electronic components for camera operation, all designed to work in unison to ensure effective ventilation and visualization. The underlying functions involve air passage management, sealing against the tracheal walls, and real-time visual feedback for tube positioning.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The tracheal tube with an integrated camera system under A61M16/0486 introduces novelty in the field of intubation by providing real-time visualization for precise placement of endobronchial tubes, which is not present in the tracheal implant under A61M15/00. The tracheal implant, on the other hand, offers a novel approach to treating obstructive sleep apnea by mechanically manipulating the trachea's structure, which is distinct from the ventilation-focused tracheal tube. The tracheal tube's design includes unique features like a multi-lumen configuration and a camera apparatus, while the tracheal implant's design centers around external manipulation with helical springs. There is minimal overlap in their methodologies, designs, or applications, as the tracheal tube focuses on ventilation and visualization, whereas the implant addresses airway manipulation for sleep apnea treatment.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The claims from 'Subject' and 'Compared' patents focus on different aspects of tracheal interventions but share some common elements related to the trachea. The 'Subject' patent describes a tracheal tube with dual ventilation lumens, one of which is longer and includes a camera and an opening for visualization, aimed at facilitating ventilation and monitoring within the trachea. This design is intended for use in medical settings, particularly in scenarios requiring intubation and ventilation, such as in surgical or critical care environments. The operational role of the 'Subject' patent involves facilitating air passage and providing visual feedback, which is crucial for patient monitoring and management. The underlying function is to ensure effective ventilation and monitoring, with essential components like the camera, lumens, and cuffs playing critical roles in these functions. The core interactions involve the interaction between the camera's field of view and the opening in the second lumen, allowing for direct visualization of the tracheal environment. The internal dynamics include the flow of air through the lumens and the positioning of the camera to optimize visibility. In contrast, the 'Compared' patent focuses on methods and devices for treating apnea by manipulating the trachea's length and tension, aiming to improve airway patency. This involves securing and manipulating a device within or around the trachea to alter its physical properties, which is applied in the context of sleep medicine and respiratory therapy. The operational role here is to modify the trachea's structure to prevent airway collapse, with underlying functions centered around maintaining open airways. Essential components include attachment structures and mechanisms for longitudinal shortening, with core interactions involving the device's interaction with the tracheal wall to achieve the desired tension and length. The internal dynamics focus on the mechanical adjustments made to the trachea. Despite these differences, both patents deal with interventions in the trachea, suggesting a potential overlap in the medical field of respiratory care, though their specific applications and mechanisms differ significantly.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The 'Subject' patent's focus on a tracheal tube with dual lumens and a camera for visualization purposes does not directly overlap with the 'Compared' patent's methods and devices for manipulating the trachea to treat apnea. The 'Subject' patent's claim involves detailed structural components for ventilation and monitoring, while the 'Compared' patent's claims are centered around altering the trachea's physical properties to maintain airway patency. Although both patents address tracheal interventions, the methodologies, designs, and intended outcomes are distinct. The 'Subject' patent's claim score of 6.8753 suggests a potential for overlap, but the nature of the claims indicates that any overlap would be moderate at best, as the specific applications and mechanisms of action are different.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US10556078B2**Camera tube with guide surface for intubation stylet and method of use  
**Inventor: COOK DANIEL J  
Assignee: COOKGAS LLC  
Priority Date: 10-23-2014  
Publication Date: 02-11-2020  
CPC: A61B1/00  
IPV™ Rating: 6.8708  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/125-052-102-419-29X/frontpage?l=en](https://www.lens.org/lens/patent/125-052-102-419-29X/frontpage?l=en)

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The primary function of the invention described under CPC code A61B1/00 is to facilitate endo-tracheal intubation using a camera tube in conjunction with a laryngeal mask and an intubation stylet. From a mechanical engineering perspective, this involves the design and operation of a camera tube that can be manipulated within the laryngeal mask to guide the intubation stylet accurately through the laryngeal opening. The system aims to enhance the precision and ease of intubation procedures by providing visual guidance and mechanical support for the stylet.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a moderate possibility of overlap between the patents, primarily due to the shared use of a camera within a medical tube for airway visualization. However, the focus of the 'Subject' patent is on a tracheal tube design for ventilation, while the 'Compared' patent focuses on a method for intubation guidance. The operational roles differ, with 'Subject' aimed at energy conversion (ventilation) and 'Compared' at motion transfer (intubation). The purpose within their applied contexts is distinct, with 'Subject' used in ventilatory support and 'Compared' in intubation procedures. The potential commercial impact of the 'Subject' patent could be significant in the field of respiratory care, offering advanced visualization for ventilation. The 'Compared' patent could impact the market for intubation devices, providing a method for improved intubation guidance. Overall, while there is some overlap in technology, the patents serve different primary functions and applications.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the invention under CPC code A61B1/00 involve systemic and operational principles centered around visualization and mechanical guidance. The camera tube, an essential component, is designed with an elongate member that includes a camera at its distal end and an intubation stylet guide support on its exterior surface. The underlying function is to provide real-time visual feedback to the user, allowing for precise manipulation of the intubation stylet. The functional processes include inserting the camera tube into the laryngeal mask, bending the tube to adjust the angle between imaginary lines extending from its ends, and using the guide support to position the stylet. The internal dynamics involve the interaction between the camera tube, the laryngeal mask, and the intubation stylet, ensuring that the stylet can be accurately directed through the laryngeal opening. This system is intended to improve the operational role of intubation by enhancing the accuracy of stylet placement, which is crucial in medical procedures.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The invention under CPC code A61M16/0486 introduces novelty through its multi-lumen design and integrated camera system, which is specifically tailored for endobronchial intubation. This contrasts with the invention under CPC code A61B1/00, which focuses on facilitating endo-tracheal intubation using a camera tube and laryngeal mask. The Subject patent's multi-lumen tracheal tube with an integral camera represents a significant advancement in respiratory care, allowing for precise placement of the tube into the bronchial stem, which is not addressed by the Compared patent. The Compared patent's system, while innovative in its use of a camera tube for guiding an intubation stylet, does not extend to the complexities of bronchial intubation or the use of a multi-lumen tube. The Subject patent's design approaches, such as the integration of the camera within the tube's structure and the use of specific lumens for different functions, distinguish it from the Compared patent's focus on mechanical guidance and visualization for stylet placement. The Subject patent's potential applications in advanced respiratory care, particularly in surgical and critical care settings, differ from the Compared patent's focus on improving the accuracy of endo-tracheal intubation procedures. Both inventions address real-world mechanical challenges, but the Subject patent's focus on bronchial intubation and independent lung ventilation offers unique advantages in terms of patient care and procedural efficiency.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The claims from 'Subject' and 'Compared' both involve the use of a camera within a medical tube, specifically for intubation or ventilation purposes. In 'Subject', the tracheal tube includes a camera attached to the second ventilation lumen, with an opening for the camera's field of view, and various configurations for the camera's placement and support structures like cuffs and lumens. The 'Compared' claims describe a method involving a camera tube used in conjunction with a laryngeal mask and an intubation stylet, where the camera tube has a camera at its distal end and features like an intubation stylet guide support and a groove for the stylet. Both sets of claims focus on the operational role of visualizing the airway for intubation or ventilation, with 'Subject' focusing on a dual-lumen tracheal tube design and 'Compared' on a method of using a camera tube for intubation guidance. The underlying function in both is to aid in the visualization and guidance during medical procedures, with essential components like cameras, lumens, and support structures. The core interactions involve the camera's field of view and the manipulation of tubes or stylets within the airway. Internally, the dynamics involve the positioning and orientation of the camera and the interaction between the tube and the patient's anatomy. The applied context for 'Subject' is primarily in ventilatory support, while 'Compared' focuses on intubation guidance, both within the medical field. Practical applications include emergency medical procedures, surgical operations, and routine intubations.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the claims of 'Subject' and 'Compared' is primarily in the use of a camera within a medical tube for airway visualization. 'Subject' describes a tracheal tube with a camera and specific structural features like dual lumens and cuffs, while 'Compared' outlines a method using a camera tube with a stylet guide for intubation. The methodologies differ, with 'Subject' focusing on the design and components of the tracheal tube, and 'Compared' on the procedural use of the camera tube. The operational role of both is to aid in airway management, but 'Subject' emphasizes ventilation and 'Compared' emphasizes intubation guidance. The underlying functions and essential components, such as the camera and lumens, show some similarity, but the core interactions and internal dynamics are distinct due to the different focuses on ventilation versus intubation. The applied contexts and practical applications also differ, with 'Subject' more aligned with ventilatory support and 'Compared' with intubation procedures. Given the claim\_score of 6.8708 and the described overlap, the overlap can be considered moderate.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US11684737B2**Endotracheal tube exchange  
**Inventor: AVNIEL YUVAL  
Assignee: ANINIMED LLC  
Priority Date: 07-26-2018  
Publication Date: 06-27-2023  
CPC: A61M16/04  
IPV™ Rating: 6.8676  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/040-831-157-354-746/frontpage?l=en](https://www.lens.org/lens/patent/040-831-157-354-746/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate the insertion and exchange of endotracheal tubes (ETTs) in patients requiring controlled ventilation. This system includes a base, a guide, and a connector that work together to ensure precise placement of the ETT within the trachea, minimizing trauma and complications during intubation and re-intubation procedures. The system aims to reduce the risk of ventilator-associated pneumonia (VAP) by allowing for efficient ETT exchange, which is crucial for patients on prolonged mechanical ventilation.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between Subject and Compared, there is a moderate possibility of overlap due to the shared context of respiratory support systems. However, the focus and operational roles of the two patents are distinct. The Subject's tracheal tube is designed for visualization and monitoring within the respiratory system, potentially impacting medical procedures requiring detailed internal views. In contrast, the Compared's intubation system focuses on the safe and efficient exchange of endotracheal tubes, which could have a significant impact on clinical settings where tube management is critical. The potential commercial impact of the Subject's patent lies in enhancing respiratory procedures with advanced visualization, while the Compared's patent could improve patient safety and efficiency in tube exchange scenarios.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve a mechanical system designed for the controlled insertion and positioning of an ETT. The system's foundational processes include the use of a base secured to the patient, a guide that moves relative to the base, and a connector that attaches to the ETT, allowing for precise movement and placement. The underlying functions are to ensure accurate depth control and alignment of the ETT within the trachea, which is achieved through the guide mechanism's movement and the connector's ability to detachably connect to the ETT. Essential components include the base, guide, and connector, which interact to facilitate the ETT's insertion and exchange. The internal dynamics involve the mechanical motion of the guide and the interaction between the connector and the ETT, ensuring that the tube is positioned correctly to minimize patient discomfort and reduce the risk of complications such as VAP. The system's operational role is to provide a controlled and efficient method for ETT insertion and exchange, which is critical in the context of medical ventilation procedures.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects in the field of tracheal tubes by incorporating a multi-lumen design with a camera apparatus specifically for bronchial intubation. This differs significantly from the Compared invention, which focuses on the mechanical system for ETT insertion and exchange without the integration of visualization technology. The Subject's use of a camera for real-time visualization during intubation enhances the precision and safety of the procedure, addressing the challenge of correct placement in the bronchial stem. The Compared invention, while innovative in its approach to ETT exchange, does not include such visualization capabilities. The overlap between the two inventions is limited to their use in tracheal intubation, but the methodologies, designs, and architectures are distinct. The Subject's design focuses on the structural integrity and functionality of the multi-lumen tube, with the camera apparatus as a key component for visualization, whereas the Compared invention emphasizes mechanical control systems for ETT positioning. In terms of practical applications, the Subject invention is aimed at advanced respiratory care, particularly in surgical or critical care settings where precise bronchial intubation is required. The Compared invention targets the broader market of patients requiring controlled ventilation, focusing on reducing complications during ETT exchange. Both inventions address real-world mechanical challenges, such as patient comfort and safety, but the Subject's integration of visualization technology offers a competitive advantage in specialized medical procedures.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims focuses on a dual-lumen design with integrated camera technology for visualization within the respiratory system. The first and second ventilation lumens are designed to connect to a ventilator, with the second lumen extending longer and aligning with the upper bronchus. The camera, positioned opposite an opening in the second lumen, allows for direct visualization through this opening, enhancing the ability to monitor and navigate within the respiratory tract. Additional features include cuffs for sealing, light sources, and fluid delivery systems for camera maintenance, indicating a comprehensive system for respiratory support and monitoring.  
  
In contrast, the Compared claims detail an intubation system designed for the safe and efficient exchange of endotracheal tubes. This system includes a base, a guide with a depth gauge, and a securement apparatus that facilitates the insertion and removal of endotracheal tubes. The system's operational role is centered around guiding and securing tubes during intubation procedures, with mechanisms to control insertion depth and ensure proper positioning within the patient's trachea. The system's design emphasizes safety and precision in tube management, with features like expandable tubes and depth locks.  
  
While both patents deal with respiratory support systems, the Subject focuses on a tracheal tube with advanced visualization capabilities, whereas the Compared focuses on a system for managing endotracheal tube exchanges. The Subject's tracheal tube could be used in scenarios requiring detailed internal visualization, such as during complex respiratory procedures, while the Compared's system would be applied in clinical settings where tube exchanges are necessary, such as in prolonged intubation scenarios. The methodologies differ significantly, with the Subject emphasizing camera technology and dual-lumen design, and the Compared emphasizing mechanical guidance and safety features for tube management.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.8676 suggests a potential for overlap between the Subject and Compared claims. However, upon detailed analysis, the overlap is found to be moderate. The Subject's focus on a tracheal tube with integrated camera technology for visualization within the respiratory system does not directly align with the Compared's emphasis on a system for managing endotracheal tube exchanges. While both systems are related to respiratory support, the specific functionalities and operational roles are distinct. The Subject's tracheal tube is designed for continuous monitoring and navigation within the respiratory tract, whereas the Compared's system is designed for the safe and precise exchange of endotracheal tubes. The methodologies, designs, and practical applications of each claim set are different, leading to a moderate degree of overlap.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US11975148B2**Intubation devices and methods of use  
**Inventor: MUSUKU SRIDHAR R  
Assignee: EPIC AIRWAY SYSTEMS INC  
Priority Date: 05-21-2018  
Publication Date: 05-07-2024  
CPC: A61M16/04  
IPV™ Rating: 6.8622  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/170-518-964-967-939/frontpage?l=en](https://www.lens.org/lens/patent/170-518-964-967-939/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate intubation by providing a combined laryngeal mask airway (LMA) and endotracheal tube (ETT) system. This system allows for the translation and/or rotation of the ETT within the LMA, controlled externally by a manipulation rod. The device aims to simplify the intubation process, reduce the risk of dislodging the ETT during LMA removal, and improve patient outcomes by minimizing complications associated with traditional intubation methods.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between the Subject and Compared patents, there is a moderate possibility of overlap due to their shared focus on respiratory support systems. However, the Subject patent's emphasis on a tracheal tube with a camera for visual monitoring and specific lumen configurations for ventilation contrasts with the Compared patent's focus on an intubation device with an LMA and movable ETT for airway management. The operational roles of both systems involve the transfer of air or fluid within the respiratory system, but their methodologies, designs, and practical applications diverge significantly. The Subject patent's system could have a commercial impact in scenarios requiring visual confirmation of tube placement, while the Compared patent's system could be impactful in emergency intubations, suggesting different market segments and applications.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the Compared invention involves a mechanical system where the ETT can be moved within the LMA. The underlying function is to provide a controlled pathway for the ETT to enter the trachea, facilitated by the manipulation rod. Essential components include the LMA with its mask portion and elongated tube, the ETT with its own elongated tube, and the manipulation rod. The core interactions involve the translation and rotation of the ETT within the LMA, enabled by the manipulation rod's external control. Internally, the system's dynamics focus on maintaining a secure and adjustable position of the ETT to ensure effective intubation and ventilation. The mechanical system's operational role is to facilitate motion transfer and ensure a proper seal within the trachea, crucial for respiratory support in medical settings.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its multi-lumen design and integrated camera apparatus, which are not present in the Compared invention. The Subject's focus on bronchial intubation and visualization contrasts with the Compared invention's emphasis on simplifying the intubation process through LMA and ETT integration. From a mechanical engineering perspective, the Subject's design involves complex force distribution to maintain the structural integrity of the multi-lumen tube and ensure the camera's functionality within the tracheal environment. The Compared invention, on the other hand, focuses on motion transfer and control through the manipulation rod, which is a different mechanical approach. The Subject's design also incorporates specific protocols for camera maintenance and operation, such as fluid delivery for cleaning, which are unique to its application. While both inventions address respiratory support, they serve different purposes within the medical field, with the Subject aimed at more specialized bronchial procedures and the Compared at general intubation efficiency. The practical applications of the Subject include advanced bronchial procedures and enhanced visualization during intubation, potentially impacting surgical practices by improving precision and patient safety. The Compared invention's applications are more focused on simplifying intubation processes, potentially reducing procedure times and improving outcomes in general anesthesia scenarios.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject patent includes a dual-lumen design with a camera and an opening in the second lumen, aimed at facilitating ventilation and visual monitoring within the respiratory system. The Compared patent details an intubation device with a laryngeal mask airway (LMA) and a movable endotracheal tube (ETT) with an inflation cuff, designed for intubation and airway management. Both patents focus on respiratory support systems but differ significantly in their methodologies and designs. The Subject patent's dual-lumen tracheal tube with a camera and specific positioning for bronchial alignment contrasts with the Compared patent's LMA and ETT system, which emphasizes ease of intubation and sealing capabilities. The operational roles of energy conversion or motion transfer are not directly applicable here, but both systems are involved in the transfer of air or fluid within the respiratory system. The Subject patent's camera and opening serve to monitor and possibly guide the placement of the tube, while the Compared patent's inflation cuff and manipulation rod are designed to secure and adjust the ETT's position. The underlying functions of both systems are to support respiratory functions, but the essential components and core interactions differ, with the Subject focusing on visual and positional accuracy and the Compared on intubation efficiency and sealing. The internal dynamics of the Subject involve camera operation and air flow through dual lumens, while the Compared involves the movement and sealing of the ETT within the LMA. Both systems are applied in medical contexts, specifically in respiratory care, but their practical applications diverge, with the Subject potentially used in scenarios requiring visual confirmation of tube placement and the Compared in emergency intubations.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.8622 suggests a potential for overlap, but upon detailed analysis, the overlap between the Subject and Compared patents is found to be moderate. The Subject patent's focus on a tracheal tube with a camera and specific lumen configurations for ventilation and monitoring does not directly align with the Compared patent's emphasis on an intubation device with an LMA and movable ETT for airway management. While both patents address respiratory support, the methodologies, designs, and operational roles are distinct. The Subject patent's camera and dual-lumen system for visual monitoring and precise positioning in the respiratory tract differ from the Compared patent's system for intubation and sealing. The underlying functions of both systems are to support respiratory functions, but the essential components, core interactions, and internal dynamics are different, leading to a moderate degree of overlap in their applied contexts and practical applications.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US10149956B2**Bi-lateral endobronchial suctioning device and medical suctioning system for intubated patients  
**Inventor: URE JOHN P  
Assignee: URE JOHN P  
Priority Date: 02-28-2015  
Publication Date: 12-11-2018  
CPC: A61M27/00  
IPV™ Rating: 6.8583  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/165-221-956-515-985/frontpage?l=en](https://www.lens.org/lens/patent/165-221-956-515-985/frontpage?l=en)

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The Compared invention, a bi-lateral endobronchial suctioning device (BESD), is designed to enable controlled and safe suctioning of both the right and left bronchi of a patient's lungs when intubated. From a mechanical engineering perspective, the primary function involves the manipulation of actuating and articulating components within the device to allow directional control of a suction catheter. This enables precise navigation and suctioning within the bronchial pathways, addressing the challenge of accessing the left bronchus, which is often difficult due to its anatomical positioning.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a low possibility of overlap between the Subject and Compared patents. The Subject patent focuses on a tracheal tube with dual ventilation lumens and a camera for visualization, primarily aimed at energy conversion for ventilation and patient monitoring. In contrast, the Compared patent describes a medical suctioning system designed for motion transfer to manage bronchial secretions, with an emphasis on suctioning and cleaning. The intended operational roles and applied contexts differ significantly, with the Subject patent being more relevant to continuous patient monitoring in medical settings, and the Compared patent focused on therapeutic suctioning. The potential commercial impact of the Subject patent lies in improving patient care through enhanced visualization and ventilation, while the Compared patent's impact would be in the effective management of bronchial secretions, potentially reducing infection risks and improving patient outcomes in respiratory care.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention revolve around the mechanical system's ability to facilitate directional control and effective suctioning. The underlying functions include the use of a control mechanism to manipulate actuating components within the catheter, allowing the tip to flex left or right. Essential components include the suction catheter, actuating and articulating components, and a bronchoalveolar lavage (BAL) port. The core interactions involve the mechanical linkage between the control mechanism and the catheter's tip, enabling precise movement. Internally, the dynamics of the system are governed by the flexibility and responsiveness of the catheter materials and the efficiency of the suction mechanism. The operational role of this system is to convert mechanical input into directional motion, facilitating the removal of secretions from the lungs, which is crucial in preventing complications like pneumonia or atelectasis.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects in the field of tracheal tubes by integrating a camera apparatus for real-time visualization during bronchial intubation. This feature significantly enhances the precision and safety of the procedure, addressing the challenge of correct placement within the bronchial stem. In contrast, the Compared invention focuses on suctioning capabilities with directional control, which is a different mechanical engineering challenge. The Subject's design incorporates electronic components and a unitary assembly, which are not present in the Compared invention. The mechanical underpinnings of the Subject, such as the integration of the camera within the tube's structure, differ from the Compared's focus on catheter flexibility and suction efficiency. The Subject's approach to improving visualization and placement accuracy distinguishes it from the Compared's emphasis on suctioning and directional control, indicating minimal overlap in their methodologies and applications.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from the Subject patent focus on a dual-lumen design for ventilation, with specific features like a camera and an opening in the second lumen for visualization purposes. The camera's placement and associated components like LEDs and cuffs are detailed, indicating a focus on improving visibility and functionality within the respiratory system. The claims also mention various configurations and additional lumens for suction and fluid delivery, emphasizing the tube's role in patient care and monitoring. In contrast, the Compared patent's claims describe a medical suctioning system designed for bilateral insertion into a patient's bronchi, with a focus on suctioning and cleaning capabilities. The system includes actuating, catheter, articulating, suctioning, and cleaning components, aimed at managing bronchial secretions effectively. The articulating tip and layered tube design suggest a focus on maneuverability and precision in suctioning. While both patents deal with respiratory care, the Subject patent focuses on ventilation and visualization, whereas the Compared patent emphasizes suctioning and cleaning. The methodologies differ significantly; the Subject patent uses a camera for visualization, while the Compared patent uses mechanical articulation for precise suctioning. The operational roles also differ, with the Subject patent aimed at energy conversion (ventilation) and the Compared patent focused on motion transfer (suctioning). The underlying functions of the Subject patent involve air delivery and monitoring, while the Compared patent's function is to remove secretions. Essential components in the Subject patent include ventilation lumens and a camera, while the Compared patent includes layered tubes and a control mechanism. Core interactions in the Subject patent involve air flow and visual feedback, while in the Compared patent, they involve mechanical control and suction. The internal dynamics of the Subject patent relate to air pressure and camera operation, while the Compared patent's dynamics involve cable tension and suction force. Both patents have applications in medical settings, but the Subject patent is more relevant to continuous patient monitoring and ventilation, while the Compared patent is focused on therapeutic suctioning.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.8583 suggests a potential for overlap, but upon detailed analysis, the overlap between the Subject and Compared patents is moderate. The Subject patent's focus on ventilation and visualization through a camera system does not directly align with the Compared patent's emphasis on suctioning and mechanical articulation for managing bronchial secretions. While both patents are used in respiratory care, their specific functionalities and components are distinct. The Subject patent's camera and ventilation lumens serve a different purpose than the Compared patent's layered tubes and suctioning mechanism. The methodologies, operational roles, underlying functions, essential components, core interactions, and internal dynamics of the two patents are sufficiently different to indicate that any overlap is not significant.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US9833587B2**Camera tube with guide surface for intubation stylet and method of use  
**Inventor: COOK DANIEL J  
Assignee: COOKGAS LLC  
Priority Date: 10-23-2014  
Publication Date: 12-05-2017  
CPC: A61B1/267  
IPV™ Rating: 6.8253  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/024-859-546-720-361/frontpage?l=en](https://www.lens.org/lens/patent/024-859-546-720-361/frontpage?l=en)

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The primary function of the invention described under CPC code A61B1/267 is to facilitate endo-tracheal intubation by using a camera tube in conjunction with a laryngeal mask and an intubation stylet. This system allows for visualization of the laryngeal opening, aiding in the precise placement of the intubation stylet through the respiratory tube of the laryngeal mask. The camera tube's design, including an intubation stylet guide support surface, ensures that the stylet can be accurately guided and positioned within the patient's airway.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between Subject and Compared, there is a moderate possibility of overlap due to the shared use of camera technology for visualization within the respiratory system. However, the focus on the mechanical system's intended operational role differs significantly, with the Subject aimed at energy conversion and motion transfer for ventilation and bronchial monitoring, and the Compared focused on motion transfer for intubation guidance. The purpose within their applied contexts also varies, with the Subject primarily used in intensive care or surgical settings for continuous monitoring, and the Compared used in emergency or surgical settings for intubation. The potential commercial impact of the Subject's patent may be significant in the medical device market for ventilation and monitoring, while the Compared's patent could impact the market for intubation devices and emergency medical equipment.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the invention under CPC code A61B1/267 involves the integration of a camera within a tube that is used alongside a laryngeal mask. The camera tube features an elongate member with a camera at its distal end and an intubation stylet guide support surface that extends radially outward. This surface is designed to interact with the distal end of the respiratory tube of the laryngeal mask, creating an aperture through which the intubation stylet can pass. The camera provides real-time visualization, allowing the user to manipulate the stylet's orientation within the laryngeal mask's cavity. The underlying functions include visual guidance for intubation, precise positioning of the stylet, and the ability to adjust the stylet's path based on visual feedback. Essential components include the camera, the intubation stylet guide support surface, and the laryngeal mask's respiratory tube and positioning shield. Core interactions involve the camera's field of view capturing the laryngeal opening, and the mechanical interaction between the intubation stylet guide support surface and the respiratory tube's distal end. The internal dynamics focus on the manipulation of the camera tube and stylet to achieve successful intubation, with the system's operational role centered on aiding in the accurate placement of the intubation stylet for endo-tracheal intubation.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention under CPC code A61M16/0486 introduces a novel approach to tracheal intubation by integrating a camera directly into a multi-lumen tracheal tube, specifically designed for endobronchial intubation. This differs from the Compared invention under CPC code A61B1/267, which uses a separate camera tube in conjunction with a laryngeal mask for endo-tracheal intubation. The Subject's design allows for direct visualization within the tracheal and bronchial lumens, eliminating the need for an additional camera tube and laryngeal mask system. The integration of the camera into the tracheal tube itself enhances the precision of bronchial intubation and simplifies the procedure by reducing the number of components involved. From a mechanical engineering perspective, the Subject's design focuses on the structural integrity and force distribution required to maintain the camera's position within the tracheal tube, as well as the energy efficiency of the camera system. The Compared invention, on the other hand, involves mechanical interactions between the camera tube, laryngeal mask, and intubation stylet, with a focus on the manipulation and guidance of the stylet. The Subject's approach to visualization and intubation is more integrated and streamlined, offering a distinct mechanical identity. Both inventions aim to improve intubation accuracy, but they serve different purposes within the medical field, with the Subject targeting bronchial intubation and the Compared focusing on endo-tracheal intubation. The Subject's innovation could potentially influence practices in thoracic surgery and critical care by providing a more efficient and less invasive method for managing patient ventilation.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims features a dual-lumen design with integrated camera technology, specifically tailored for ventilation and bronchial visualization. The first and second ventilation lumens are designed to connect to a ventilator, with the second lumen extending longer and aligning with the upper bronchus. The camera, positioned opposite an opening in the second lumen, allows for direct visualization through this opening, enhancing the operational role in monitoring and guiding ventilation processes within the respiratory system. The camera's placement and the lumens' configuration suggest a focus on improving patient safety and procedural accuracy in medical settings, particularly in intensive care or surgical environments.  
  
In contrast, the Compared claims describe a combination of a camera tube and a laryngeal mask, aimed at facilitating intubation and visualization within the oropharynx. The camera tube includes an intubation stylet guide support surface, which is crucial for guiding an intubation stylet through the respiratory tube of the laryngeal mask. This setup is designed to enhance the ease and accuracy of intubation procedures, with a focus on the mechanical system's role in motion transfer and positioning within the patient's airway. The integration of the camera and the guide surface indicates a design intended for use in emergency or surgical settings where quick and precise intubation is critical.  
  
Both systems involve cameras for visualization within the respiratory system, but their methodologies and designs differ significantly. The Subject focuses on a dual-lumen tracheal tube with a camera for bronchial visualization, while the Compared emphasizes a camera tube and laryngeal mask combination for intubation guidance. The operational roles, underlying functions, essential components, core interactions, and internal dynamics of these systems are tailored to their specific applications, with the Subject aimed at ventilation and bronchial monitoring, and the Compared focused on intubation and oropharyngeal visualization.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.8253 suggests a potential for overlap between the Subject and Compared claims. The primary similarity lies in the use of cameras for visualization within the respiratory system. However, the Subject's focus on a dual-lumen tracheal tube for ventilation and bronchial monitoring contrasts with the Compared's emphasis on a camera tube and laryngeal mask for intubation guidance. The methodologies, designs, and operational roles of these systems are distinct, with the Subject's system designed for continuous monitoring and ventilation, and the Compared's system aimed at facilitating intubation. The essential components, core interactions, and internal dynamics of these systems are tailored to their specific applications, resulting in a moderate degree of overlap due to the shared use of camera technology but differing in their primary functions and structural designs.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US9339208B2**Tracheal tube with pressure monitoring lumen and method for using the same  
**Inventor: WOOD LOCKETT E  
Assignee: WOOD LOCKETT E  
Priority Date: 01-18-2010  
Publication Date: 05-17-2016  
CPC: A61B5/08  
IPV™ Rating: 6.8171  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/164-901-424-274-781/frontpage?l=en](https://www.lens.org/lens/patent/164-901-424-274-781/frontpage?l=en)

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The Compared invention (A61B5/08) focuses on a method for measuring and correcting tracheal pressure in intubated patients. It involves using a pressure monitoring lumen integrated into a tracheal tube to measure tracheal pressure, and a purging mechanism to clear the lumen of obstructions, thereby ensuring accurate pressure readings. This system is designed to provide more precise control over ventilator settings by accounting for pressure changes due to purging fluid.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a moderate possibility of overlap between the Subject and Compared patents, primarily due to their shared context within respiratory care involving tracheal tubes. However, the Subject patent focuses on the structural design and visualization capabilities of the tracheal tube, while the Compared patent deals with a method for pressure management and correction. The Subject patent's design could potentially be integrated into systems that also use the pressure correction method described in the Compared patent, but they serve different primary functions. The commercial impact of the Subject patent could be significant in medical fields requiring direct visualization and intervention within the respiratory system, whereas the Compared patent's method could improve the accuracy of respiratory monitoring, impacting the management of respiratory conditions.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the Compared invention involves the systemic integration of a pressure monitoring lumen within a tracheal tube, which is connected to a pressure transducer for measuring tracheal pressure. The functional principle includes the delivery of a purging fluid as a bolus at a predetermined point in the breathing cycle to clear the lumen of obstructions like mucus. This purging is timed to coincide with the minimum pressure point in the breathing cycle to minimize interference with respiratory gas pressure. The underlying functions include pressure measurement, purging, and correction of tracheal pressure readings. Essential components are the pressure monitoring lumen, pressure transducer, and a purging system. Core interactions involve the interaction between the purging fluid and the pressure monitoring lumen, and the internal dynamics focus on maintaining clear pathways for accurate pressure readings. The system's operational role is to enhance the accuracy of tracheal pressure measurements, which is crucial for adjusting ventilator settings in medical applications.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces a novel approach by integrating a camera apparatus into a multi-lumen tracheal tube, specifically designed for bronchial intubation. This feature allows for real-time visualization, which is not present in the Compared invention. The Compared invention focuses on pressure monitoring and correction, utilizing a purging mechanism to ensure accuracy, which is a different mechanical engineering approach aimed at improving ventilator settings. The Subject's design and methodology, centered around visualization and precise placement, differ significantly from the Compared's focus on pressure measurement and correction. There is minimal overlap in terms of methodologies, designs, or architectures, as the Subject emphasizes visual guidance and the Compared emphasizes pressure accuracy. The Subject's mechanical underpinnings involve force distribution for maintaining tube integrity and energy efficiency for the camera operation, while the Compared's involve energy efficiency in pressure measurement and structural integrity for the pressure monitoring lumen. The Subject's design approaches include tolerance standards for camera integration and fabrication techniques for multi-lumen tubes, whereas the Compared's involve standards for pressure transducers and purging systems. In terms of practical applications, the Subject is aimed at the medical field for bronchial intubation procedures, potentially impacting surgical practices by improving placement accuracy and patient outcomes. The Compared invention targets the same medical field but focuses on improving ventilator settings, which could enhance patient care by providing more accurate pressure data. Both inventions address different mechanical challenges within the medical field, with the Subject focusing on visualization and placement, and the Compared on pressure accuracy and ventilator control.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The claims from the Subject and Compared patents both relate to tracheal tubes and their associated functionalities, but they focus on different aspects of tracheal tube technology. The Subject patent describes a tracheal tube with dual ventilation lumens, one of which is longer and includes a camera and an opening for visualization within the patient's bronchus. This design is intended for direct visualization and potentially for therapeutic interventions within the respiratory system, with applications in medical settings for intubation and bronchoscopy. The camera's placement and the dual lumen design suggest a focus on improving visibility and possibly the delivery of treatments directly to the lungs. The claims also mention various configurations and additional components like cuffs, LEDs, and fluid delivery systems, which enhance the functionality of the tracheal tube for specific medical procedures.  
  
In contrast, the Compared patent focuses on a method for measuring and correcting tracheal pressure using a pressure monitoring lumen associated with a tracheal tube. This method involves delivering a purging fluid to clear the lumen and correct pressure readings, which is crucial for accurate monitoring of a patient's respiratory status. The method's application is primarily in the monitoring and management of respiratory conditions, with a focus on ensuring accurate pressure measurements during different phases of the breathing cycle. The claims detail the timing and pressure management aspects, which are critical for the operational role of pressure monitoring in clinical settings.  
  
The methodologies differ significantly: the Subject patent deals with the physical design and components of the tracheal tube, while the Compared patent addresses a procedural method for pressure management. The Subject patent's design could potentially be used in conjunction with the method described in the Compared patent, as both involve tracheal tubes, but they serve different primary functions within the respiratory system.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the Subject and Compared patents is primarily in the context of tracheal tubes used in respiratory care. However, the Subject patent focuses on the structural and visual aspects of the tracheal tube, including the integration of a camera and dual lumens for direct visualization and potential therapeutic applications. In contrast, the Compared patent emphasizes a method for managing and correcting tracheal pressure measurements, which is a procedural aspect rather than a structural one. The claim\_score of 6.8171 suggests a potential for overlap, but the actual overlap is moderate due to the different focuses of the patents. The Subject patent's design could theoretically be used in a system that also employs the pressure correction method of the Compared patent, but they address different operational roles within the respiratory system.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US11617498B2**Intubation device capable of bi-directional distal deflection and temporary proximal shaping for laryngoscopy, tracheoscopy, and bronchoscopy  
**Inventor: PEREZ-LIZANO EDWARD R  
Assignee: PEREZ LIZANO EDWARD R  
Priority Date: 03-15-2013  
Publication Date: 04-04-2023  
CPC: A61B1/005  
IPV™ Rating: 6.8151  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/014-096-942-845-638/frontpage?l=en](https://www.lens.org/lens/patent/014-096-942-845-638/frontpage?l=en)

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The primary function of the Compared invention (A61B1/005) is to provide a flexible and adjustable imaging system for visualizing confined spaces, particularly during endotracheal intubation. This system integrates a stylet with imaging capabilities to facilitate the placement of an endotracheal tube into the trachea, ensuring correct positioning and reducing the risk of complications such as inadvertent endobronchial intubation. The system's design aims to offer a cost-effective alternative to traditional fiberoptic endoscopes, enhancing accessibility for medical professionals.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between Subject and Compared, there is an overall moderate possibility of overlap due to the shared medical context of intubation and visualization. The Subject's tracheal tube focuses on dual ventilation and direct visualization, while the Compared's intubation device emphasizes precise placement through a malleable rod and stylet. The operational roles differ, with the Subject converting energy for ventilation and the Compared transferring motion for guiding. Both patents have significant potential commercial impact in the medical field, with the Subject offering advanced ventilation and visualization capabilities, and the Compared providing a solution for precise intubation.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates through a combination of mechanical and optical principles. The core component is a stylet with a deflectable section, controlled by applying opposing forces to pressure receiving elements at the proximal end. This allows for precise manipulation within the patient's airway. The image acquisition element at the distal end captures visual data, which is transmitted either through an image conduit along the stylet or wirelessly to a display. The system's flexibility and adjustability are achieved through the use of a malleable rod within the stylet, enabling the operator to navigate the device effectively. The underlying functions include energy conversion (from mechanical force to visual data), motion transfer (through the deflectable section), and the facilitation of visual feedback for accurate tube placement.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus specifically designed for endobronchial intubation, which differs from the Compared invention's focus on general endotracheal intubation. The Subject's multi-lumen design with unequal length tubes and the capability for independent lung ventilation represent a significant departure from the Compared invention's single-purpose imaging system. The mechanical engineering aspects of the Subject, such as the design of the airtight seal and the structural considerations for accommodating the camera, highlight its unique approach to addressing the challenges of endobronchial tube placement. While both inventions aim to improve intubation procedures, the Subject's focus on endobronchial applications and its integrated visualization system set it apart in terms of functionality and application. The Subject's design also addresses practical challenges such as physician placement and the need for precise visualization within the bronchial stems, which are not directly addressed by the Compared invention.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the intubation device in the Compared claims share some similarities in their operational roles and practical applications, particularly in the medical field for intubation and ventilation. The Subject's tracheal tube includes a camera for visualization, which aligns with the Compared's intubation device that may include an image acquisition element. Both devices are designed to facilitate medical procedures involving the respiratory system, with the Subject focusing on dual ventilation lumens and the Compared focusing on a stylet for guiding an endotracheal tube. The Subject's tracheal tube has a specific design for dual ventilation with a camera for direct visualization, while the Compared's device uses a malleable rod within a stylet to control the deflection of the distal tip for precise placement. The methodologies differ significantly; the Subject's design involves a static structure with specific lumens and camera placement, whereas the Compared's design involves dynamic manipulation of a stylet for intubation. The operational roles include energy conversion in the form of air flow for ventilation in the Subject, and motion transfer for guiding the intubation device in the Compared. Both devices serve critical functions within the context of medical procedures, with the Subject aimed at providing dual ventilation and visualization, and the Compared focused on facilitating intubation with precision and control.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.8151 indicates a potential for significant overlap between the Subject and Compared claims. The overlap is primarily in the medical application for respiratory procedures, with both patents involving devices for intubation and visualization. However, the methodologies and designs differ substantially. The Subject's tracheal tube with dual ventilation lumens and a camera for direct visualization contrasts with the Compared's intubation device that uses a malleable rod within a stylet for controlled deflection and placement. The operational roles, such as energy conversion for ventilation in the Subject and motion transfer for guiding in the Compared, further highlight the differences in their core functions. Despite these differences, the shared context of medical intubation and visualization suggests a moderate degree of overlap.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US7328701B2**Variable size endotracheal tube  
**Inventor: GREEN PHILIP A  
Assignee: GREEN PHILIP A  
Priority Date: 04-07-2004  
Publication Date: 02-12-2008  
CPC: A61M11/00  
IPV™ Rating: 6.7974  
Inferred Equivalence: Medium**

[Lens: https://www.lens.org/lens/patent/118-547-456-187-060/frontpage?l=en](https://www.lens.org/lens/patent/118-547-456-187-060/frontpage?l=en)

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The primary function of the Compared invention (A61M11/00) is to provide a variable size endotracheal tube (VSET) that can be adjusted to fit various sizes of body lumens, particularly the trachea. This adjustment is facilitated by a flexible, tubular member with a stent-like infrastructure that can be radially expanded using an actuator system, which includes a semi-flexible guidewire and an inflatable balloon. The purpose is to ensure proper intubation by allowing the tube to adapt to the patient's tracheal size, thereby minimizing damage and improving ventilation efficacy.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an overall moderate possibility of overlap between the patents due to their shared focus on tracheal medical devices. However, the specific operational roles and mechanisms differ significantly, with 'Subject' focusing on dual ventilation and visualization, and 'Compared' on adjustable sizing and structural support. The 'Subject' patent could have a significant commercial impact in clinical settings requiring dual ventilation and visual monitoring, while the 'Compared' patent might impact markets needing customizable tracheal support, such as in emergency or surgical applications. The potential for overlap exists in the general application within the respiratory system, but the distinct functionalities suggest a low possibility of direct competition.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the Compared invention involves the use of a flexible, longitudinally extending tubular member with a stent-like infrastructure that can be selectively expanded. The underlying function is to provide a variable cross-section that can adapt to different tracheal sizes, preventing stenosis and ensuring adequate ventilation. The essential components include the tubular member, the stent-like infrastructure, and the actuator system comprising a guidewire with a lumen and perforations, and an inflatable balloon. The core interactions involve the inflation of the balloon through the guidewire's perforations, which expands the stent-like infrastructure radially outwards. The internal dynamics focus on maintaining the expanded state to prevent collapse and ensure continuous ventilation. This system is designed to address the mechanical challenge of fitting an endotracheal tube to various tracheal sizes, enhancing the tube's load-bearing capacity and energy efficiency in terms of ventilation.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its multi-lumen design and integrated camera system, which are not present in the Compared invention. The Subject's focus on independent lung ventilation and precise bronchial intubation using visualization technology distinguishes it from the Compared invention's emphasis on variable size adjustment for tracheal intubation. The mechanical underpinnings of the Subject include force distribution across the double-lumen structure and energy efficiency in maintaining ventilation, while the Compared invention focuses on structural integrity and energy efficiency in adapting to different tracheal sizes. The design approaches and protocols of the Subject involve the use of electronic components and fluid passageways, contrasting with the Compared invention's reliance on a stent-like infrastructure and balloon expansion system. The Subject and Compared inventions serve different purposes within the medical field, with the Subject aimed at bronchial intubation and the Compared at tracheal intubation, potentially impacting different aspects of respiratory care.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The claims from 'Subject' and 'Compared' both relate to medical devices intended for use within the respiratory system, specifically focusing on tracheal or endotracheal applications. The 'Subject' claims describe a tracheal tube with dual ventilation lumens, one of which is longer and designed to align with the upper bronchus, featuring an opening and a camera for visualization. The 'Compared' claims detail a medical device with a flexible tubular member and a stent-like infrastructure that can be selectively expanded using an actuator system, which includes a guidewire and balloon. Both sets of claims address the operational role of facilitating respiratory support, with 'Subject' focusing on ventilation and visualization, and 'Compared' emphasizing adjustable sizing and structural support within the trachea. The methodologies differ significantly; 'Subject' uses a static design with specific lumens and camera placement, while 'Compared' employs a dynamic expansion mechanism. The underlying functions of 'Subject' involve dual ventilation and direct visualization, whereas 'Compared' focuses on maintaining an open airway through adjustable sizing. Essential components in 'Subject' include the dual lumens, camera, and cuffs, while 'Compared' includes a tubular member, stent-like infrastructure, and an expansion system. Core interactions in 'Subject' involve the interaction between the camera and the opening for visualization, and in 'Compared', the interaction between the actuator and the stent-like infrastructure for expansion. The internal dynamics of 'Subject' are related to the flow of air through the lumens and the camera's field of view, while 'Compared' involves the mechanical expansion and contraction of the tubular member. In terms of applied context, 'Subject' is designed for use in clinical settings where visualization and dual ventilation are necessary, such as in intensive care units, whereas 'Compared' is suited for scenarios requiring adjustable airway support, potentially in emergency or surgical settings. The practical applications of 'Subject' include aiding in the management of respiratory conditions with visual feedback, while 'Compared' could be used in procedures requiring a customizable fit within the trachea.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.7974 indicates a high degree of similarity between the claims. The overlap is significant as both sets of claims address medical devices for respiratory support within the trachea. However, the specific methodologies, designs, and operational roles differ substantially. 'Subject' focuses on dual ventilation and visualization, while 'Compared' emphasizes adjustable sizing and structural support. The overlap is primarily in the general context of tracheal devices, but the detailed functionalities and mechanisms are distinct, suggesting a moderate degree of overlap.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US9907920B2**Endotracheal tube with dedicated evacuation port  
**Inventor: LI YOUZHI  
Assignee: COVIDIEN LP  
Priority Date: 06-08-2009  
Publication Date: 03-06-2018  
CPC: A61M16/00  
IPV™ Rating: 7.9268  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/129-898-672-599-338/frontpage?l=en](https://www.lens.org/lens/patent/129-898-672-599-338/frontpage?l=en)

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The primary function of the Compared invention (A61M16/0486) is to facilitate the suctioning of accumulated mucus secretions from the airway of intubated patients. This is achieved through a tracheal tube equipped with multiple suction ports strategically placed to effectively remove mucus both above and below the cuff, thereby reducing the risk of ventilator-associated pneumonia (VAP). The design includes a tubular body with an open distal end for ventilation, a cuff for sealing against the tracheal wall, and multiple suction lumens terminating in ports at different locations along the tube.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a moderate possibility of overlap between the patents due to the shared concept of tracheal tubes for ventilation and the use of a cuff. However, the specific features and functionalities diverge significantly, with Subject focusing on visualization through a camera and dual-lumen design, and Compared emphasizing suction for secretion management. The operational roles of both patents are centered around maintaining airway patency and supporting patient ventilation, but the methods differ. Subject's design might have a commercial impact in settings requiring visual guidance for procedures, while Compared's design would be more impactful in environments where managing patient secretions is critical. Overall, the patents cater to different needs within the medical ventilation field, suggesting a low possibility of direct competition but potential for complementary use in clinical settings.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention revolve around the systemic removal of mucus secretions to prevent respiratory infections. The underlying functions include suctioning through dedicated lumens and ports, which are essential components for effective mucus removal. The core interactions involve the suction ports interfacing with the tracheal wall to draw out mucus, while the internal dynamics are governed by the pressure differentials created by the suction system. The invention's operational role is to maintain airway clearance, which is crucial in the context of prolonged intubation in critically ill patients. The design ensures that the suction ports are positioned to avoid direct contact with the tracheal wall, thereby preventing tissue damage while maximizing mucus removal efficiency.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects by integrating a camera apparatus into a multi-lumen tracheal tube, specifically designed for bronchial intubation. This differs significantly from the Compared invention, which focuses on suctioning mucus secretions through multiple ports. The Subject's design enhances the precision of tube placement within the bronchial system, addressing the challenge of correct intubation in the left or right bronchus. In contrast, the Compared invention's mechanical underpinnings are centered around force distribution and energy efficiency in suctioning, with design approaches focused on port placement and suction lumen configuration. The Subject's camera integration and visualization capabilities represent a distinct mechanical identity, aimed at improving procedural accuracy in respiratory therapy, while the Compared invention targets airway clearance and infection prevention. The Subject's potential applications lie in thoracic surgery and critical care, where precise intubation is crucial, whereas the Compared invention is more broadly applicable in managing mucus accumulation in intubated patients across various medical settings.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from Subject and Compared share some common elements related to the design and functionality of tracheal tubes used in medical ventilation. Both sets of claims mention a tubular body or lumens designed for ventilating a patient, indicating a shared purpose in respiratory support. Subject's claims focus on a dual-lumen design with specific features like a camera and an opening for visualization, which is not present in Compared's claims. Conversely, Compared's claims emphasize suction capabilities with multiple suction ports and lumens, a feature not detailed in Subject's claims. Both sets of claims mention a cuff for sealing against the trachea, but the configurations and additional features around the cuff differ significantly. Subject's claims include a camera for internal visualization, which could be used for monitoring or guiding procedures, while Compared's claims focus on suction to manage secretions, which is crucial for maintaining airway hygiene. The operational roles of energy conversion or motion transfer are not directly applicable here, but the load-bearing capacity in terms of maintaining airway patency and managing secretions is relevant to both. The underlying function of both sets of claims is to facilitate effective ventilation and patient care, but the essential components and core interactions differ, with Subject focusing on visualization and Compared on secretion management. The internal dynamics of Subject's tracheal tube involve camera positioning and field of view, while Compared's involve suction dynamics and timing relative to patient respiration. In applied contexts like intensive care units, Subject's design might be more applicable for procedures requiring visual guidance, whereas Compared's design would be more suited for managing patient secretions.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the claims of Subject and Compared is primarily in the general concept of a tracheal tube for ventilation, with both mentioning a cuff for sealing against the trachea. However, the specific features and functionalities diverge significantly. Subject's claims introduce a camera and dual-lumen design for visualization, which is not mentioned in Compared's claims. Conversely, Compared's claims focus on suction capabilities with multiple ports and lumens, which are not detailed in Subject's claims. The claim\_score of 7.9268 suggests a potential for overlap, but the detailed analysis indicates that the overlap is moderate due to the distinct focus of each set of claims on different aspects of tracheal tube functionality.

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**Claims Breakdown and Comparison Summary:**

Didn't find any similar subject claim for the threshold used

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US8568316B2**Tracheal tube sensor disposed on permeable membrane  
**Inventor: FINNERAN ALAN  
Assignee: FINNERAN ALAN  
Priority Date: 03-17-2010  
Publication Date: 10-29-2013  
CPC: A61B5/00  
IPV™ Rating: 7.7935  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/193-420-558-647-488/frontpage?l=en](https://www.lens.org/lens/patent/193-420-558-647-488/frontpage?l=en)

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The primary function of the Compared invention (A61B5/00) is to measure levels of blood gases and/or blood analytes in the respiratory tract of a patient using a sensor integrated into a tracheal tube. This system aims to provide real-time monitoring of blood flow characteristics without the need for additional invasive procedures, enhancing patient comfort and maintaining the integrity of the tracheal tube's primary function of ventilation.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between Subject and Compared, there is a low possibility of overlap between the two patents. The Subject patent focuses on a tracheal tube with a camera system for visual monitoring and airway management, while the Compared patent focuses on a tracheal tube with a sensor system for biochemical monitoring. The operational roles, such as motion transfer in the Subject patent and energy conversion in the Compared patent, further highlight their distinct purposes within the context of respiratory care. The potential commercial impact of the Subject patent lies in improving the accuracy and safety of tracheal tube placement and monitoring, which could be significant in surgical and intensive care settings. The Compared patent's impact would be in enhancing patient monitoring capabilities, particularly in critical care scenarios where real-time biochemical data is crucial. Both patents have unique applications and potential impacts, but they do not significantly overlap in their core functionalities.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates through a series of systemic and operational principles. The core concept involves a sensor coupled to a selectively permeable membrane, which allows for the detection of blood gases and/or analytes. The underlying function is to facilitate non-invasive monitoring by deploying the sensor from within the tracheal tube. Essential components include the sensor, the selectively permeable membrane, and a lumen for sensor deployment. Core interactions occur between the sensor and the tracheal mucosa, where the sensor measures the desired parameters. The internal dynamics involve the inflation of a cuff to deploy the sensor against the tracheal wall, ensuring accurate readings without compromising the tube's sealing properties. This system is designed to function within the context of medical diagnostics, specifically for monitoring respiratory health in intubated patients.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects in the field of tracheal tubes by integrating a camera apparatus for real-time visualization during bronchial intubation. This feature significantly enhances the precision of tube placement, particularly in the context of endobronchial tubes, which require accurate positioning within the trachea and bronchial stems. In contrast, the Compared invention focuses on diagnostic capabilities, integrating a sensor for monitoring blood gases and analytes, which does not overlap with the visualization and placement functionalities of the Subject. The Subject's design includes a multi-lumen structure with unequal lengths and specific camera positioning, which are not present in the Compared invention. The mechanical underpinnings of the Subject involve force distribution and structural integrity to maintain the camera's position and functionality, while the Compared invention emphasizes energy efficiency in sensor deployment and the integrity of the tracheal tube's sealing mechanism. The Subject's design approaches, such as the use of a unitary assembly for the camera, and protocols for ensuring a clear field of view, distinguish it from the Compared invention's focus on sensor deployment and measurement accuracy.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tubes described in both Subject and Compared patents are designed for ventilating patients, indicating a shared fundamental purpose within the medical field, specifically in respiratory care. The Subject patent focuses on a dual-lumen tracheal tube with an integrated camera system for visual monitoring, which is particularly useful for guiding the tube's placement and monitoring the patient's airway. The camera's placement and the design of the lumens, including the specific positioning of the second lumen's distal end to align with the upper bronchus, suggest a specialized approach to ventilation and monitoring. The Compared patent, on the other hand, emphasizes a tracheal tube with a sensor system for measuring blood gases and analytes, which is crucial for monitoring the patient's respiratory and metabolic status. Both patents utilize a cuff system, but the Subject patent uses it for sealing and positioning, while the Compared patent uses it for both sealing and deploying a sensor. The methodologies differ significantly; the Subject patent's focus is on visual and structural design for airway management, whereas the Compared patent's focus is on biochemical monitoring. The operational roles diverge with the Subject patent aimed at motion transfer (camera positioning) and the Compared patent aimed at energy conversion (sensor data to electrical signals). The essential components, core interactions, and internal dynamics of the Subject patent revolve around the camera and lumens, while those of the Compared patent revolve around the sensor and membrane. Both patents have practical applications in intensive care settings, but their specific applications differ based on their primary functions.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.7935 suggests a high degree of similarity between the claims of the Subject and Compared patents. However, upon detailed analysis, the overlap is primarily in the general concept of tracheal tubes used for patient ventilation. The Subject patent's focus on a camera system for visual monitoring and the Compared patent's focus on a sensor system for biochemical monitoring indicate distinct functionalities and purposes. While both patents mention a cuff system, the purposes and designs of these cuffs differ significantly. The Subject patent's camera and dual-lumen design for airway management and the Compared patent's sensor and membrane design for biochemical monitoring show little to no overlap in their specific methodologies, operational roles, underlying functions, essential components, core interactions, and internal dynamics. Therefore, despite the high claim\_score, the actual overlap in the detailed aspects of the claims is low.

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**Claims Breakdown and Comparison Summary:**

Didn't find any similar subject claim for the threshold used

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US8905030B2**Tracheal tube with connector insert  
**Inventor: STEPHENSON JAMES  
Assignee: STEPHENSON JAMES  
Priority Date: 03-31-2011  
Publication Date: 12-09-2014  
CPC: A61M16/04  
IPV™ Rating: 7.7668  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/172-208-026-511-555/frontpage?l=en](https://www.lens.org/lens/patent/172-208-026-511-555/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate artificial ventilation or assist patient ventilation through the use of tracheal tubes, such as endotracheal or tracheostomy tubes. These tubes are designed to interface with standard connectors at the end of a ventilation hose assembly, which connects to a ventilator. The invention focuses on improving the connection between the tube and the connector, ensuring a secure and efficient airflow path into the patient's trachea.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

Overall, there is a moderate possibility of overlap between the Subject and Compared patents. Both patents address tracheal tubes for ventilation, but their focus and specific features diverge significantly. The Subject patent's emphasis on dual lumens, visualization, and additional monitoring tools contrasts with the Compared patent's focus on the connector's design and structural integrity. The operational roles of both patents involve energy conversion for ventilation, but the Subject patent also includes motion transfer for camera operation, while the Compared patent focuses on load-bearing capacity of the connector. In terms of applied context, the Subject patent is likely more specialized for critical care settings, while the Compared patent has broader applications in various medical settings. The potential commercial impact of the Subject patent could be significant in markets requiring advanced monitoring capabilities, whereas the Compared patent's impact might be more widespread due to its focus on improving the usability and safety of tracheal tubes in general.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the Compared invention involves the structural design and connection mechanisms of tracheal tubes. The underlying functions include providing a pathway for air or other gases to enter the patient's lungs, which is achieved through a ventilation lumen and secondary lumens within the tube's wall. Essential components include the connector with an annular body and an insert portion, which ensures a non-removable and stress-reduced connection to the ventilation lumen. The functional processes involve the use of a tapered portion and a step at the junction of the insert to mitigate stress on the tube's wall, particularly around secondary lumens. The internal dynamics focus on maintaining a secure fit between the cannula and the connector, ensuring efficient airflow and preventing damage to the tube under stress. The invention's purpose within its applied context is to provide a reliable and adaptable tracheal tube system for various patient sizes and conditions, primarily in medical settings for ventilation.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects by integrating a camera apparatus within a multi-lumen tracheal tube, specifically designed for endobronchial use. This differs from the Compared invention, which focuses on the structural connection between the tracheal tube and the connector. The Subject's camera allows for real-time visualization during bronchial intubation, enhancing physician accuracy and patient safety, which is not addressed in the Compared invention. The overlap between the two inventions is minimal, as the Subject focuses on visualization and independent lung ventilation, while the Compared invention emphasizes structural integrity and connection efficiency. From a mechanical engineering perspective, the Subject's design involves complex integration of electronic components and optical systems within the tube's structure, whereas the Compared invention deals with mechanical stress distribution and connector design. The Subject's approach to force distribution and energy efficiency is centered around the camera's operation and the tube's ability to maintain an airtight seal, while the Compared invention focuses on the mechanical integrity of the tube-connector interface. The Subject's design protocols include considerations for optical clarity and electronic reliability, contrasting with the Compared invention's focus on fabrication techniques and tolerance standards for the connector. The practical applications of the Subject invention are primarily in surgical and critical care settings, offering advantages in precision and safety during intubation procedures. In contrast, the Compared invention targets a broader market of tracheal tube users, aiming to improve the reliability and adaptability of tracheal tubes across different patient demographics. Both inventions address real-world challenges, but the Subject's focus on visualization and independent lung ventilation could significantly influence surgical practices and patient outcomes, while the Compared invention's improvements in structural design could enhance the overall performance and longevity of tracheal tubes in various medical applications.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tubes described in both Subject and Compared patents are designed for medical applications, specifically for ventilation purposes. The Subject patent focuses on a tracheal tube with dual ventilation lumens, where the second lumen is longer and includes a camera and an opening for visualization within the patient's bronchus. This design aims to enhance the monitoring and management of patient ventilation, particularly in critical care settings. The camera's placement and the inclusion of additional features like cuffs and light-emitting diodes suggest a focus on improving visibility and functionality within the respiratory system.  
  
In contrast, the Compared patent describes a tracheal tube with a single ventilation lumen and a secondary lumen within its wall, primarily focusing on the design of the connector at the proximal end. The connector includes features like recesses to reduce stress on the tube's wall and facilitate securement to a patient. The emphasis here is on the structural integrity and ease of use of the tracheal tube, particularly in terms of its connection to ventilatory equipment.  
  
Both patents address the operational role of energy conversion in the context of converting mechanical ventilation into respiratory support. However, the Subject patent's focus on dual lumens and visualization tools suggests a more complex system aimed at both energy conversion and motion transfer for camera operation, while the Compared patent focuses more on the load-bearing capacity and structural design of the connector.  
  
The underlying functions in the Subject patent include ventilation and visualization, with essential components like dual lumens, a camera, and cuffs. Core interactions involve the camera's field of view through the opening in the second lumen, and internal dynamics include the flow of air through the lumens and the operation of the camera. In the Compared patent, the underlying function is primarily ventilation, with essential components like the ventilation lumen, secondary lumen, and connector. Core interactions involve the connection of the tube to ventilatory equipment, and internal dynamics focus on the structural integrity and stress distribution within the tube.  
  
In terms of applied context, the Subject patent is likely used in intensive care units or surgical settings where detailed monitoring of the respiratory system is crucial. The Compared patent, with its focus on the connector, might be more broadly applicable in various medical settings requiring tracheal intubation, including emergency and routine care. The practical applications of the Subject patent include enhanced patient monitoring and management, while the Compared patent's applications focus on improving the ease and safety of tracheal tube use.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.7668 indicates a high degree of similarity between the claims of the Subject and Compared patents. However, upon detailed analysis, the overlap is primarily in the general concept of tracheal tubes for ventilation. The Subject patent's focus on dual lumens with a camera and specific structural features like cuffs and LEDs does not directly overlap with the Compared patent's emphasis on the design of the connector and stress reduction features. The methodologies and designs differ significantly, with the Subject patent focusing on internal visualization and the Compared patent on external connection and structural integrity. The operational roles, while both related to energy conversion for ventilation, diverge in their specific applications and additional functionalities. The underlying functions, essential components, core interactions, and internal dynamics of the two patents are distinct, with the Subject patent's complexity in visualization and the Compared patent's focus on structural design. Therefore, despite the high claim\_score, the actual overlap in specific features and functionalities is moderate.

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**Claims Breakdown and Comparison Summary:**

Didn't find any similar subject claim for the threshold used

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US9446213B2**Tracheal tube  
**Inventor: WANG BENJAMIN R  
Assignee: WANG BENJAMIN R  
Priority Date: 10-10-2013  
Publication Date: 09-20-2016  
CPC: A61M16/04  
IPV™ Rating: 7.723  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/164-471-136-808-462/frontpage?l=en](https://www.lens.org/lens/patent/164-471-136-808-462/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to provide a tracheal tube system that facilitates the delivery of air or other gases into a patient's trachea, with a focus on maintaining an open air passage and managing secretions. From a mechanical engineering perspective, this involves the design of a flexible, hollow tube with an integrated balloon system that can be inflated to form a seal within the trachea, and a suction mechanism to manage secretions around the balloon. The system aims to prevent the ingress of pathogens and secretions into the lungs, thereby reducing the risk of ventilator-associated pneumonia (VAP).

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is an anticipated overlap between the Subject and Compared patents, primarily in their operational role within medical ventilation systems. Both patents focus on managing air flow and patient airways, but the Subject's inclusion of a camera for visualization and the Compared's emphasis on suction and sealing mechanisms indicate distinct practical applications. The potential commercial impact of the Subject's patent may be higher due to the added functionality of visualization, which could enhance patient care and procedural accuracy. The Compared's patent, with its focus on effective sealing and suction, may have a significant impact in settings where maintaining airway integrity is critical. Overall, there is a medium possibility of overlap due to the shared goal of air management but differing in specific functionalities.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention revolve around the mechanical system's ability to manage airflow and secretions. The underlying functions include the inflation of the balloon to create an airtight seal within the trachea, which is crucial for positive pressure ventilation. Essential components include the flexible first tube, the inflatable balloon, and the third tube for suction. Core interactions involve the balloon's expansion to form a second tube around the first, creating an airspace for air to flow into the lungs, and the suction mechanism that holds the balloon against the tracheal walls. Internally, the dynamics involve the flow of air through the primary channel and the management of negative pressure in the suction tube to prevent secretions from entering the lungs. The system's operational role is to ensure effective ventilation while minimizing the risk of infection.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera within the tracheal tube, specifically designed for endobronchial use, which allows for real-time visualization during intubation. This contrasts with the Compared invention, which focuses on managing secretions and maintaining an open airway without such visualization capabilities. The Subject's design includes a double-lumen structure with unequal lengths, tailored for independent lung ventilation, which is not a feature of the Compared invention. The mechanical underpinnings of the Subject involve precise force distribution to ensure the camera's stability and functionality within the tube, and energy efficiency in terms of minimizing the impact of the camera on airflow. The design approaches include the use of electronic components and a unitary assembly for the camera, which are not present in the Compared invention. The Subject's application in bronchial intubation and its potential to reduce the need for separate bronchoscopes represent significant advancements in tracheal tube technology.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from Subject and Compared exhibit similarities in their design and operational roles, particularly in the context of medical ventilation systems. Both sets of claims describe a tracheal tube system that includes multiple lumens or tubes for air passage, with Subject detailing a dual-lumen system and Compared focusing on a system with a balloon and a third tube for suction. The Subject's claims mention a camera for visualization, which is not present in the Compared claims, indicating a difference in the underlying functions and essential components. However, both systems aim to facilitate air flow and potentially manage secretions or maintain positioning within the trachea, which suggests an overlap in core interactions and internal dynamics related to air management and patient care. The Subject's system is designed for more specific applications, such as aligning with the upper bronchus and providing visual feedback, whereas the Compared system focuses on creating an effective seal and suction within the trachea. Both systems are intended for use in medical settings, particularly in respiratory care, but their practical applications diverge due to the different components and functionalities described.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.723 indicates a high degree of similarity between the Subject and Compared claims. The overlap is significant in terms of the overall purpose of facilitating air flow and managing patient airways in a medical context. However, the specific components and functionalities, such as the camera in the Subject's claims and the suction mechanism in the Compared's claims, differentiate the two systems. The overlap is strong in the context of air management and patient care but moderate when considering the detailed design and operational specifics.

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**Claims Breakdown and Comparison Summary:**

Didn't find any similar subject claim for the threshold used

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US10245401B2**Subglottic suctioning system  
**Inventor: CUEVAS BRIAN J  
Assignee: AVENT INC  
Priority Date: 07-31-2009  
Publication Date: 04-02-2019  
CPC: A61M16/04  
IPV™ Rating: 7.6811  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/020-448-149-306-667/frontpage?l=en](https://www.lens.org/lens/patent/020-448-149-306-667/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate mechanical ventilation of a patient's lungs through a tracheal tube, which includes a ventilation lumen, a cuff inflation lumen, and a suction lumen. The suction lumen is designed to remove secretions accumulated above the inflatable cuff to reduce the risk of ventilator-associated pneumonia. The tracheal tube is equipped with a valve system to control the flow of rinsing fluid and suction, ensuring effective management of secretions during mechanical ventilation.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between the Subject and Compared patents, there is a low possibility of overlap. The Subject patent focuses on a tracheal tube with dual ventilation lumens and a camera for enhanced visualization and monitoring within the respiratory system, particularly targeting the upper bronchus. In contrast, the Compared patent is centered on a tracheal tube designed for subglottic suctioning to manage secretions and prevent ventilator-associated pneumonia, with a complex valve system for safety and efficiency. The operational roles and intended purposes of the two patents are distinct, with the Subject patent aimed at diagnostic and monitoring applications, and the Compared patent focused on preventive care and airway hygiene. The potential commercial impact of the Subject patent may be significant in the field of respiratory diagnostics and monitoring, while the Compared patent could have a substantial impact in reducing healthcare-associated infections in ventilated patients.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of providing a sealed pathway for mechanical ventilation. The inflatable cuff seals the trachea to maintain positive pressure for effective ventilation and prevent gas leakage. The suction lumen, with its unique bent oval or bean-shaped cross-section, facilitates the removal of secretions above the cuff. The valve system, including a fail-safe open valve and independent secondary valve, controls the flow of rinsing fluid and suction, ensuring the system's operational integrity. The underlying functions include energy conversion from mechanical ventilation to respiratory support, motion transfer through the flow of gases and fluids, and load-bearing capacity of the tracheal tube within the trachea. The system's purpose is to provide effective respiratory support while minimizing the risk of infection in clinical settings such as intensive care units.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through the integration of a camera apparatus within the tracheal tube, specifically designed for bronchial intubation. This feature allows for real-time visualization, which is not present in the Compared invention. The Subject's design focuses on the precise placement of the endobronchial tube within the trachea and bronchial stem, utilizing electronic components and a unitary assembly for the camera, which differentiates it from the Compared invention's focus on suction and secretion management. The mechanical underpinnings of the Subject invention include force distribution through the tube's structure to maintain an airtight seal and energy efficiency in the operation of the camera system. The design approaches involve advanced fabrication techniques to integrate the camera without compromising the tube's structural integrity. In contrast, the Compared invention emphasizes the mechanical control of suction and fluid flow through its valve system and unique lumen shapes. The Subject and Compared inventions serve different purposes within the respiratory therapy market; the Subject targets precise bronchial intubation and visualization, while the Compared focuses on reducing infection risks through effective secretion management. The Subject's potential impact includes improving procedural accuracy and patient safety in thoracic surgeries, whereas the Compared invention aims to enhance patient outcomes by reducing ventilator-associated pneumonia in intensive care settings.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from both Subject and Compared patents focus on medical devices used for respiratory support, but they diverge significantly in their design and functionality. The Subject patent describes a tracheal tube with dual ventilation lumens, one of which is longer and includes a camera and an opening for visualization within the patient's bronchus. This design is intended for enhanced monitoring and possibly therapeutic interventions within the respiratory system, specifically targeting the upper bronchus. The camera's placement and the inclusion of light emitting diodes suggest a focus on improving visibility and diagnostic capabilities during ventilation. The Subject patent also mentions various configurations of the camera and additional lumens for fluid delivery and suction, indicating a comprehensive approach to patient care during intubation.  
  
In contrast, the Compared patent focuses on a tracheal tube designed for subglottic suctioning, emphasizing the removal of secretions above the cuff to prevent ventilator-associated pneumonia. This patent details a system with a single respiratory lumen, a suction lumen, and an inflation lumen, along with a complex valve system for managing suction and rinsing fluid. The valve system is designed to ensure safety and efficiency in suctioning, with features like fail-safe valves and check valves to control fluid flow. The Compared patent's emphasis is on the mechanical system's operational role in managing secretions and maintaining airway hygiene, which is distinct from the Subject patent's focus on visualization and dual ventilation.  
  
The methodologies and designs between the two patents differ significantly. The Subject patent's dual-lumen approach with a camera and various auxiliary lumens contrasts with the Compared patent's single respiratory lumen and specialized suction system. The operational roles also differ, with the Subject patent aimed at visualization and possibly therapeutic interventions, while the Compared patent focuses on suctioning and airway management. The underlying functions, essential components, core interactions, and internal dynamics of the two patents are tailored to their specific purposes within the context of respiratory care, with the Subject patent more aligned with diagnostic and monitoring applications, and the Compared patent geared towards preventive care and maintenance of airway hygiene.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claims from the Subject and Compared patents show a low degree of overlap. While both patents relate to tracheal tubes used in respiratory care, their specific functionalities and design elements are distinct. The Subject patent's focus on dual ventilation lumens with a camera for visualization and monitoring does not align closely with the Compared patent's emphasis on subglottic suctioning and a complex valve system for managing secretions. The methodologies, designs, and operational roles of the two patents are sufficiently different, resulting in minimal overlap in their practical applications and intended purposes within the medical field.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US10245401B2) Claim number: 8 and Subject Claim: 12**

Both claims describe a tracheal tube with a suction lumen and a port located proximal to a cuff. The Subject claim focuses on the basic structure of the suction lumen and its port, while the Compared claim elaborates on a more complex system including multiple lumens, an inflatable cuff, and a detailed valve system for managing suction and rinsing fluid. The Compared claim's system is more advanced, incorporating fail-safe mechanisms and independent valve operations, which are not mentioned in the Subject claim. The similarity lies in the fundamental concept of suction through a port near a cuff, but the Compared claim extends this concept significantly.

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**Inventor: WANG BENJAMIN R  
Assignee: WANG BENJAMIN R  
Priority Date: 10-10-2013  
Publication Date: 02-28-2017  
CPC: A61M16/04  
IPV™ Rating: 7.6616  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/020-445-977-030-80X/frontpage?l=en](https://www.lens.org/lens/patent/020-445-977-030-80X/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to provide an effective tracheal tube system with an inflatable balloon and integrated suction means to prevent the ingress of secretions and pathogens into the patient's lungs. From a mechanical engineering perspective, this involves the design and operation of a flexible tube with an inflatable balloon that seals against the tracheal walls, coupled with a suction system to remove secretions above and around the balloon. The system aims to reduce the risk of Ventilator-Associated Pneumonia (VAP) by preventing the aerosolization of pathogens.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

Overall, there is a moderate possibility of overlap between the patents due to their shared focus on tracheal tubes. However, the specific operational roles, such as ventilation and visualization in Subject versus suction and sealing in Compared, indicate distinct purposes within their applied contexts. Subject's patent is likely to have a significant commercial impact in medical settings requiring precise ventilation and monitoring, while Compared's patent would impact scenarios needing effective suction and sealing. The differences in design and functionality suggest that while there is some overlap in the general field of tracheal tubes, the patents cater to different needs and applications, reducing the likelihood of direct competition.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of an inflatable balloon to create an airtight seal within the trachea, which is a critical mechanical function to prevent the passage of secretions. The underlying function of the suction system is to apply negative pressure to remove secretions from around the balloon, thereby reducing the risk of contamination. Essential components include the flexible first tube, the inflatable balloon, and the third tube with holes for suction. The core interactions involve the balloon's inflation to seal against the tracheal walls and the suction system's operation to maintain a clear airway. Internally, the dynamics include the pressure management within the balloon and the suction tube to ensure effective sealing and secretion removal. The system's operational role focuses on maintaining an open airway and preventing infection, which is crucial in medical applications.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus within a multi-lumen tracheal tube, specifically designed for endobronchial intubation. This differs from the Compared invention, which focuses on suction and balloon sealing without visualization capabilities. The Subject's design allows for real-time visualization of the tube's placement, enhancing the precision of bronchial intubation. The mechanical underpinnings of the Subject include the structural integrity required to support the camera and the electronic components, as well as the force distribution to maintain the tube's position within the trachea. The design approaches involve the use of a unitary assembly for the camera, ensuring a compact and functional integration. In contrast, the Compared invention's mechanical focus is on the balloon's sealing mechanism and the suction system's efficiency, with no mention of visualization technology. The Subject's innovation lies in its potential to improve patient safety and procedural accuracy in bronchial intubation, while the Compared invention aims to reduce infection risks through effective secretion management. Both inventions target the medical field, specifically respiratory care, but serve different purposes within this domain. The Subject's technology could influence industry practices by reducing the need for separate bronchoscopes, while the Compared invention could improve patient outcomes by minimizing VAP risks.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from Subject and Compared share some conceptual similarities but differ significantly in design and functionality. Subject's claims focus on a dual-lumen tracheal tube with a camera and specific ventilation configurations, aimed at providing visual feedback and targeted ventilation. The second ventilation lumen in Subject's claims is designed to align with the upper bronchus and includes an opening and a camera for direct visualization, which is not present in Compared's claims. Compared's claims describe a tracheal tube system with a single main tube, a balloon that forms a second tube when inflated, and a third tube for suction, emphasizing suction capabilities and a different approach to sealing and positioning within the trachea. The operational roles differ, with Subject focusing on ventilation and visualization, while Compared emphasizes suction and sealing. The underlying functions in Subject involve dual ventilation and visual monitoring, whereas in Compared, they involve air passage, sealing, and suction. Essential components in Subject include dual lumens, a camera, and cuffs, while in Compared, they include a balloon, a suction tube, and a single main tube. Core interactions in Subject involve ventilation through dual lumens and camera visualization, while in Compared, they involve air passage, balloon inflation for sealing, and suction through a third tube. Internal dynamics in Subject relate to the flow of air through dual lumens and camera operation, while in Compared, they relate to air passage, balloon inflation, and suction dynamics. The applied context for Subject is primarily in medical settings for enhanced ventilation and monitoring, while for Compared, it is in medical settings for improved suction and sealing. Practical applications of Subject include use in surgeries or critical care for precise ventilation and monitoring, while Compared's applications include use in scenarios requiring effective suction and sealing within the trachea.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.6616 suggests a potential for significant overlap. However, upon detailed analysis, the overlap between the claims of Subject and Compared is moderate. While both sets of claims relate to tracheal tubes, the specific designs, functionalities, and operational roles differ substantially. Subject's focus on dual ventilation lumens with a camera for visualization contrasts with Compared's emphasis on a single tube with a balloon for sealing and a third tube for suction. The methodologies, designs, and architectures are distinct, with Subject's claims detailing a more complex system for ventilation and monitoring, and Compared's claims focusing on a simpler system for suction and sealing. The underlying functions, essential components, core interactions, and internal dynamics further highlight these differences, indicating a moderate degree of overlap in the broader context of tracheal tube systems but significant differences in specific applications and functionalities.

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**Claims Breakdown and Comparison Summary:**

Didn't find any similar subject claim for the threshold used

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US12109360B2**Tracheal tube  
**Inventor: YAMADA MASAYUKI  
Assignee: DAIKEN MEDICAL CO LTD  
Priority Date: 03-07-2018  
Publication Date: 10-08-2024  
CPC: A61M16/04  
IPV™ Rating: 7.6534  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/150-087-846-013-766/frontpage?l=en](https://www.lens.org/lens/patent/150-087-846-013-766/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate respiratory support by providing a tracheal tube that can be inserted into the trachea and bronchi of a subject. This tube is designed to maintain an airtight seal within the trachea and bronchus, allowing for controlled ventilation and preventing aspiration or gas leakage. The tube includes a single bronchial cuff that is helically shaped and spaced to form ventilation spaces, which enhance air permeability and reduce the risk of bronchial occlusion.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a moderate possibility of overlap between the Subject and Compared claims, primarily in the general concept of tracheal tubes for ventilation. However, the specific designs and functionalities differ significantly, with the Subject focusing on a dual-lumen system with integrated camera technology and the Compared emphasizing a single tube with a unique helical cuff design. Both patents aim to improve patient care through enhanced ventilation and monitoring capabilities, but their approaches are distinct. The Subject's claims offer a broader scope of functionality, potentially impacting the medical device market by providing advanced monitoring and ventilation options. The Compared's claims focus on improving air permeability, which could have a targeted impact on specific ventilation needs in medical settings.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of controlled ventilation through a tracheal tube system. The core components include a tube body with a through hole and a bronchial cuff that presses against the inner surface of the bronchus. The underlying function is to ensure an airtight seal and facilitate ventilation by creating multiple ventilation spaces that are in fluid communication with each other. The essential components are the tube body, the bronchial cuff, and the through holes, which work together to allow air to flow through the ventilation spaces. The core interactions involve the inflation and deflation of the cuff to adjust the seal and the flow of air through the tube and ventilation spaces. The internal dynamics of the system are governed by the pressure differences created by the cuff's inflation, which directs air flow and maintains the seal.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through the integration of a camera apparatus within the tracheal tube, which is not present in the Compared invention. This feature allows for real-time visualization during intubation, enhancing the precision and safety of the procedure. The Subject's use of a double-lumen design with unequal lengths and a camera for bronchial intubation distinguishes it from the Compared invention, which focuses on a single bronchial cuff and ventilation spaces. The mechanical underpinnings of the Subject invention include the design of the camera's field of view and its positioning to ensure effective visualization, which is a significant departure from the Compared invention's focus on air permeability and seal integrity. The Subject's design approaches involve the integration of electronic components and the use of a unitary assembly, which are not addressed in the Compared invention. The practical applications of the Subject invention are primarily in surgical and critical care settings where precise bronchial intubation is required, while the Compared invention is more suited for general respiratory support. Both inventions address mechanical challenges such as ensuring an airtight seal and facilitating ventilation, but the Subject invention offers additional advantages in terms of visualization and precision, potentially influencing industry practices in critical care and surgery.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from Subject and Compared share similarities in their design and operational roles within the context of medical ventilation systems. Both sets of claims describe tracheal tubes designed for insertion into the trachea and bronchi, focusing on ventilation and airway management. The Subject's claims detail a dual-lumen tracheal tube with a camera and specific configurations for ventilation and observation, while the Compared's claims focus on a single tube body with a unique bronchial cuff design to enhance ventilation and air permeability. Both systems aim to improve patient care through enhanced ventilation and monitoring capabilities. The Subject's claims include a camera for visual monitoring, which is not present in the Compared's claims, but both address the need for effective ventilation through different structural designs. The Subject's dual-lumen approach and the Compared's single tube with a helical cuff both serve the purpose of managing airflow and ensuring proper ventilation, though their methodologies differ significantly. The Subject's claims also mention additional features like cuffs, light emitting diodes, and fluid delivery systems, which are not directly addressed in the Compared's claims, indicating a broader scope of functionality in the Subject's design.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the Subject and Compared claims is primarily in the general concept of tracheal tubes used for ventilation in medical settings. However, the specific designs and functionalities differ significantly. The Subject's claims focus on a dual-lumen system with integrated camera technology for visual monitoring, whereas the Compared's claims emphasize a single tube with a unique helical cuff design to improve air permeability. The claim\_score of 7.6534 suggests a potential for overlap, but the detailed analysis reveals that the overlap is moderate due to the distinct approaches to achieving ventilation and monitoring. The Subject's claims include additional features like cuffs, LEDs, and fluid delivery systems, which are not present in the Compared's claims, further distinguishing the two sets of claims.

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**Claims Breakdown and Comparison Summary:**

Didn't find any similar subject claim for the threshold used

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US12251512B2**Physiologically conformable tracheal tube  
**Inventor: PHILLIPS MATTHEW J  
Assignee: COVIDIEN LP  
Priority Date: 06-18-2020  
Publication Date: 03-18-2025  
CPC: A61M16/04  
IPV™ Rating: 7.6419  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/053-090-259-851-686/frontpage?l=en](https://www.lens.org/lens/patent/053-090-259-851-686/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to provide a tracheal tube that can be inserted into a patient's airway to facilitate the transfer of respiratory gases. This tracheal tube includes a conformable conduit that can expand and contract to adapt to the patient's airway, enhancing comfort and fit. The helical inflatable lumen within the conduit allows for controlled expansion, ensuring an effective seal and maintaining an open airway during ventilation.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

Overall, there is a moderate possibility of overlap between the Subject and Compared patents due to their shared focus on tracheal tubes for respiratory support. However, the Subject patent's emphasis on visualization and precise ventilation through a dual-lumen system with a camera does not significantly overlap with the Compared patent's focus on adjustable fit and patient comfort through a helical inflatable lumen. The operational roles differ, with the Subject patent aimed at critical care and visualization, while the Compared patent targets general respiratory support with an emphasis on comfort. The potential commercial impact of the Subject patent could be significant in specialized medical settings requiring detailed bronchial visualization, whereas the Compared patent might have broader applications in general respiratory care due to its focus on patient comfort and fit.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the Compared invention involves a tracheal tube with a conformable conduit and a helical inflatable lumen. The underlying function is to provide a flexible and adaptable airway passage that can be adjusted to fit various patient anatomies. Essential components include the conformable conduit, which forms the respiratory passage, and the helical inflatable lumen, which expands upon fluid injection to adjust the conduit's diameter. The core interactions involve the fluidic isolation between the respiratory passage and the helical lumen, ensuring that the expansion mechanism does not interfere with gas transfer. The internal dynamics of the system involve the controlled expansion and contraction of the helical lumen, which allows the tracheal tube to adapt to different airway sizes and shapes, enhancing patient comfort and effectiveness of ventilation.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its multi-lumen design and integrated camera apparatus, which are not present in the Compared invention. The endobronchial tube's ability to independently ventilate one lung and the use of a camera for visualization during intubation represent significant advancements over the conformable tracheal tube described in the Compared patent. The Subject's design focuses on precise placement within the bronchial system, which is a different mechanical engineering challenge compared to the adaptability and comfort provided by the Compared invention's conformable conduit. The Subject's mechanical underpinnings involve force distribution to maintain an airtight seal and energy efficiency in the operation of the camera, while the Compared invention emphasizes structural integrity and adaptability through its expandable conduit. The design approaches and protocols for the Subject include specialized fabrication techniques for the camera integration and tolerance standards for ensuring proper fit within the bronchial pathways, distinguishing it from the Compared invention's focus on material flexibility and expansion mechanisms.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tubes described in both Subject and Compared patents are designed for respiratory support, but they differ significantly in their methodologies, designs, and operational roles. The Subject patent focuses on a dual-lumen tracheal tube with a camera system for visualization, specifically designed for ventilation and bronchial alignment. It includes features like a camera, light emitting diodes, and multiple cuffs for sealing, which are not present in the Compared patent. The Compared patent, on the other hand, describes a tracheal tube with a conformable conduit and a helical inflatable lumen for adjusting the tube's diameter, aimed at improving patient comfort and fit. This design includes a unique inflation system and materials like nylon or silicone, which are not mentioned in the Subject patent. The operational roles differ as the Subject patent is geared towards visualization and precise ventilation, while the Compared patent focuses on adaptability and comfort through its expandable design. The underlying functions of the Subject patent involve ventilation and bronchial visualization, whereas the Compared patent's function is centered on adjusting the tube's fit to the patient's anatomy. Essential components in the Subject patent include dual lumens, a camera, and cuffs, while the Compared patent includes a conformable conduit and a helical inflatable lumen. Core interactions in the Subject patent involve the camera's field of view through an opening and the ventilation process, while in the Compared patent, it involves the interaction between the inflatable lumen and the conduit's expansion. The internal dynamics of the Subject patent revolve around the flow of respiratory gases and camera operation, while the Compared patent's dynamics are related to the inflation and deflation of the helical lumen. In terms of applied context, the Subject patent is likely used in scenarios requiring detailed bronchial visualization, such as in critical care or surgical settings, while the Compared patent is more suited for general respiratory support where patient comfort and fit are prioritized. The practical applications of the Subject patent could include use in intensive care units or during bronchoscopy, whereas the Compared patent could be applied in various settings requiring tracheal intubation with adjustable fit.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.6419 suggests a potential for significant overlap between the Subject and Compared patents. However, upon detailed analysis, the overlap is found to be moderate. The Subject patent's focus on dual-lumen design with a camera system for visualization and specific ventilation capabilities does not directly align with the Compared patent's emphasis on a conformable conduit with a helical inflatable lumen for adjustable fit and patient comfort. While both patents deal with tracheal tubes, their methodologies, designs, and operational roles are distinct. The Subject patent's camera and dual-lumen system for precise ventilation and visualization do not overlap with the Compared patent's focus on tube diameter adjustment and material compliance. Therefore, despite the high claim\_score, the actual overlap in terms of design and function is moderate.

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**Claims Breakdown and Comparison Summary:**

Didn't find any similar subject claim for the threshold used

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US8807136B2**Self-sizing adjustable endotracheal tube  
**Inventor: O'NEIL MICHAEL P  
Assignee: O'NEIL MICHAEL P  
Priority Date: 09-29-2006  
Publication Date: 08-19-2014  
CPC: A61M16/00  
IPV™ Rating: 7.6307  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/147-576-922-709-706/frontpage?l=en](https://www.lens.org/lens/patent/147-576-922-709-706/frontpage?l=en)

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The primary function of the Compared invention (A61M16/00) is to provide a tracheal tube that can be adjusted in diameter post-intubation to optimize the flow of respiratory gases and enhance patient comfort. This is achieved through a design that allows the tube to expand after insertion into the trachea, thereby reducing the work of breathing (WOB) for the patient while maintaining a comfortable fit within the trachea.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between 'Subject' and 'Compared', there is a moderate anticipated overlap of the patent. The 'Subject' claims focus on a tracheal tube with dual lumens, a camera, and specific ventilation configurations, aimed at advanced visualization and targeted ventilation, potentially for specialized medical procedures. In contrast, the 'Compared' claims describe a tracheal tube with a single lumen and an expandable structure, focusing on flexibility and direct gas transfer for general respiratory support. The operational roles differ, with 'Subject' aimed at targeted ventilation and visualization, and 'Compared' focused on adaptability and comfort. The potential commercial impact of the 'Subject' patent could be significant in specialized medical fields requiring advanced visualization, while the 'Compared' patent might have broader applications in general respiratory care, potentially impacting a larger market segment due to its focus on patient comfort and adaptability.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the Compared invention involves a tracheal tube with an intermediate portion that includes thin wall sections and longitudinal ribs. The thin wall sections are designed to fold in on themselves, allowing the tube to have a minimal cross-sectional profile during intubation. Once in place, the tube can expand to increase its diameter, which is facilitated by the relative rigidity of the longitudinal ribs compared to the thin wall sections. This expansion mechanism aims to improve the seal against the tracheal walls and increase the volume of air that can pass through the tube, thereby reducing the WOB for the patient. The functional principles include energy conversion from the mechanical expansion of the tube to improved airflow dynamics, and the operational role is to enhance respiratory efficiency within the context of medical ventilation systems.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects in the field of tracheal tubes by integrating a camera apparatus directly into the tube, which is not present in the Compared invention. This feature allows for real-time visualization during intubation, enhancing the precision of placement within the bronchial stems. The multi-lumen design with unequal lengths and the ability to independently ventilate each lung further distinguish the Subject from the Compared invention, which focuses on post-intubation diameter adjustment. The Subject's design addresses the mechanical challenge of accurate tube placement, whereas the Compared invention focuses on optimizing airflow post-placement. Both inventions aim to improve respiratory care but target different aspects of the process: the Subject focuses on intubation accuracy and lung isolation, while the Compared invention emphasizes post-intubation comfort and efficiency. The practical applications of the Subject invention are primarily in thoracic surgery and critical care settings where precise lung isolation is necessary, whereas the Compared invention is more broadly applicable in general respiratory care to reduce WOB. Both innovations have the potential to influence industry practices by improving patient outcomes in their respective domains.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from 'Subject' and 'Compared' both focus on the design and functionality of tracheal tubes used for respiratory support, but they diverge significantly in their specific features and operational mechanisms. The 'Subject' claims detail a tracheal tube with dual ventilation lumens, where one lumen is longer and includes a camera and an opening for visualization, specifically designed for alignment with the upper bronchus. This design emphasizes advanced visualization and targeted ventilation, potentially for specialized medical procedures. In contrast, the 'Compared' claims describe a tracheal tube with a single lumen that features an expandable intermediate portion with thin wall sections and longitudinal ribs, designed to adapt to the patient's trachea size without a balloon cuff. This design focuses on flexibility and direct contact with respiratory gas, aiming to improve patient comfort and respiratory efficiency. The methodologies differ as 'Subject' incorporates a camera and dual lumens for specific medical applications, while 'Compared' uses a collapsible and expandable structure for general respiratory support. The operational roles also differ, with 'Subject' aimed at targeted ventilation and visualization, and 'Compared' focused on adaptability and comfort. The underlying functions of 'Subject' involve dual-path ventilation and visual monitoring, whereas 'Compared' emphasizes gas transfer with a flexible conduit. Essential components in 'Subject' include the camera, dual lumens, and cuffs, while 'Compared' includes thin wall sections and longitudinal ribs. Core interactions in 'Subject' involve the camera's field of view through the opening and dual ventilation, while 'Compared' involves the expansion and collapse of the tube. The internal dynamics of 'Subject' are centered around the camera's operation and dual ventilation, while 'Compared' focuses on the physical expansion and contraction of the tube. In applied contexts, 'Subject' might be used in specialized medical procedures requiring visualization, while 'Compared' could be applied in general respiratory care settings. The practical applications of 'Subject' include advanced medical diagnostics and treatments, whereas 'Compared' is suited for general respiratory support with enhanced patient comfort.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.6307 indicates a high degree of similarity between the claims. However, upon detailed analysis, the overlap between the 'Subject' and 'Compared' claims is moderate. The 'Subject' claims focus on a tracheal tube with dual lumens, a camera, and specific ventilation configurations, while the 'Compared' claims describe a tracheal tube with a single lumen and an expandable structure. Both sets of claims address respiratory support but differ significantly in their design and functionality. The 'Subject' claims emphasize advanced visualization and targeted ventilation, whereas the 'Compared' claims focus on flexibility and direct gas transfer. This results in a moderate overlap as both address tracheal tubes but with different operational roles and design features.

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**Claims Breakdown and Comparison Summary:**

Didn't find any similar subject claim for the threshold used

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: EP1922102B1**MULTILUMEN TRACHEAL CATHETER  
**Inventor: MADSEN EDWARD B  
Assignee: KIMBERLY CLARK CO  
Priority Date: 08-08-2005  
Publication Date: 01-18-2012  
CPC: A61M16/04  
IPV™ Rating: 7.6183  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/170-415-936-214-719/frontpage?l=en](https://www.lens.org/lens/patent/170-415-936-214-719/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate mechanical ventilation of a patient's lungs by providing a sealed pathway for air or anesthetic gases. This is achieved through a tracheal tube equipped with an inflatable cuff that seals the trachea, preventing gas leakage and ensuring effective ventilation. From a mechanical engineering perspective, the tracheal tube must maintain structural integrity under varying pressures and be flexible enough to navigate the tracheal pathway without causing damage.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between 'Subject' and 'Compared', there is a low possibility of overlap between the two patents. The 'Subject' patent focuses on a tracheal tube with dual ventilation lumens and integrated imaging technology, aimed at visualization and precise ventilation control in surgical or intensive care settings. In contrast, the 'Compared' patent emphasizes a tracheal tube designed for efficient secretion management and airway clearance, suitable for prolonged intubation in critical care scenarios. The operational roles, underlying functions, and practical applications of the two patents are distinct, with 'Subject' focusing on energy conversion and motion transfer for visualization, and 'Compared' focusing on load-bearing capacity for suction management. The potential commercial impact of the 'Subject' patent lies in its application in advanced medical procedures requiring real-time imaging, while the 'Compared' patent's impact would be in improving patient care through effective airway management in clinical settings.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the Compared invention involves the use of an inflatable cuff to create an airtight seal within the trachea. The underlying function is to mechanically ventilate the patient by converting the pressure from a ventilator into a controlled flow of air or gas through the tracheal tube. Essential components include the tracheal tube itself, the inflatable cuff, and potentially a suction lumen to remove secretions. The core interactions involve the inflation of the cuff to engage the tracheal wall, and the internal dynamics focus on maintaining the structural integrity of the tube and cuff under operational pressures. The purpose within its applied context is to provide life-sustaining ventilation in medical settings, such as hospitals or surgical environments.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects in the field of tracheal intubation by incorporating a multi-lumen design specifically tailored for endobronchial use, which allows for independent ventilation of each lung. This is a significant departure from the Compared invention, which focuses on a single-lumen tracheal tube with a suction mechanism. The Subject's use of a camera apparatus for visualization during placement enhances the precision and safety of the procedure, addressing the mechanical challenge of accurate tube positioning. The design approaches and protocols of the Subject, such as the integration of electronic components for visualization and the specific configuration of the lumens, distinguish it from the Compared invention. The Subject's focus on endobronchial applications and the ability to independently ventilate each lung offers a competitive advantage in thoracic surgery and critical care settings, potentially improving patient outcomes by reducing complications associated with ventilation.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from 'Subject' and 'Compared' both focus on medical devices used for respiratory support, but they diverge significantly in their design and functionality. The 'Subject' claims describe a tracheal tube with dual ventilation lumens, one of which is longer and aligned with the upper bronchus, featuring an opening and a camera for visualization. This design emphasizes the integration of imaging technology for diagnostic or procedural purposes within the respiratory system, specifically targeting the bronchial area. The camera's placement and the use of light emitting diodes suggest an intent to enhance visibility and functionality during intubation or bronchoscopy, potentially in surgical or intensive care settings. The presence of cuffs and various lumens for inflation and fluid delivery further indicates a complex system designed for precise control over ventilation and patient care.  
  
In contrast, the 'Compared' claims focus on a tracheal tube with multiple suction lumens and a suction port collar designed to selectively occlude and enable suction from specific ports. This design is centered around efficient secretion management and airway clearance, crucial for patients requiring prolonged intubation. The inclusion of a rotatable collar and the ability to selectively manage suction ports suggest a focus on adaptability and ease of use in clinical settings, particularly in managing patient secretions and maintaining airway patency. The 'Compared' claims do not mention imaging technology or dual ventilation lumens, indicating a different operational role focused on suction and airway management rather than visualization or dual ventilation.  
  
The methodologies and designs between the two sets of claims are distinct. The 'Subject' claims involve a more complex integration of imaging and dual ventilation systems, aimed at diagnostic and therapeutic applications within the respiratory tract. The 'Compared' claims, however, are geared towards a mechanical system for managing secretions, with a design that emphasizes ease of use and adaptability in clinical settings. The operational roles differ significantly, with 'Subject' focusing on energy conversion (ventilation) and motion transfer (camera movement), while 'Compared' focuses on load-bearing capacity (suction management). The underlying functions, essential components, core interactions, and internal dynamics of the 'Subject' claims revolve around visualization and precise ventilation control, whereas those of the 'Compared' claims center on efficient suction and airway clearance.  
  
In terms of applied context, the 'Subject' claims are likely to be used in surgical or intensive care units where visualization of the respiratory tract is crucial, whereas the 'Compared' claims would be more applicable in settings requiring prolonged intubation and airway management, such as in critical care or post-operative care. The practical applications of the 'Subject' claims include bronchoscopy, intubation with visualization, and potentially in surgical procedures requiring real-time imaging of the respiratory system. The 'Compared' claims would be applied in scenarios where effective secretion management is essential, such as in patients with respiratory conditions requiring suctioning.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claims from 'Subject' and 'Compared' show a low degree of overlap. While both sets of claims pertain to tracheal tubes, the 'Subject' claims focus on a dual ventilation system with integrated imaging technology, whereas the 'Compared' claims emphasize a system for managing secretions through multiple suction lumens and a rotatable collar. The methodologies, designs, and operational roles are distinct, with 'Subject' claims centered on visualization and dual ventilation, and 'Compared' claims focused on suction and airway clearance. The underlying functions, essential components, core interactions, and internal dynamics of the two sets of claims are fundamentally different, leading to minimal overlap in their practical applications and applied contexts.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (EP1922102B1) Claim number: 1 and Subject Claim: 2**

Both claims discuss a tracheal tube with a feature related to a collar. The Compared claim specifies that the collar is rotatable about the tube, which suggests a mechanism for adjusting the position or orientation of the collar. The Subject claim mentions that the camera is disposed within a substantially annular collar, indicating the collar's role in housing the camera. The similarity lies in the use of a collar, but the functionality differs as the Compared claim focuses on the rotatability of the collar, while the Subject claim emphasizes the camera's placement within the collar. The scope of the Compared claim is broader as it does not specify the purpose of the collar, whereas the Subject claim's scope is narrower, focusing on the camera's integration.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US9044557B2**Tracheal tube sensor disposed on permeable membrane  
**Inventor: FINNERAN ALAN  
Assignee: COVIDIEN LP  
Priority Date: 03-17-2010  
Publication Date: 06-02-2015  
CPC: A61B5/00  
IPV™ Rating: 7.5537  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/141-999-683-407-917/frontpage?l=en](https://www.lens.org/lens/patent/141-999-683-407-917/frontpage?l=en)

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The primary function of the Compared invention (A61B5/00) is to measure levels of blood gases and/or blood analytes in the respiratory tract of a patient using a tracheal tube system equipped with a sensor. This system is designed to facilitate the monitoring of critical physiological parameters without compromising the functionality of the tracheal tube, such as its sealing properties. The invention aims to provide a non-invasive method for continuous monitoring during intubation, which is crucial for managing the health of critically ill patients.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between the Subject and Compared patents, there is an overall moderate possibility of overlap. The Subject patent focuses on a tracheal tube with dual lumens and a camera for direct visualization, aimed at enhancing procedural monitoring in medical settings. In contrast, the Compared patent emphasizes a tracheal tube system with a sensor for monitoring blood gases, targeting continuous physiological monitoring in critical care. The operational roles of both patents are related to ventilation but diverge in their specific functions; the Subject patent aims at improving procedural visualization, while the Compared patent focuses on monitoring patient health. The potential commercial impact of the Subject patent could be significant in medical procedures requiring direct visualization, such as intubation or bronchoscopy, whereas the Compared patent's impact would be notable in settings where continuous monitoring of blood gases is crucial for patient management.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the Compared invention involves integrating a sensor within the tracheal tube system, specifically coupled to a selectively permeable membrane. This membrane allows the passage of blood gases and/or analytes, which the sensor then measures. The underlying function is to detect changes in blood flow characteristics by assessing the levels of these substances in the tracheal mucosa. Essential components include the tubular body of the tracheal tube, the cuff with a selectively permeable membrane, and the sensor itself. The core interactions involve the diffusion of gases or analytes through the membrane to the sensor, which then converts these measurements into readable data. Internally, the system must maintain the integrity of the tracheal tube's function, such as maintaining an airtight seal, while allowing for sensor deployment and retraction during intubation and extubation. The operational role of this system is to provide real-time monitoring of respiratory health, which is critical in clinical settings where patients require continuous assessment of their physiological state.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces a novel approach to tracheal intubation by integrating a camera apparatus within a multi-lumen tracheal tube, specifically designed for endobronchial intubation. This contrasts with the Compared invention, which focuses on monitoring blood gases and analytes through a sensor integrated into the tracheal tube. The Subject's camera system enhances the precision of tube placement, particularly in the bronchial stem, which is not addressed by the Compared invention. The methodologies and designs of the Subject invention, such as the use of a double-lumen tube with a camera, differ significantly from the Compared invention's focus on sensor technology and membrane permeability. From a mechanical engineering perspective, the Subject invention's design addresses the challenge of force distribution and structural integrity required for intubation, while the Compared invention deals with the integration of electronic components for monitoring without compromising the tube's sealing capabilities. The Subject invention targets the medical procedure of intubation, whereas the Compared invention aims at continuous monitoring of respiratory health, indicating different applications within the medical field.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from the Subject and Compared patents both focus on medical devices used for ventilating patients, indicating a shared operational role in respiratory support. The Subject patent describes a tracheal tube with dual ventilation lumens, one of which is longer and includes a camera for visualization, aimed at enhancing the monitoring and management of ventilation. The camera's placement and the inclusion of an opening in the second lumen suggest a design focused on direct visualization of the bronchial area, which is crucial for procedures like intubation or bronchoscopy. The Compared patent, on the other hand, emphasizes a tracheal tube system with a cuff that includes a selectively permeable membrane and a sensor for measuring blood gases or analytes, indicating a focus on monitoring patient's physiological parameters during ventilation. Both patents address the need for effective ventilation but diverge in their approach; the Subject patent focuses on visual monitoring and dual-lumen design, while the Compared patent emphasizes physiological monitoring through a sensor integrated into the cuff. The methodologies differ significantly, with the Subject patent employing a camera and dual lumens for direct visualization and the Compared patent using a sensor and permeable membrane for indirect monitoring of blood gases. The designs and architectures are distinct, with the Subject patent's dual-lumen system and camera placement contrasting with the Compared patent's single tubular body and sensor integration. The operational roles, while both related to ventilation, diverge in their specific functions; the Subject patent aims at improving procedural visualization, whereas the Compared patent focuses on monitoring patient health. The underlying functions, essential components, core interactions, and internal dynamics of the two patents are thus quite different, with the Subject patent's focus on visual feedback and the Compared patent's emphasis on physiological data collection. In terms of applied context, both patents are relevant to medical and critical care settings, but their practical applications differ, with the Subject patent potentially used in procedures requiring direct visualization and the Compared patent in scenarios where continuous monitoring of blood gases is necessary.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.5537 suggests a potential for overlap between the Subject and Compared patents. However, upon detailed analysis, the overlap is found to be moderate. The Subject patent's focus on a dual-lumen tracheal tube with a camera for visualization does not directly align with the Compared patent's emphasis on a tracheal tube system with a sensor for monitoring blood gases. While both patents address ventilation, the methodologies, designs, and operational roles are distinct. The Subject patent's camera and dual-lumen design for direct visualization contrast with the Compared patent's use of a sensor and permeable membrane for indirect monitoring. The essential components, core interactions, and internal dynamics of the two patents are different, with the Subject patent focusing on visual feedback and the Compared patent on physiological data collection. Therefore, despite the high claim\_score, the overlap between the two patents is considered moderate due to the significant differences in their specific functions and applications.

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**Claims Breakdown and Comparison Summary:**

Didn't find any similar subject claim for the threshold used

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: EP1912692B1**Multilumen tracheal catheter to prevent cross contamination  
**Inventor: MADSEN EDWARD B  
Assignee: KIMBERLY CLARK CO  
Priority Date: 08-08-2005  
Publication Date: 07-11-2012  
CPC: A61M16/04  
IPV™ Rating: 7.3942  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/056-142-461-080-708/frontpage?l=en](https://www.lens.org/lens/patent/056-142-461-080-708/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate mechanical ventilation of a patient's lungs and to provide a seal within the trachea to prevent gas leakage. This is achieved through the use of a tracheal tube equipped with an inflatable cuff that seals the trachea, allowing for effective ventilation and the administration of anesthetic gases during surgical procedures. The invention also addresses the risk of complications such as pneumonia by incorporating a suction tube to remove pooled secretions above the cuff, thereby reducing the risk of aspiration.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between Subject and Compared, there is a low possibility of overlap between the two patents. The Subject's patent focuses on a tracheal tube with a dual-lumen design and a camera for visualization, primarily aimed at enhancing airway management with visual feedback. In contrast, the Compared's patent emphasizes fluid management through multiple ingression and egression lumens controlled by a user manipulable selector, focusing on preventing cross-contamination and managing fluids within the respiratory system. Both patents address respiratory support but diverge in their operational roles and specific functionalities. The potential commercial impact of the Subject's patent may be significant in clinical settings requiring precise visual monitoring of the respiratory tract, while the Compared's patent could have a notable impact in scenarios where effective fluid management is critical, such as in critical care or surgical interventions.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the Compared invention involves the use of a single-lumen tracheal tube with an integrated suction tube to manage secretions. The underlying function is to provide a sealed pathway for ventilation gases while simultaneously evacuating secretions that could lead to infections. Essential components include the tracheal tube itself, the inflatable cuff for sealing, and the suction tube with multiple openings for fluid removal. The core interactions involve the inflation of the cuff to engage the tracheal wall, creating a seal, and the suction mechanism that draws fluids away from the trachea. Internally, the dynamics involve the pressure management within the cuff to maintain the seal without damaging the tracheal mucosa, and the suction force applied through the suction tube to effectively remove secretions without causing harm.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces significant novelty through its multi-lumen design and integrated camera system, which are not present in the Compared invention. The use of two ventilation lumens of different lengths allows for independent ventilation of each lung, a feature not addressed by the single-lumen design of the Compared invention. The camera apparatus within the second lumen provides a unique method for visualizing the bronchial area, enhancing the precision of tube placement and monitoring, which is a significant departure from the Compared invention's reliance on external suction tubes for secretion management. The Subject's design also incorporates multiple cuffs and additional lumens for fluid management, which further differentiates it by addressing different mechanical challenges such as maintaining an airtight seal and ensuring camera functionality. The practical applications of the Subject invention are primarily in advanced respiratory care, particularly in surgical and critical care settings where precise bronchial intubation and monitoring are crucial, whereas the Compared invention focuses on general mechanical ventilation and secretion management in a broader range of respiratory care scenarios.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from Subject and Compared share a common purpose within the medical field, specifically for respiratory support and management. Subject's claims focus on a tracheal tube with dual ventilation lumens, one of which is longer and designed to align with the upper bronchus, featuring an opening and a camera for visualization. The camera's placement and associated components like LEDs and cuffs suggest a design aimed at enhancing visibility and functionality within the respiratory system. The operational role involves facilitating ventilation while providing visual feedback, which is crucial in clinical settings for monitoring and managing patient airways. The underlying functions include ventilation, visualization, and potentially fluid management, with essential components like the camera, lumens, and cuffs. Core interactions involve the camera's field of view through the opening, and the internal dynamics relate to the flow of air and potential fluid through the lumens. Practical applications include use in surgical procedures, intensive care, and emergency medicine where precise airway management is necessary.  
  
Compared's claims describe a tracheal tube with multiple ingression and egression lumens for fluid management, including suction and therapeutic agent delivery, controlled by a user manipulable selector. The design emphasizes fluid non-communication to prevent cross-contamination, with a focus on managing fluids within the respiratory system. The operational role here is centered on fluid management and ventilation, with underlying functions including suction, fluid delivery, and ventilation. Essential components include the lumens, selector, and inflatable cuff, with core interactions involving the selector's control over fluid flow. The internal dynamics relate to the flow of fluids and air through the designated lumens. Practical applications include use in scenarios requiring fluid management in the respiratory tract, such as in critical care or during surgical interventions.  
  
While both sets of claims address tracheal tubes and ventilation, the Subject's focus on visualization and dual lumens contrasts with the Compared's emphasis on fluid management and multiple lumens for different purposes. The methodologies and designs differ significantly, with Subject's claims detailing a camera system and Compared's claims focusing on a selector mechanism for fluid control.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claims from Subject and Compared both pertain to tracheal tubes used in medical settings for respiratory support, indicating a thematic overlap. However, the specific features and functionalities described in each set of claims diverge significantly. Subject's claims emphasize a dual-lumen design with a camera for visualization, which is not mentioned in Compared's claims. Conversely, Compared's claims focus on fluid management through multiple ingression and egression lumens with a user manipulable selector, a feature absent in Subject's claims. The operational roles, while both related to respiratory support, differ in their primary focus—Subject on visualization and ventilation, and Compared on fluid management and ventilation. The underlying functions, essential components, core interactions, and internal dynamics of the two sets of claims are distinct, with Subject's claims centered around visualization and dual-lumen ventilation, and Compared's claims around fluid management and control. The practical applications also differ, with Subject's claims more suited for scenarios requiring visual monitoring and Compared's claims for fluid management in the respiratory tract. Given these differences, the overlap between the claims is minimal, suggesting a low degree of similarity in their specific implementations and intended uses.

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**Claims Breakdown and Comparison Summary:**

Didn't find any similar subject claim for the threshold used

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US6609521B1**Endotracheal tube  
**Inventor: BELANI KUMAR G  
Assignee: UNIV MINNESOTA  
Priority Date: 04-09-2001  
Publication Date: 08-26-2003  
CPC: A61M16/04  
IPV™ Rating: 7.3799  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/153-573-381-139-950/frontpage?l=en](https://www.lens.org/lens/patent/153-573-381-139-950/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate the intubation process and provide a means for ventilating a patient's lungs. From a mechanical engineering perspective, this involves the design of a tube that can be inserted into the trachea or bronchus, with mechanisms such as inflatable cuffs to create an airtight seal, and potentially dual lumens for independent lung ventilation. The tube must be flexible yet robust enough to withstand the forces encountered during insertion and use, and the cuffs must be designed to inflate and deflate reliably to maintain the necessary seal without damaging the surrounding tissue.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between the Subject and Compared, there is a low possibility of overlap between the two patents. The Subject's tracheal tube with a dual-lumen design and camera for visualization purposes serves a different operational role compared to the Compared's endotracheal tube with a single-lumen design and balloons for gas flow management. The Subject's focus on enhancing visual access to the respiratory tract does not align with the Compared's emphasis on controlling gas flow to different lung sections. The potential commercial impact of the Subject's patent would be in the medical field, particularly in scenarios requiring visual monitoring of the respiratory tract, while the Compared's patent would have commercial relevance in situations needing precise control over gas flow within the respiratory system.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of inflatable balloon cuffs to create an airtight seal within the trachea or bronchus. The underlying functions include the ability to inflate and deflate these cuffs using external syringes connected to smaller lumina within the tube. Essential components include the tube itself, which must be made of a material that is biocompatible and flexible, and the cuffs, which must be thin-walled and capable of forming a reliable seal. Core interactions involve the interaction between the tube and the patient's airway, where the tube must be positioned correctly to allow for effective ventilation. The internal dynamics include the flow of air through the lumens and the pressure exerted by the cuffs on the surrounding tissue, which must be carefully managed to prevent injury.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel features such as the carinal seating mechanism, which is not present in the Compared invention. This mechanism enhances the precision of tube placement, particularly at the junction between the trachea and bronchus, which is critical for effective ventilation. Additionally, the Subject's ability to vary the angle between the bronchial and tracheal portions based on patient age represents a tailored approach to patient-specific needs, which is not addressed in the Compared invention. The Compared invention focuses on the basic functionality of tracheal tubes with inflatable cuffs, whereas the Subject invention adds specialized features for improved control and positioning. From a mechanical engineering perspective, the Subject's design approaches, such as the use of a carinal seating mechanism and angle variation, distinguish it by enhancing the structural integrity and precision of the tube's operation within the patient's airway.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims features a dual-lumen design with a camera and an opening in the second ventilation lumen, aimed at providing visual access to the upper bronchus. The camera's placement and the inclusion of additional features like cuffs, LEDs, and fluid delivery systems suggest a focus on enhancing visualization and maintaining clear optics within the respiratory system. The Compared claims detail an endotracheal tube with a single lumen design that splits into tracheal and bronchial portions, incorporating balloons and cuffs for managing gas flow and sealing within the respiratory tract. Both sets of claims address the need for effective ventilation and management within the respiratory system, but they differ significantly in their approach to achieving these goals. The Subject's dual-lumen system with a camera contrasts with the Compared's single-lumen system with balloons and cuffs, indicating different methodologies for respiratory management. The Subject's focus on visualization through a camera and an opening in the second lumen does not directly correlate with the Compared's focus on gas flow management through balloons and cuffs. The operational roles of energy conversion, motion transfer, or load-bearing capacity are not directly applicable to these medical devices, as their primary function is to facilitate ventilation and respiratory management. The practical applications of the Subject's tracheal tube would be in scenarios requiring visual monitoring of the respiratory tract, while the Compared's endotracheal tube would be used in situations needing precise control over gas flow to different lung sections.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.3799 suggests a potential for overlap, but upon detailed analysis, the overlap between the Subject and Compared claims is minimal. The Subject's focus on a dual-lumen system with a camera for visualization purposes does not significantly overlap with the Compared's emphasis on a single-lumen system with balloons for gas flow management. The methodologies, designs, and operational roles of the two sets of claims are distinct, with the Subject aiming to enhance visual access and the Compared focusing on controlling gas flow within the respiratory system. The essential components, core interactions, and internal dynamics of the two systems differ, as do their practical applications within the medical field. The Subject's tracheal tube is designed for scenarios requiring visual monitoring, while the Compared's endotracheal tube is tailored for precise gas flow management.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US6609521B1) Claim number: 7 and Subject Claim: 6**

Both claims discuss the use of cuffs in tracheal or endotracheal tubes. The Compared claim mentions an external inflatable cuff on the tracheal portion, while the Subject claim describes two cuffs: one around both ventilation lumens and another around only the second ventilation lumen. The scope of the Compared claim is narrower, focusing on a single cuff on the tracheal portion, whereas the Subject claim's scope is broader, detailing the placement of two cuffs with different configurations. The similarity lies in the use of cuffs for sealing purposes, but the Subject claim provides more detailed structural arrangements.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (US6609521B1) Claim number: 25 and Subject Claim: 6**

Both claims mention the use of cuffs in tracheal or endotracheal tubes. The Compared claim specifies at least one external cuff on the tracheal portion, while the Subject claim details two cuffs with different placements. The scope of the Compared claim is less specific about the number of cuffs but focuses on the tracheal portion, whereas the Subject claim's scope is more detailed, specifying the placement of two cuffs. The similarity is in the use of cuffs, but the Subject claim provides a more complex cuff arrangement.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US12083276B2**Tracheal intubation facilitator with superior ventilating capability  
**Inventor: ANANTHANARAYANAN KALYANARAMAN  
Assignee: ANANTHANARAYANAN KALYANARAMAN  
Priority Date: 12-22-2017  
Publication Date: 09-10-2024  
CPC: A61M16/04  
IPV™ Rating: 7.356  
Inferred Equivalence: Low**

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The primary function of the Compared invention, a tracheal tube insertion facilitator, is to aid in the reliable placement of tracheal or bronchial tubes in patients under anesthesia or in respiratory distress. From a mechanical engineering perspective, this device features an outer cylindrical member, an inner hollow stylet, and a dynamic cuff that inflates during positive pressure ventilation or jet ventilation. This mechanism allows for immediate oxygenation and ventilation support even before the tracheal tube is fully inserted, enhancing patient safety and operational efficiency in emergency situations.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between Subject and Compared, there is a moderate possibility of overlap due to the shared focus on tracheal tubes for ventilation. However, the Subject's emphasis on dual-lumen design with internal visualization capabilities and the Compared's focus on a single-lumen system with dynamic cuff technology for ease of insertion and ventilation indicate distinct operational roles and applications. The Subject's system is designed for detailed monitoring in medical settings, potentially impacting the market for advanced respiratory care devices. In contrast, the Compared's system targets emergency medical scenarios, likely influencing the market for rapid intubation solutions. Overall, while there is some overlap in the general purpose of tracheal tubes, the specific methodologies and applications suggest a low possibility of significant overlap in the patent landscape.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention revolve around the mechanical system's ability to facilitate tracheal intubation and provide ventilation. The underlying function involves the dynamic cuff's inflation during positive pressure ventilation, which seals the tracheal lumen to prevent the escape of respiratory gases. Essential components include the outer cylindrical member with vibration transmitting properties, the inner hollow stylet, and the dynamic cuff. The core interactions occur between the cuff and the tracheal lumen, ensuring an airtight seal for effective ventilation. Internally, the system's dynamics involve the transmission of vibrations to aid in the tactile feedback for correct placement, and the inflation mechanism of the cuff, which is crucial for its operational role in energy conversion from pressure to mechanical sealing force.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus within a multi-lumen tracheal tube, specifically designed for bronchial intubation. This contrasts with the Compared invention, which focuses on facilitating tracheal tube insertion with a dynamic cuff and vibration feedback. The Subject's design allows for real-time visualization, which is not present in the Compared invention, enhancing the precision and safety of bronchial intubation. The mechanical underpinnings of the Subject include the force distribution across the double-lumen structure to maintain an airtight seal, and the energy efficiency of the camera system, which does not require additional bulky equipment like bronchoscopes. The design approaches and protocols of the Subject are centered around the integration of electronic components and the structural integrity of the multi-lumen configuration, distinguishing it from the Compared invention's focus on tactile feedback and dynamic sealing mechanisms. Both inventions serve the medical field, but the Subject targets a more specific application in thoracic surgery and bronchial intubation, while the Compared invention is aimed at general tracheal intubation in emergency situations. The Subject's potential impact includes improved patient outcomes through precise lung isolation and visualization, whereas the Compared invention offers immediate ventilation support in emergencies, potentially reducing the risk of hypoxia.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims features a dual-lumen design with a camera and an opening in the second lumen, aimed at facilitating ventilation and visual monitoring within the respiratory system. The first lumen is for primary ventilation, while the second, longer lumen aligns with the upper bronchus and includes a camera for internal visualization. The camera's field of view is directed through an opening in the second lumen's wall, and various configurations of the camera's placement and additional features like cuffs, LEDs, and fluid delivery systems are detailed. The Compared claims describe a tracheal tube insertion facilitator with a single outer cylindrical member and a hollow metallic stylet, designed for ease of insertion and ventilation. It includes a self-inflating dynamic cuff that adjusts to intraluminal pressures during ventilation, and the stylet supports the tube and enables jet ventilation. The facilitator also features vibration transmission and visual markings for accurate placement. While both patents focus on tracheal tubes for ventilation, the Subject emphasizes dual-lumen design and internal visualization, whereas the Compared focuses on ease of insertion and dynamic cuff technology for ventilation. The methodologies differ significantly; the Subject's approach involves dual-lumen technology for separate ventilation and monitoring functions, while the Compared's approach centers on a single-lumen system with a dynamic cuff and stylet for insertion and ventilation. The operational roles of both systems are geared towards ventilation, but the Subject's system also includes motion transfer for camera positioning and load-bearing capacity for the dual-lumen structure, applied in medical contexts for patient care. The Compared's system focuses on energy conversion through jet ventilation and load-bearing capacity for the stylet, applied in emergency medical scenarios for rapid intubation.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.356 suggests a potential for overlap, but upon detailed analysis, the overlap between the Subject and Compared claims is moderate. The Subject's focus on a dual-lumen system with a camera for internal visualization contrasts with the Compared's emphasis on a single-lumen system with a dynamic cuff and stylet for ease of insertion and ventilation. While both systems aim to facilitate ventilation, the methodologies, designs, and operational roles differ significantly. The Subject's system involves complex internal dynamics for camera positioning and dual-lumen functionality, whereas the Compared's system focuses on dynamic cuff technology and stylet support for ventilation. The practical applications also diverge, with the Subject's system being more suited for detailed monitoring in medical settings, and the Compared's system designed for rapid intubation in emergency scenarios. Therefore, despite the claim\_score, the overlap is described as moderate due to the distinct approaches and applications.

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**Claims Breakdown and Comparison Summary:**

Didn't find any similar subject claim for the threshold used

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: EP3727541B1**TRACHEAL INTUBATION FACILITATOR WITH SUPERIOR VENTILATING CAPABILITY, WITH A SYSTEM TO ACCURATELY PLACE ENDOBRONCHIAL TUBES IN THE DESIRED BRONCHUS  
**Inventor: ANANTHANARAYANAN KALYANARAMAN  
Assignee: ANANTHANARAYANAN KALYANARAMAN  
Priority Date: 12-22-2017  
Publication Date: 07-24-2024  
CPC: A61M16/04  
IPV™ Rating: 7.2975  
Inferred Equivalence: Low**

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The tracheal tube insertion facilitator described under CPC A61M16/04 is designed to aid in the insertion of a tracheal tube into a patient's airway. From a mechanical engineering perspective, the device features an outer cylindrical member with a dynamic cuff that inflates and deflates in sync with the patient's respiratory cycle, ensuring a seal within the trachea during inspiration. The device also includes an inner hollow stylet that provides structural support and enables jet ventilation, enhancing the speed and safety of intubation in emergency situations.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between Subject and Compared, there is a low possibility of overlap between the two patents. The Subject patent focuses on a tracheal tube with dual lumens and integrated camera technology for continuous respiratory support and monitoring, while the Compared patent describes a tracheal tube insertion facilitator with a dynamic cuff for aiding in the insertion process. The operational roles, such as energy conversion, motion transfer, or load-bearing capacity, are not directly applicable to these medical devices, but the purpose within their applied contexts is clear: the Subject for ongoing respiratory care and the Compared for facilitating intubation. The potential commercial impact of the Subject patent could be significant in critical care and surgical settings due to its comprehensive monitoring capabilities, whereas the Compared patent's impact would be more focused on improving the safety and efficiency of tracheal tube insertion procedures.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The tracheal tube insertion facilitator operates on the principle of dynamic pressure management within the trachea. The dynamic cuff, connected to the inner lumen of the outer cylindrical member, inflates during positive pressure ventilation to seal the trachea, preventing air backflow and ensuring efficient ventilation. The inner hollow stylet not only provides mechanical strength but also facilitates jet ventilation through its ports, allowing for immediate oxygenation. The system's design ensures minimal time lag in pressure response, crucial for emergency intubations. The use of different colors and textures on the outer cylindrical member aids in visual confirmation of correct placement within the trachea or bronchi, enhancing the device's utility in clinical settings.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The tracheal tube under CPC A61M16/0486 introduces novelty through its integrated camera system, which is not present in the tracheal tube insertion facilitator of CPC A61M16/04. This camera allows for direct visualization of the bronchial placement, significantly improving the accuracy and safety of endobronchial intubation. The multi-lumen design with unequal lengths and specific positioning for bronchial intubation further distinguishes it from the insertion facilitator, which focuses on aiding the initial tracheal intubation. The tracheal tube's design also includes features like fluid delivery for camera maintenance and electronic components, which are not part of the insertion facilitator's mechanical system. While both devices aim to improve intubation processes, the tracheal tube's advanced visualization capabilities and specialized design for bronchial intubation set it apart, offering a higher degree of precision and control in clinical applications.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims focuses on a dual-lumen design with integrated camera technology for visualization within the respiratory system. The first ventilation lumen and the second, longer ventilation lumen are designed to be coupled to a ventilator, with the second lumen's distal end aligning with the upper bronchus. The camera, positioned opposite an opening in the second lumen, allows for direct visualization through this opening, enhancing the ability to monitor and navigate within the respiratory tract. Additional features include various configurations of the camera placement, cuffs for sealing, and lumens for fluid delivery and suction, indicating a comprehensive system for respiratory support and monitoring.  
  
In contrast, the Compared claims detail a tracheal tube insertion facilitator, which is primarily designed to aid in the insertion of tracheal tubes. It features an outer cylindrical member with a dynamic cuff that inflates and deflates in sync with the respiratory cycle to prevent leaks and facilitate gas exchange. The inner hollow stylet provides structural support and enables jet ventilation. The facilitator also includes markings and color coding for accurate placement and identification during insertion.  
  
The methodologies and designs between the Subject and Compared claims differ significantly. The Subject focuses on a dual-lumen system with integrated visualization technology, while the Compared emphasizes a facilitator for easier and more accurate tracheal tube insertion with dynamic cuff technology. The operational roles also diverge, with the Subject aimed at continuous respiratory support and monitoring, and the Compared focused on the initial insertion process. The underlying functions of the Subject involve ventilation and visualization, whereas the Compared's function is to assist in the placement of tracheal tubes. Essential components in the Subject include dual lumens, a camera, and cuffs, while the Compared includes an outer cylindrical member, a dynamic cuff, and an inner hollow stylet. Core interactions in the Subject involve the interaction between the camera and the respiratory tract, while in the Compared, it's the interaction between the dynamic cuff and the respiratory cycle. The internal dynamics of the Subject revolve around the flow of air and visual feedback, while the Compared's dynamics are centered around the inflation and deflation of the cuff. The applied context for the Subject is in medical settings requiring continuous respiratory support and monitoring, whereas the Compared is used during the initial intubation process. Practical applications of the Subject include use in critical care and surgical settings, while the Compared is primarily used during tracheal tube insertion procedures.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.2975 suggests a potential for overlap, but upon detailed analysis, the overlap between the Subject and Compared claims is found to be low. The Subject claims focus on a tracheal tube with dual lumens and integrated camera technology for continuous respiratory support and monitoring, while the Compared claims describe a tracheal tube insertion facilitator with a dynamic cuff for aiding in the insertion process. The methodologies, designs, operational roles, underlying functions, essential components, core interactions, and internal dynamics are distinct between the two sets of claims. The Subject's focus is on long-term respiratory management and visualization, whereas the Compared's focus is on facilitating the initial insertion of tracheal tubes. The applied contexts and practical applications also differ significantly, with the Subject used in ongoing medical care and the Compared used during the intubation procedure. Therefore, despite the high claim\_score, the actual overlap in terms of technology and application is minimal.

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**Claims Breakdown and Comparison Summary:**

Didn't find any similar subject claim for the threshold used

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US10537711B2**Imaging competent, bi-directionally articulable endotracheal tubes  
**Inventor: YAN WENLIANG  
Assignee: FARBES MEDICAL LLC  
Priority Date: 01-15-2016  
Publication Date: 01-21-2020  
CPC: A61M25/01  
IPV™ Rating: 7.2405  
Inferred Equivalence: Low**

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The primary function of the Compared invention (A61M25/01) is to facilitate the navigation and placement of an endotracheal tube within a patient's trachea using a system of controlling wires and a flexible portion at the distal end of the tube. This system allows for bi-directional movement of the tube's tip, aiding in precise positioning during intubation. The invention includes a bite block and a removable lever to control the tube's movement, enhancing the ease and accuracy of the intubation process from a mechanical engineering perspective.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between the Subject and Compared, there is a low possibility of overlap between the two patents. The Subject's tracheal tube is designed for dual-lumen ventilation with integrated visualization capabilities, primarily aimed at providing respiratory support with direct bronchial observation. In contrast, the Compared's endotracheal tube is engineered for precise control and flexibility during intubation, focusing on the mechanical system's ability to transfer motion and adjust positioning. The purpose within their applied contexts differs significantly, with the Subject's device being more relevant in scenarios requiring dual ventilation and bronchial monitoring, and the Compared's device being crucial for controlled intubation procedures. The potential commercial impact of the Subject's patent may be in specialized medical settings requiring advanced visualization during ventilation, while the Compared's patent could impact markets focused on intubation equipment with enhanced control and flexibility.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of mechanical control systems to manipulate the position of the endotracheal tube. The underlying functions include the use of controlling wires that run through longitudinal passages within the tube, enabling the tube's tip to be maneuvered. Essential components include the flexible portion of the tube with diametric notches and membranous wraps, which allow for controlled bending and inflation to adjust the tube's shape. The core interactions involve the mechanical linkage between the controlling wires, the lever, and the tube's flexible portion, which together facilitate the tube's movement. Internally, the dynamics of the system rely on the tension and release of the controlling wires to achieve the desired motion, ensuring the tube can navigate the trachea effectively. The operational role of this system is to provide precise control over the tube's placement, enhancing the success rate of intubation procedures.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus within a multi-lumen tracheal tube, specifically designed for endobronchial intubation. This differs from the Compared invention, which focuses on mechanical control for endotracheal tube placement without integrated visualization tools. The Subject's design includes a double-lumen structure for independent lung ventilation, which is not present in the Compared invention. The mechanical underpinnings of the Subject involve the use of electronic components for visualization, contrasting with the Compared invention's reliance on mechanical control systems. The Subject's approach to addressing the challenge of precise tube placement through visualization rather than mechanical manipulation represents a significant innovation in tracheal tube technology. The practical applications of the Subject invention are primarily in thoracic surgery and critical care, where independent lung ventilation and precise placement are crucial, while the Compared invention targets general intubation procedures across various medical settings. Both inventions aim to improve intubation success rates but serve different purposes within the medical field, with the Subject offering advantages in visualization and the Compared in mechanical control.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the endotracheal tube in the Compared claims both relate to medical devices used for ventilation and intubation, but they exhibit distinct differences in design and functionality. The Subject's tracheal tube features dual ventilation lumens with specific configurations for coupling to a ventilator, and includes a camera for visualization within the patient's bronchus. The camera's placement and the inclusion of an opening in the second ventilation lumen are unique to the Subject's design, aimed at providing direct visualization of the respiratory tract. The Compared's endotracheal tube, on the other hand, focuses on a flexible portion with diametric notches and membranous wraps for controlled movement, and includes a bite block and lever system for manipulation. The Compared's design emphasizes adjustability and control during intubation, with features like controlling wires and a video imaging stylet for enhanced functionality. Both devices serve the purpose of aiding in respiratory support within a medical context, but their operational roles diverge significantly: the Subject's device is geared towards dual-lumen ventilation with visual feedback, while the Compared's device is designed for precise positioning and control during intubation. The practical applications of the Subject's device would be in scenarios requiring dual ventilation and bronchial visualization, whereas the Compared's device would be used in situations where precise control and flexibility during intubation are critical.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.2405 suggests a potential for overlap, but upon detailed analysis, the overlap between the Subject and Compared claims is found to be low. The Subject's focus on dual ventilation lumens with a camera for visualization does not directly correspond to the Compared's emphasis on a flexible tube with control mechanisms for intubation. While both devices are used in respiratory care, their specific designs, methodologies, and intended functions are distinct. The Subject's device involves energy conversion in the form of ventilation and motion transfer for camera positioning, whereas the Compared's device focuses on motion transfer for tube positioning and load-bearing capacity of the bite block and lever system. The underlying functions, essential components, core interactions, and internal dynamics of the two devices are fundamentally different, leading to minimal overlap in their practical applications within medical settings.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US10537711B2) Claim number: 19 and Subject Claim: 1**

Both claims relate to imaging capabilities within a tracheal or endotracheal tube. The Subject claim describes a tracheal tube with a camera and an opening for viewing, specifically designed for ventilation and imaging within the bronchus. The Compared claim focuses on a video imaging stylet for imaging during intubation. The similarity lies in the use of imaging technology within the tube for medical purposes, though the Subject claim provides more detail on the structural arrangement of the tube and the camera's positioning, while the Compared claim emphasizes the function of imaging during intubation. The scope of the Subject claim is broader, encompassing ventilation and specific structural details, whereas the Compared claim is more focused on the imaging function during a specific procedure.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US8535265B2**Tracheal catheter with suction lumen port in close proximity to the cuff  
**Inventor: BURNETT STEVEN RAY  
Assignee: BURNETT STEVEN RAY  
Priority Date: 12-22-2009  
Publication Date: 09-17-2013  
CPC: A61M29/00  
IPV™ Rating: 7.2148  
Inferred Equivalence: Low**

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The primary function of the Compared invention (A61M29/00) from a mechanical engineering perspective is to facilitate the dilation or constriction of tubular structures within the body, such as blood vessels or airways. This is achieved through mechanical means that apply controlled forces to alter the diameter of the targeted structure, thereby managing fluid flow or pressure within the system. The invention's purpose is to provide a means of adjusting the internal dimensions of bodily tubes to treat various medical conditions, such as stenosis or to aid in surgical procedures.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between Subject and Compared, there is a low possibility of overlap between the two patents. The Subject patent focuses on a dual-lumen system with a camera for advanced monitoring and ventilation, while the Compared patent emphasizes a single respiratory lumen and a suction lumen for ventilation and suctioning. The operational roles, underlying functions, essential components, core interactions, and internal dynamics of the two patents are distinct, leading to different practical applications. The potential commercial impact of the Subject patent lies in critical care settings where visual monitoring is crucial, while the Compared patent's impact is in settings where prevention of ventilator-associated pneumonia is a priority.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the use of mechanical devices that can expand or contract to modify the internal diameter of a tubular structure. The underlying functions include the application of radial forces to achieve dilation or constriction. Essential components may include expandable balloons, mechanical actuators, or other mechanisms capable of altering their size. The functional processes involve the controlled inflation or deflation of these devices, which interact with the internal walls of the tubular structure to achieve the desired change in diameter. The internal dynamics of the system focus on the precise control of force distribution and the maintenance of structural integrity during operation, ensuring that the device can effectively perform its intended role in medical applications.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus within a multi-lumen tracheal tube, specifically designed for endobronchial intubation. This feature allows for real-time visualization during placement, which is not present in the Compared invention focused on dilation or constriction of tubular structures. The Subject's design also includes a double-lumen configuration for independent lung ventilation, a feature not addressed by the Compared invention. From a mechanical engineering perspective, the Subject's innovation lies in its mechanical control systems for camera positioning and the structural integrity required to maintain the functionality of the camera within the tracheal environment. The Compared invention, while mechanically sophisticated in its own right, does not overlap with these specific functionalities or design approaches, as it is concerned with altering the diameter of bodily tubes rather than facilitating ventilation or visualization.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject patent includes a dual-lumen design with a camera and an opening in the second ventilation lumen, aimed at facilitating ventilation and visual monitoring within the respiratory system. The Compared patent focuses on a tracheal catheter with a single respiratory lumen and a suction lumen, designed for ventilation and suctioning of the subglottic space. Both patents address respiratory support but differ significantly in their design and operational roles. The Subject patent's dual-lumen system and camera integration are intended for advanced monitoring and ventilation, potentially in critical care settings, while the Compared patent's design emphasizes effective suctioning alongside ventilation, which is crucial for preventing ventilator-associated pneumonia. The methodologies in the Subject patent involve the use of a camera for visual inspection, which is not present in the Compared patent. The operational roles differ as the Subject patent focuses on both ventilation and visual monitoring, whereas the Compared patent focuses on ventilation and suctioning. The underlying functions of the Subject patent include energy conversion for ventilation and motion transfer for camera operation, while the Compared patent focuses on energy conversion for ventilation and motion transfer for suctioning. Essential components in the Subject patent include the dual lumens, camera, and opening, while the Compared patent includes a cannula, respiratory lumen, suction lumen, and inflatable cuff. Core interactions in the Subject patent involve the interaction between the camera and the opening for visual monitoring, while in the Compared patent, the interaction is between the suction lumen and the subglottic space for suctioning. The internal dynamics of the Subject patent involve the flow of air through the dual lumens and the operation of the camera, while the Compared patent involves the flow of air through the respiratory lumen and the suctioning through the suction lumen. The practical applications of the Subject patent are in critical care settings where visual monitoring is crucial, while the Compared patent's applications are in settings where prevention of ventilator-associated pneumonia is a priority.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.2148 suggests a potential for overlap, but upon detailed analysis, the overlap between the Subject and Compared patents is minimal. The Subject patent's focus on a dual-lumen system with a camera for visual monitoring and ventilation does not align closely with the Compared patent's emphasis on a single respiratory lumen and a suction lumen for ventilation and suctioning. The methodologies, designs, and operational roles are distinct, with the Subject patent aiming for advanced monitoring and the Compared patent focusing on effective suctioning. The underlying functions, essential components, core interactions, and internal dynamics further highlight the differences between the two patents. The practical applications also differ, with the Subject patent being more suited for critical care settings requiring visual monitoring, while the Compared patent is more focused on preventing ventilator-associated pneumonia.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US8535265B2) Claim number: 1 and Subject Claim: 12**

Both claims describe a tracheal device with a suction lumen that terminates in a port located proximal to a cuff. The Subject claim focuses on a tracheal tube with a first cuff, while the Compared claim specifies a tracheal catheter with an inflatable cuff and an upper collar that partially blocks the suction lumen distal to the port. The Subject claim's scope is broader as it does not specify the type of cuff or the presence of an upper collar, whereas the Compared claim's scope is more specific to the configuration of the cuff and the suction lumen. The similarity score reflects the shared concept of a suction lumen and its positioning relative to a cuff, but the differences in detail and specificity contribute to a lower score.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US8813750B2**Self-sizing adjustable endotracheal tube  
**Inventor: O'NEIL MICHAEL P  
Assignee: O'NEIL MICHAEL P  
Priority Date: 09-29-2006  
Publication Date: 08-26-2014  
CPC: A61M16/00  
IPV™ Rating: 7.1779  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/064-879-060-546-251/frontpage?l=en](https://www.lens.org/lens/patent/064-879-060-546-251/frontpage?l=en)

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The primary function of the Compared invention (A61M16/00) is to provide a tracheal tube that can adjust its diameter to enhance the seal against the tracheal walls and optimize the flow of respiratory gases. This adjustment is achieved through an intermediate portion of the tube that can change both its inner and outer diameters, allowing for a better fit within the trachea and potentially reducing the work of breathing for the patient.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a low possibility of overlap between the patents described in 'Subject' and 'Compared'. The 'Subject' patent focuses on a tracheal tube with dual ventilation lumens and integrated visualization tools, aimed at monitoring and ventilating different parts of the respiratory system, which is particularly useful in critical care settings. In contrast, the 'Compared' patent emphasizes a tracheal tube with a single lumen that can adapt its diameter to fit the patient's trachea, focusing on effective sealing and adaptability, suitable for surgical and emergency respiratory support. The potential commercial impact of the 'Subject' patent could be significant in specialized medical fields requiring advanced monitoring capabilities, whereas the 'Compared' patent might have broader applications in general respiratory care due to its adaptability and ease of use.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of dynamic diameter adjustment to achieve an effective seal and optimize respiratory gas flow. The underlying functions include the ability of the intermediate portion to expand or contract, facilitated by an outer layer and an inner layer connected by perforated members that allow gas flow within the gap between the layers. Essential components include the distal, intermediate, and proximal end portions of the tube, with the intermediate portion being crucial for its adaptability. Core interactions involve the expansion of the tube to contact the tracheal walls, ensuring a seal, while the internal dynamics focus on maintaining the integrity of the respiratory gas passageway through the tube's layers and connecting members.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus within a multi-lumen tracheal tube, specifically designed for endobronchial use, which is not present in the Compared invention. The Compared invention focuses on diameter adjustment for sealing and respiratory efficiency, whereas the Subject invention emphasizes visualization for accurate placement and independent lung ventilation. The Subject's design includes unique features such as a camera located opposite an opening in the second ventilation lumen, and the use of light-emitting diodes and fluid delivery systems to maintain camera functionality, which are not addressed in the Compared invention. From a mechanical engineering perspective, the Subject's design involves complex integration of electronic components and fluid dynamics within the tracheal tube, differing significantly from the Compared invention's focus on mechanical adaptability and sealing. The Subject's approach to addressing real-world challenges like physician placement and bronchial intubation accuracy contrasts with the Compared invention's focus on optimizing respiratory gas flow and patient comfort through diameter adjustment.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from 'Subject' and 'Compared' both focus on medical devices used for respiratory support, but they diverge significantly in their design and functionality. The 'Subject' claims describe a tracheal tube with dual ventilation lumens, one of which is longer and includes a camera and an opening for visualization within the patient's bronchus. This design emphasizes the ability to monitor and ventilate different parts of the respiratory system simultaneously, with specific features like cuffs, LEDs, and fluid delivery systems for camera maintenance. The operational role here is primarily focused on ventilation and visualization, with applications in critical care settings where real-time monitoring of the respiratory tract is necessary.  
  
In contrast, the 'Compared' claims detail a tracheal tube with a single passageway that can change its diameter to fit the patient's trachea, using materials like PTFE or silicone. The design includes an intermediate portion that can expand and collapse, potentially using a stylet for insertion and removal, and focuses on sealing the trachea effectively. The operational role here is centered on ensuring a proper seal and fit within the trachea, with applications in both surgical and emergency respiratory support scenarios.  
  
The methodologies and designs differ significantly: 'Subject' focuses on dual-lumen technology with integrated visualization tools, while 'Compared' emphasizes a single lumen with adaptive diameter capabilities. The underlying functions of 'Subject' involve dual ventilation and monitoring, whereas 'Compared' focuses on sealing and adaptability. Essential components in 'Subject' include dual lumens, cameras, and cuffs, while 'Compared' includes an expandable intermediate portion and specific materials. Core interactions in 'Subject' involve the interaction between the camera and the respiratory tract, while in 'Compared', it's the interaction between the tube and the tracheal walls. Internal dynamics in 'Subject' relate to the flow of air through dual lumens, while in 'Compared', it's the expansion and contraction of the tube's diameter.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the claims of 'Subject' and 'Compared' is minimal. The 'Subject' claims focus on a dual-lumen tracheal tube with integrated visualization capabilities, which is a distinct feature not present in the 'Compared' claims. The 'Compared' claims, on the other hand, emphasize a single-lumen tube with the ability to adapt its diameter to fit the trachea, a feature not mentioned in the 'Subject' claims. While both sets of claims relate to tracheal tubes used for respiratory support, the specific functionalities, designs, and operational roles are quite different, resulting in little to no overlap in terms of literal or semantic similarities.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (US8813750B2) Claim number: 6 and Subject Claim: 6**

Both claims discuss the use of cuffs in a tracheal tube. The Compared claim mentions a single inflatable balloon cuff at the distal end, while the Subject claim describes two cuffs: one around both ventilation lumens and another around only the second ventilation lumen. The scope of the Compared claim is narrower, focusing on a single cuff at the distal end, whereas the Subject claim's scope is broader, detailing the configuration of two cuffs with specific placements. The similarity score reflects the commonality in the use of cuffs but also accounts for the differences in their configurations and placements.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US10478054B2**Endotracheal tube with visualization capabilities and a laryngeal mask  
**Inventor: NAVE OMRI  
Assignee: ETVIEW LTD  
Priority Date: 02-12-2016  
Publication Date: 11-19-2019  
CPC: A61B1/06  
IPV™ Rating: 7.1762  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/199-489-691-206-132/frontpage?l=en](https://www.lens.org/lens/patent/199-489-691-206-132/frontpage?l=en)

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The primary function of the Compared invention (A61B1/06) is to provide visualization within the respiratory tract using a bronchoscope. This device is designed to be inserted through an endotracheal tube to aid in the accurate placement of the tube within the trachea and to prevent misplacement into the esophagus or bronchi. The bronchoscope's mechanical engineering aspect involves the design of a flexible shaft that can navigate the complex pathways of the respiratory system, coupled with optical systems for illumination and image transmission.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

The overall anticipated overlap between the Subject and Compared claims is moderate. Both sets of claims focus on improving intubation and ventilation through visualization technology, but they differ in their approach and specific design elements. The Subject claims emphasize a dual-lumen tracheal tube with an integrated camera system, while the Compared claims describe a method using an LMA and a single-lumen endotracheal tube with a visualization device. The operational roles of both are centered around facilitating ventilation and intubation, but the designs and applications are distinct. The potential commercial impact of the Subject claims could be significant in specialized medical settings requiring targeted ventilation and monitoring, whereas the Compared claims could have broader applications in various clinical settings due to the procedural method described. There is a low possibility of direct overlap in terms of patent infringement due to the distinct methodologies and designs, but both could coexist in the market serving different needs within the medical field.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve systemic principles of optical engineering and mechanical flexibility. The underlying functions include light transmission and image capture, facilitated by a fiber optic system or a video camera at the tip of the bronchoscope. Essential components include the flexible shaft, which allows for maneuverability within the respiratory tract, and the optical system, which includes lenses and light sources to provide clear visualization. Core interactions involve the manipulation of the bronchoscope by the operator to navigate the respiratory tract, while internal dynamics focus on maintaining the integrity of the optical pathway and ensuring the flexibility and durability of the shaft. The mechanical system's operational role is to enable precise visualization for guiding the endotracheal tube, ensuring correct placement and preventing complications.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integrated camera system within a multi-lumen tracheal tube, specifically designed for bronchial intubation. This contrasts with the Compared invention, which uses a separate bronchoscope for visualization. The Subject's design allows for a more streamlined approach to intubation, as it does not require additional equipment like a bronchoscope, potentially reducing procedural complexity and cost. The multi-lumen design with unequal lengths and the ability to independently ventilate each lung further distinguishes the Subject from the Compared invention, which focuses solely on visualization. From a mechanical engineering perspective, the Subject's design involves complex force distribution to maintain the integrity of the tube's structure and the camera's positioning, as well as considerations for energy efficiency in the camera's operation and structural integrity to withstand the pressures of ventilation. The Subject's approach to visualization and intubation is more integrated and potentially more efficient, addressing challenges such as physician placement accuracy and patient comfort.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims features a dual-lumen design with integrated camera technology for visualization, specifically tailored for intubation and ventilation purposes. The first and second ventilation lumens are designed to connect to a ventilator, with the second lumen extending longer and aligning with the upper bronchus, indicating a focus on targeted ventilation and monitoring. The camera, positioned opposite an opening in the second lumen, allows for direct visualization of the bronchial area, which is crucial for precise medical procedures. Additional features like cuffs, light emitting diodes, and fluid delivery systems enhance the functionality for maintaining clear visibility and effective sealing during use. In contrast, the Compared claims detail a method for intubation using a laryngeal mask airway (LMA) and an endotracheal tube with a visualization device. The method involves guiding the endotracheal tube through the LMA, which is then removed, leaving the tube in place for ventilation. The endotracheal tube in the Compared claims also includes a single ventilation lumen and additional features like fluid injection for lens cleaning, indicating a focus on maintaining clear visualization during intubation. Both sets of claims share the common goal of improving intubation and ventilation processes through visualization, but they differ in their approach and specific design elements. The Subject focuses on a dual-lumen tracheal tube with integrated camera technology, while the Compared emphasizes a method involving an LMA and a single-lumen endotracheal tube with a visualization device.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The overlap between the Subject and Compared claims is primarily in the use of visualization technology for intubation and ventilation. Both sets of claims aim to enhance the precision and safety of these medical procedures through direct visualization. However, the Subject claims focus on a tracheal tube with a dual-lumen design and an integrated camera system, whereas the Compared claims describe a method using an LMA and an endotracheal tube with a visualization device. The methodologies differ significantly, with the Subject claims detailing a specific device design and the Compared claims outlining a procedural method. The operational roles are similar in terms of facilitating ventilation and intubation, but the designs and applications are distinct. The Subject's dual-lumen approach with a camera opposite an opening in the second lumen is unique compared to the single-lumen endotracheal tube in the Compared claims. The essential components, core interactions, and internal dynamics also vary, with the Subject claims focusing on the interaction between the camera and the bronchial area, and the Compared claims emphasizing the interaction between the LMA and the endotracheal tube. The practical applications of the Subject claims are more suited for targeted ventilation and monitoring, while the Compared claims are focused on a method for intubation that can be applied in various clinical settings. Given the claim\_score of 7.1762, the overlap is described as moderate due to the shared goal of visualization but significant differences in design and methodology.

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**Claims Breakdown and Comparison Summary:**

Didn't find any similar subject claim for the threshold used

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US11426548B2**Combined laryngeal-bronchial lung separation system  
**Inventor: ZHOU GARY  
Assignee: ZHOU GARY  
Priority Date: 05-11-2018  
Publication Date: 08-30-2022  
CPC: A61M16/04  
IPV™ Rating: 7.1693  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/184-204-293-071-002/frontpage?l=en](https://www.lens.org/lens/patent/184-204-293-071-002/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to provide a bronchial isolation tube that can be inserted through an airway channel of a supraglottic airway device, crossing the glottis and trachea, into a bronchus of a human. This tube is designed to isolate and ventilate one lung independently, often used in surgical procedures requiring one-lung ventilation. The tube features an elongated non-collapsible body with a portion of reduced diameter to facilitate easier passage through the glottis, and includes an inflatable member at the distal end to seal the bronchus, ensuring effective isolation and ventilation.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between the Subject and Compared, there is a moderate anticipated overlap of the patents. The Subject's tracheal tube and the Compared's bronchial isolation tube both address respiratory support but with different focuses. The tracheal tube is designed for dual-lumen ventilation and visual monitoring, suitable for critical care settings, while the bronchial isolation tube is designed for isolating a specific bronchus, applicable in thoracic surgery. The potential commercial impact of the Subject's patent could be significant in critical care and emergency medicine due to its dual functionality. The Compared's patent may have a niche market in thoracic surgery and procedures requiring bronchial isolation. Overall, there is a low possibility of direct overlap due to the distinct operational roles and applications of each device.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the Compared invention involves the use of an elongated non-collapsible tubular body that extends from a proximal to a distal end, designed to be inserted into a bronchus. The underlying function is to achieve an airtight seal within the bronchus using an inflatable member at the distal end, which is crucial for isolating one lung. Essential components include the non-collapsible body, the inflatable member, and a portion with reduced diameters to ease passage through the glottis. The core interactions involve the inflation of the member to seal the bronchus, allowing for independent ventilation. Internally, the dynamics of the tube involve maintaining structural integrity and flexibility to navigate the airway, while the reduced diameter section aids in reducing resistance during insertion. The operational role of this system is to facilitate one-lung ventilation, crucial in surgical contexts where lung isolation is necessary.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through the integration of a camera apparatus within a multi-lumen tracheal tube, specifically designed for bronchial intubation. This feature allows for real-time visualization, which is not present in the Compared invention. The Compared invention focuses on the mechanical aspects of bronchial isolation and ventilation, lacking the electronic component for visualization. The Subject's design includes a unitary assembly for the camera, which enhances the ease of use and accuracy during intubation. From a mechanical engineering perspective, the Subject's innovation lies in its ability to combine mechanical functionality with electronic visualization, potentially improving procedural outcomes. The Compared invention, while effective for its intended purpose, does not incorporate such advanced visualization technology, highlighting a significant difference in their mechanical identities. Both inventions target the medical field, specifically respiratory therapy, but the Subject's integration of a camera apparatus offers a competitive advantage in terms of procedural accuracy and safety. The practical applications of the Subject invention extend to scenarios requiring precise bronchial intubation, potentially influencing industry practices by setting new standards for visualization in respiratory procedures.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the bronchial isolation tube in the Compared claims both relate to medical devices used for respiratory support, specifically targeting the airways. The Subject's tracheal tube includes dual ventilation lumens, with one lumen extending longer to reach the upper bronchus, and features a camera for visualization through an opening in the second lumen. This design focuses on providing ventilation and visual monitoring within the respiratory system. In contrast, the Compared's bronchial isolation tube is designed to isolate a specific bronchus, featuring a non-collapsible tubular body with a portion of reduced diameter to navigate the glottis and trachea, and an inflatable member for sealing. The methodologies and designs differ significantly; the Subject's device emphasizes dual-lumen ventilation and visual capabilities, while the Compared's device focuses on isolation and sealing within a single bronchus. The operational roles also differ, with the Subject's device aimed at both ventilation and monitoring, and the Compared's device focused on isolation for targeted ventilation. The underlying functions of the Subject's device include energy conversion (ventilation) and motion transfer (camera movement), while the Compared's device primarily involves load-bearing capacity (sealing the bronchus). Essential components in the Subject's device include the dual lumens, camera, and cuffs, whereas the Compared's device includes a non-collapsible body, inflatable member, and specific diameter adjustments. Core interactions in the Subject's device involve the interaction between the camera and the opening for visualization, and between the lumens and the ventilator for ventilation. In the Compared's device, core interactions are between the inflatable member and the bronchus for sealing, and the tube's navigation through the airway. The internal dynamics of the Subject's device involve the flow of air through the lumens and the camera's field of view, while the Compared's device involves the structural integrity of the tube and the sealing action of the inflatable member. The practical applications of the Subject's device are in scenarios requiring both ventilation and visual monitoring, such as in critical care settings, whereas the Compared's device is applied in situations requiring isolation of a specific bronchus, such as during thoracic surgery.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.1693 suggests a potential for significant overlap. However, upon detailed analysis, the overlap between the tracheal tube and the bronchial isolation tube is found to be moderate. The Subject's tracheal tube and the Compared's bronchial isolation tube both target the respiratory system but serve different primary functions. The tracheal tube focuses on dual-lumen ventilation and visual monitoring, while the bronchial isolation tube emphasizes isolation and sealing of a specific bronchus. The methodologies, designs, and operational roles differ, with the Subject's device involving dual lumens and a camera, and the Compared's device featuring a non-collapsible body with a reduced diameter section and an inflatable member. The underlying functions, essential components, core interactions, and internal dynamics also vary significantly between the two devices. Therefore, despite the high claim\_score, the overlap is considered moderate due to the distinct purposes and mechanisms of the devices.

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**Claims Breakdown and Comparison Summary:**

Didn't find any similar subject claim for the threshold used

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: EP3225272B1**MEDICAL TUBES FOR SELECTIVE MECHANICAL VENTILATION OF THE LUNGS  
**Inventor: POL GUILLERMO L  
Assignee: POL GUILLERMO L  
Priority Date: 02-04-2010  
Publication Date: 09-11-2019  
CPC: A61M16/00  
IPV™ Rating: 7.1678  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/068-554-554-355-682/frontpage?l=en](https://www.lens.org/lens/patent/068-554-554-355-682/frontpage?l=en)

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The primary function of the Compared invention is to facilitate selective mechanical ventilation of either the left or right lung of a patient using a single lumen endobronchial tube. This is achieved through a medical tube with a tracheal portion and a bronchial portion, equipped with multiple inflatable cuffs and an aperture for gas delivery, allowing for isolation and ventilation control of one lung while maintaining an airway to the other.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

There is a low possibility of overlap between the Subject and Compared patents. The Subject focuses on a dual-lumen tracheal tube with visual monitoring capabilities, aimed at dual-lung ventilation, while the Compared focuses on a single-lumen endobronchial tube with multiple cuffs for selective lung ventilation. The operational roles, underlying functions, and practical applications of the two patents are distinct, with the Subject aimed at providing ventilation to both lungs with visual feedback, and the Compared aimed at controlling ventilation to either lung selectively. The potential commercial impact of the Subject patent could be significant in medical scenarios requiring dual-lung ventilation with visual monitoring, while the Compared patent's impact would be in scenarios requiring selective lung ventilation, such as in surgical or critical care settings.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of selective lung isolation and ventilation. It includes a single lumen with openings at both ends for gas delivery, and multiple inflatable cuffs (tracheal and bronchial) that expand radially to seal against the trachea and bronchi. An aperture between the tracheal and bronchial portions, controlled by an expandable balloon or a mechanism within the tube wall, allows for the regulation of gas flow to the non-isolated lung. The underlying functions involve sealing the respiratory tract at specific points to isolate one lung, while the essential components include the cuffs, the aperture, and the control mechanism. Core interactions occur between the cuffs and the respiratory tract, and the internal dynamics involve the inflation and deflation of cuffs to control ventilation pathways.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its multi-lumen design and integrated camera system, which is not present in the Compared invention. The Subject's use of a camera for real-time visualization during intubation and its multi-lumen configuration for independent ventilation of the lungs differ significantly from the single lumen approach of the Compared invention. The Subject's design also includes unique features like the positioning of the camera and the use of LEDs, which enhance its functionality for precise placement and monitoring. While both inventions address lung ventilation, the Subject's approach to visualization and multi-lumen structure provides a distinct mechanical engineering solution. The practical applications of the Subject invention are primarily in surgical and critical care settings where precise intubation and monitoring are crucial, whereas the Compared invention focuses on selective lung ventilation in scenarios requiring one-lung ventilation. Both inventions could impact medical practices, but the Subject's technology offers advantages in terms of procedural accuracy and patient safety through enhanced visualization.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims features a dual-lumen design, with the second lumen being longer and having an opening and a camera for visualization, which is a significant departure from the single-lumen design of the Compared claims. The Subject's design focuses on providing ventilation to both lungs with the capability of visual monitoring through the camera, which is positioned to view through an opening in the second lumen. This camera placement and the dual-lumen configuration are unique to the Subject and not found in the Compared, which instead uses a single lumen with multiple inflatable cuffs for selective ventilation of either lung. The Compared also includes a distal intraluminal balloon blocker for sealing the lumen, a feature not present in the Subject. Both patents mention the use of cuffs, but the Subject uses them for sealing around both lumens, while the Compared uses them for selective ventilation control. The Subject's claims also mention additional features like light emitting diodes and fluid delivery systems for the camera, which are not discussed in the Compared. The methodologies and designs differ significantly, with the Subject focusing on dual-lumen ventilation with visual capabilities, and the Compared focusing on single-lumen selective ventilation with multiple sealing mechanisms. The operational roles differ, with the Subject aimed at dual-lung ventilation and monitoring, and the Compared aimed at selective lung ventilation. The underlying functions, essential components, core interactions, and internal dynamics of the two patents are distinct, with the Subject's focus on dual-lumen operation and visual feedback, and the Compared's focus on single-lumen control and selective ventilation. The practical applications of the Subject are in scenarios requiring dual-lung ventilation with visual monitoring, while the Compared's applications are in scenarios requiring selective lung ventilation.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 7.1678 suggests a potential for overlap, but upon detailed analysis, the overlap between the Subject and Compared is minimal. The Subject's dual-lumen design with a camera for visualization and the Compared's single-lumen design with multiple cuffs for selective ventilation represent fundamentally different approaches to tracheal tube functionality. The Subject's focus on dual-lung ventilation with visual monitoring and the Compared's focus on selective lung ventilation with sealing mechanisms indicate little to no overlap in their core functionalities, methodologies, or practical applications.

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**Claims Breakdown and Comparison Summary:  
Compared Patent (EP3225272B1) Claim number: 1 and Subject Claim: 6**

Both claims describe tracheal tubes with multiple cuffs for sealing purposes. The Compared claim details a single lumen endobronchial tube with a tracheal portion and a bronchial portion, each with specific cuffs for sealing against the trachea and left main stem bronchi. The Subject claim, on the other hand, describes a tracheal tube with two ventilation lumens and two cuffs, one around both lumens and another around only the second lumen. The similarity lies in the use of multiple cuffs for sealing, but the Subject claim's dual lumen configuration and the specific placement of the second cuff around only the second lumen differentiate it from the single lumen and cuff configuration in the Compared claim. The scope of the Compared claim is broader as it specifies the use for left lung ventilation, while the Subject claim focuses on the configuration of the cuffs and lumens without specifying the lung targeted.

------------------------------------------------------------------------------------------------------------------- **Compared Patent (EP3225272B1) Claim number: 4 and Subject Claim: 4**

Both claims describe the integration of a camera within a tracheal tube. The Compared claim specifies a built-in video camera embedded within the common tube wall of a single lumen endobronchial tube, while the Subject claim describes a camera embedded in the wall of the second ventilation lumen of a dual lumen tracheal tube. The similarity lies in the concept of embedding a camera within the tube for visual monitoring. However, the Compared claim's scope is limited to a single lumen system, whereas the Subject claim's scope includes a dual lumen system with specific placement of the camera in the second lumen. The difference in lumen configuration and camera placement distinguishes the two claims.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US10441735B1**Combined laryngeal-bronchial lung separation system  
**Inventor: ZHOU GARY  
Assignee: ZHOU GARY  
Priority Date: 05-11-2018  
Publication Date: 10-15-2019  
CPC: A61M16/04  
IPV™ Rating: 6.9546  
Inferred Equivalence: Low**

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The primary function of the Compared invention (A61M16/04) is to facilitate one-lung ventilation by isolating and ventilating one side of the lungs while providing access to the other side. This is achieved through the use of a bronchial blocking tube (BBT) or a double-lumen tube (DLT), which can be used in conjunction with an endotracheal tube to ensure effective ventilation and isolation during surgical procedures.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between the Subject and Compared, there is a low possibility of overlap between the tracheal tube and the airway device. The tracheal tube's focus on direct tracheal and bronchial access for ventilation and visualization contrasts with the airway device's emphasis on sealing the glottis and managing secretions in the hypopharyngeal area. The potential commercial impact of the tracheal tube could be significant in critical care settings where precise ventilation and monitoring are required, while the airway device might have a broader impact in surgical or emergency settings where maintaining an airway and managing secretions are critical. The distinct purposes and applications of these devices suggest minimal overlap in their market segments.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of selective lung isolation and ventilation. The underlying functions include the use of a BBT or DLT to block and isolate one lung, allowing for ventilation of the other. Essential components include the bronchial blocking tube with a distal cuff to seal the bronchus, and a lumen for evacuation and CPAP application. Core interactions involve the placement of the tube within the trachea and bronchus, ensuring an airtight seal to prevent contamination and facilitate surgical operations. The internal dynamics focus on the control of airflow and pressure within the isolated lung, ensuring effective ventilation and collapse of the operative lung as needed.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integrated camera apparatus, which is not present in the Compared invention. This camera allows for real-time visualization during intubation, enhancing the precision and safety of the procedure. The Compared invention focuses on lung isolation and ventilation without such visualization capabilities. The Subject's design includes a unitary assembly for the camera, which is a distinct feature from the BBT or DLT used in the Compared invention. The mechanical underpinnings of the Subject involve the integration of electronic components for visualization, which differs from the Compared's focus on airflow control and pressure management. The Subject's approach to bronchial intubation with visualization addresses the challenge of accurate placement, potentially reducing the risk of complications associated with traditional methods. Both inventions serve the medical field, particularly in respiratory therapy, but the Subject's innovation lies in its ability to enhance procedural accuracy through visualization.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the airway device in the Compared claims both involve medical devices designed for respiratory support, but they differ significantly in their design and operational roles. The Subject's tracheal tube includes dual ventilation lumens with specific configurations for ventilation and bronchial alignment, along with a camera for visualization. This design focuses on direct tracheal and bronchial access, suitable for applications in intensive care or surgical settings where precise control over ventilation and monitoring is crucial. The camera's placement and the dual lumen system suggest a focus on both ventilation and diagnostic capabilities, potentially used in scenarios requiring real-time visualization of the respiratory tract.  
  
In contrast, the Compared claims describe an airway device with a mask portion and multiple channels, including an airway channel and an imaging channel, designed to cover and seal around the glottis. This device is intended for use in the hypopharyngeal area, suggesting applications in anesthesia or emergency airway management where maintaining a seal around the glottis is essential. The inclusion of an ampulla and sumps indicates a design focused on managing secretions and potentially gastric fluids, which is not a feature of the tracheal tube in the Subject claims.  
  
The methodologies and designs differ in their approach to respiratory support: the tracheal tube uses a direct insertion method with specific lumens for ventilation and visualization, while the airway device uses a mask and channel system to manage airflow and secretions. The operational roles also diverge, with the tracheal tube focusing on ventilation and bronchial access, and the airway device emphasizing airway management and secretion control. The underlying functions of the tracheal tube involve direct ventilation and monitoring, whereas the airway device's functions include sealing the glottis and managing fluid pathways. Essential components like the camera in the tracheal tube and the mask portion in the airway device highlight their distinct purposes. Core interactions in the tracheal tube involve the interaction between the camera and the ventilation lumens, while in the airway device, interactions occur between the mask, channels, and the patient's anatomy. The internal dynamics of the tracheal tube are centered around airflow and visualization, while the airway device's dynamics involve sealing and fluid management.  
  
In terms of practical applications, the tracheal tube could be used in critical care settings for patients requiring precise ventilation and bronchial monitoring, whereas the airway device might be more applicable in surgical or emergency settings where maintaining an airway and managing secretions are priorities.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.9546 suggests a potential for overlap, but upon detailed analysis, the overlap between the Subject and Compared claims is found to be low. The tracheal tube and the airway device serve different primary functions within their respective contexts. The tracheal tube is designed for direct tracheal and bronchial access with a focus on ventilation and visualization, while the airway device is designed for sealing the glottis and managing secretions in the hypopharyngeal area. The methodologies, designs, and operational roles of these devices are distinct, with the tracheal tube focusing on direct ventilation and the airway device on airway management. The essential components, core interactions, and internal dynamics further highlight their differences, with the tracheal tube's camera and dual lumens contrasting with the airway device's mask and channel system. Therefore, despite the high claim\_score, the actual overlap in terms of function, design, and application is minimal.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US9119927B1**Apparatus and method for intubating humans and non-human animals  
**Inventor: RATTERREE JERRY BLAINE  
Assignee: RATTERREE JERRY BLAINE  
Priority Date: 05-19-2009  
Publication Date: 09-01-2015  
CPC: A61M16/00  
IPV™ Rating: 6.9496  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/074-489-280-734-376/frontpage?l=en](https://www.lens.org/lens/patent/074-489-280-734-376/frontpage?l=en)

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The primary function of the Compared invention (A61M16/00) is to provide an intubation device with a flexible tube that includes a plurality of spaced-apart flexible resilient annular blaines for sealing the body passage. This design aims to improve the seal within the trachea or other body passages, reducing the risk of leakage and enhancing the safety and effectiveness of intubation procedures.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between the Subject and Compared patents, there is a low possibility of overlap. The Subject patent focuses on a tracheal tube with dual lumens for ventilation and a camera for monitoring, aimed at energy conversion and motion transfer within the context of respiratory care. In contrast, the Compared patent emphasizes a single-lumen intubation device with blaines for sealing, focusing on load-bearing capacity for general intubation procedures. The potential commercial impact of the Subject patent lies in specialized medical settings requiring advanced monitoring and ventilation, while the Compared patent's impact is broader, applicable to various intubation scenarios where effective sealing is essential.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The Compared invention operates on the principle of using a series of radially tapered blaines to create a seal within the trachea. The blaines are formed as a single monolithic piece with the tube, extending radially from the lumen to the outer circumference. The tapering from a thicker inner radius to a thinner outer radius allows the blaines to flex and conform to the tracheal walls, ensuring a tight seal. This design facilitates the transfer of gases into the trachea while preventing leakage, which is crucial for controlled ventilation during medical procedures. The mechanical system's role is to provide a reliable and less invasive method for intubation, addressing issues such as over or under pressurization of the trachea, which can lead to complications.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel features such as the integration of a camera apparatus within the tracheal tube, specifically designed for bronchial intubation. This allows for real-time visualization of the bronchial placement, which is not present in the Compared invention. The multi-lumen design with unequal lengths and specific positioning of the camera and opening further distinguishes the Subject from the Compared invention, which focuses on sealing the trachea with blaines. The Subject's design addresses the mechanical challenge of accurate placement in the bronchus, while the Compared invention focuses on improving the seal within the trachea. Both inventions aim to enhance the safety and effectiveness of intubation but target different aspects of the procedure. The Subject's potential impact includes improved accuracy in bronchial intubation, potentially reducing complications related to incorrect placement, whereas the Compared invention's impact lies in reducing leakage and improving the seal, which could lead to safer and more reliable intubation procedures across various medical settings.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject patent includes a dual-lumen design with a camera and specific features for ventilation and visualization within the respiratory system. The first and second ventilation lumens are designed for connection to a ventilator, with the second lumen extending longer and aligning with the upper bronchus. The camera, positioned opposite an opening in the second lumen, facilitates visual monitoring through the respiratory tract. Additional features include cuffs for sealing, light sources, and fluid delivery systems for camera maintenance, indicating a focus on enhancing patient monitoring and care during ventilation.  
  
In contrast, the Compared patent focuses on an intubation device with a single lumen surrounded by a flexible tube, featuring multiple annular blaines for sealing within a body passage. These blaines are designed with specific shapes and sizes to optimize sealing and comfort, and the entire device is made from a single material, emphasizing ease of use and manufacturability. The design aims to improve the fit and function of the intubation device within the body.  
  
The methodologies and designs between the two patents differ significantly. The Subject patent's dual-lumen system with integrated camera and ventilation capabilities is tailored for advanced respiratory monitoring and treatment, while the Compared patent's single-lumen system with blaines focuses on effective sealing and comfort during intubation. The operational roles also diverge, with the Subject patent aimed at energy conversion (ventilation) and motion transfer (camera movement), and the Compared patent focused on load-bearing capacity (sealing against body passages).  
  
The underlying functions of the Subject patent involve ventilation and visual monitoring, with essential components like the camera, lumens, and cuffs. Core interactions include the camera's field of view through the opening and the ventilation process through the lumens. In contrast, the Compared patent's function is primarily to seal the intubation device within the body, with essential components being the blaines and the flexible tube. Core interactions involve the blaines' contact with the body passage walls.  
  
In terms of internal dynamics, the Subject patent's system involves the flow of air through the lumens and the camera's operation, while the Compared patent's dynamics relate to the deformation and sealing action of the blaines. The purpose within their applied contexts differs, with the Subject patent aimed at medical ventilation and monitoring in clinical settings, and the Compared patent focused on general intubation procedures across various medical applications.  
  
Practical applications of the Subject patent include use in intensive care units for patients requiring mechanical ventilation and visual monitoring, while the Compared patent's applications are broader, suitable for any intubation scenario where effective sealing is crucial.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.9496 suggests a potential for overlap, but upon detailed analysis, the overlap between the Subject and Compared patents is minimal. The Subject patent's focus on a dual-lumen tracheal tube with integrated camera and ventilation capabilities contrasts sharply with the Compared patent's emphasis on a single-lumen intubation device with sealing blaines. The methodologies, designs, and operational roles are distinct, with the Subject patent aimed at advanced respiratory monitoring and treatment, and the Compared patent focused on effective sealing during intubation. The underlying functions, essential components, core interactions, and internal dynamics further highlight the differences, indicating little to no overlap in their practical applications and purposes within their respective medical contexts.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: EP3402383B1**IMAGING COMPETENT, BI-DIRECTIONALLY ARTICULABLE ENDOTRACHEAL TUBES  
**Inventor: YAN WENLIANG  
Assignee: FARBES MEDICAL LLC  
Priority Date: 01-15-2016  
Publication Date: 04-22-2020  
CPC: A61M16/04  
IPV™ Rating: 6.9473  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/009-062-676-626-97X/frontpage?l=en](https://www.lens.org/lens/patent/009-062-676-626-97X/frontpage?l=en)

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The Compared invention, an endotracheal tube, is designed to facilitate intubation by providing a conduit for air or oxygen from a ventilator to a patient's lungs. From a mechanical engineering perspective, the primary function involves ensuring a secure and effective pathway for respiratory gases, which requires the tube to be flexible yet robust enough to navigate the trachea and maintain its position. The tube's design includes features like controlling wires and a bite block to aid in precise placement and manipulation within the trachea, addressing the mechanical challenge of aligning the tube correctly with the patient's airway.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between the Subject and Compared, there is a low possibility of overlap between the tracheal tube and the endotracheal tube. The Subject's tracheal tube is designed for ventilation with visual feedback, focusing on energy conversion for ventilation and visual monitoring, while the Compared's endotracheal tube is designed for precise control and positioning, focusing on motion transfer. The purpose of the Subject's device within its applied context, such as in critical care settings, is to provide targeted ventilation and visual confirmation of tube placement, whereas the Compared's device is used in scenarios requiring precise tube placement, such as in surgical or emergency intubations. The potential commercial impact of the Subject's patent could be significant in markets requiring advanced ventilation and monitoring solutions, while the Compared's patent could impact markets needing devices with enhanced control and positioning capabilities.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention revolve around the mechanical system's ability to facilitate intubation through controlled movement and positioning. The underlying functions include the use of controlling wires that run through longitudinal passages within the tube, allowing for bi-directional movement of the tube's distal end. Essential components such as the bite block and removable lever provide mechanical leverage and control, enabling the intubationist to adjust the tube's position. The core interactions involve the mechanical manipulation of the tube via the controlling wires, which interact with the tube's flexible portion and notches to achieve the desired movement. Internally, the dynamics of the system are governed by the tension and flexibility of the wires, ensuring that the tube can be maneuvered without compromising its structural integrity. The operational role of this system is to enable precise motion transfer, crucial for successful intubation, particularly in challenging anatomical conditions.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects in the field of tracheal tubes by integrating a camera apparatus for visualization, which is not present in the Compared invention. This feature enhances the precision of tube placement, particularly in the bronchial stems, and allows for real-time monitoring during intubation. The multi-lumen design with unequal lengths and the ability to provide independent ventilation to each lung further distinguish the Subject from the Compared invention, which focuses on general intubation with mechanical control for positioning. The Subject's design addresses the mechanical challenge of ensuring correct placement in both the trachea and bronchus, leveraging the camera for improved accuracy. In contrast, the Compared invention's mechanical control system, while innovative for general intubation, does not offer the same level of visualization or specialized ventilation capabilities. The Subject's approach to force distribution and energy efficiency is tailored to the specific needs of bronchial intubation, whereas the Compared invention's design focuses on general tracheal intubation with an emphasis on mechanical manipulation. The Subject's potential impact lies in its ability to improve patient outcomes in complex intubation scenarios, while the Compared invention offers a more general solution for intubation challenges.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims and the endotracheal tube in the Compared claims both pertain to medical devices used for ventilation and airway management, but they exhibit distinct differences in design and functionality. The Subject's tracheal tube features dual ventilation lumens, with one lumen specifically designed to align with the upper bronchus and includes a camera for visualization, which is not present in the Compared's endotracheal tube. The Compared's endotracheal tube focuses on flexibility and control, with features like diametric notches, membranous wraps, and a lever system for bi-directional movement of the tube's distal end, which are not mentioned in the Subject's claims. The Subject's claims emphasize the integration of a camera and specific lumen configurations for ventilation, while the Compared's claims focus on the structural and operational control of the tube, including the use of controlling wires and a bite block. The methodologies and designs differ significantly, with the Subject's tracheal tube aimed at providing visual feedback and targeted ventilation, and the Compared's endotracheal tube designed for enhanced maneuverability and positioning within the trachea. The operational roles also differ, with the Subject's device focusing on energy conversion for ventilation and the Compared's device on motion transfer for positioning. The underlying functions of the Subject's device involve energy conversion for ventilation and visual monitoring, while the Compared's device focuses on motion transfer for precise placement. Essential components in the Subject's device include dual lumens, a camera, and an opening, whereas the Compared's device includes a flexible tube, notches, membranous wraps, and a lever system. Core interactions in the Subject's device involve the camera's field of view through the opening and the ventilation through the lumens, while in the Compared's device, interactions involve the control of the tube's position via the lever and wires. The internal dynamics of the Subject's device relate to the flow of air and visual data, while the Compared's device involves the mechanical movement of the tube. The practical applications of the Subject's device are in scenarios requiring visual confirmation of tube placement and targeted ventilation, such as in critical care settings, whereas the Compared's device is applicable in situations requiring precise control over tube placement, such as in surgical or emergency intubations.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.9473 suggests a potential for overlap, but upon detailed analysis, the overlap between the Subject's tracheal tube and the Compared's endotracheal tube is minimal. The Subject's focus on dual lumens with a camera for visualization and specific ventilation configurations does not align with the Compared's emphasis on tube flexibility, control mechanisms, and structural enhancements for positioning. The methodologies, designs, and operational roles of the two devices are distinct, with the Subject's device centered on energy conversion for ventilation and visual monitoring, and the Compared's device focused on motion transfer for precise tube placement. The underlying functions, essential components, core interactions, and internal dynamics further highlight the differences, indicating that the overlap is low despite the high claim\_score.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US11056020B2**Method, system, and apparatus for modeling a human trachea  
**Inventor: OZGA WILLIAM  
Assignee: OZGA WILLIAM  
Priority Date: 11-05-2018  
Publication Date: 07-06-2021  
CPC: G09B23/28  
IPV™ Rating: 6.899  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/187-765-397-108-622/frontpage?l=en](https://www.lens.org/lens/patent/187-765-397-108-622/frontpage?l=en)

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The tracheal tube described in the 'Compared' invention (A61M16/0486) is designed for intubation and ventilation of a patient's lungs, specifically for use in thoracic surgery where independent ventilation of each lung is required. It features a double-lumen structure with a camera apparatus integrated for visualization during placement, particularly into the bronchial stems. The primary function from a mechanical engineering perspective involves ensuring an airtight seal within the trachea and a patient's bronchus, allowing for precise control of ventilation and the ability to isolate one lung from the other during surgical procedures.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between the Subject and Compared, there is a low possibility of overlap between the tracheal tube and the anatomical model. The Subject's tracheal tube focuses on the operational role of energy conversion and motion transfer for patient care, specifically in respiratory therapy and surgery, while the Compared's anatomical model focuses on load-bearing capacity and motion transfer for educational purposes in medical training. The potential commercial impact of the Subject's tracheal tube lies in its ability to improve patient care through enhanced ventilation and monitoring, potentially increasing its demand in healthcare settings. In contrast, the Compared's anatomical model's commercial impact would be in the educational sector, providing a tool for training medical professionals in tracheostomy procedures and understanding tracheal complications.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concept of the 'Compared' invention revolves around the mechanical design of a double-lumen tracheal tube with unequal lengths, where one lumen terminates in the tracheal airway and the other extends into a bronchial stem. The underlying function includes the ability to independently ventilate each lung, which is facilitated by the airtight seals provided by cuffs around the lumens. Essential components include the first and second ventilation lumens, cuffs for sealing, and an integrated camera for visualization. The core interactions involve the interaction between the tube and the patient's respiratory system, ensuring proper placement and function. Internally, the dynamics involve the flow of air through the lumens, controlled by the cuffs and the structural integrity of the tube to maintain its position and function during use. The mechanical system's operational role is to facilitate energy conversion (air pressure to ventilation) and motion transfer (airflow through the lumens), crucial for its application in thoracic surgery.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The 'Subject' invention focuses on educational and training applications, providing a model that simulates various tracheal conditions and allows for the practice of airway management. In contrast, the 'Compared' invention is a functional medical device designed for actual patient use, with features like integrated cameras and double-lumen design for independent lung ventilation. The novel aspects of the 'Subject' include its ability to simulate abnormal airway anatomy and demonstrate the effects of varying airflows, which are not addressed by the 'Compared' invention. The 'Compared' invention's novelty lies in its integrated visualization system and the mechanical design for precise placement and function in thoracic surgery. There is minimal overlap in methodologies, designs, or architectures between the two inventions, as they serve different purposes and operate in different domains. The 'Subject' invention does not involve mechanical control systems, dedicated hardware logic, or circuitry, which are central to the 'Compared' invention's operation. The design approaches and protocols for the 'Subject' focus on educational simulation, while those for the 'Compared' focus on medical functionality and patient safety.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims focuses on a medical device designed for ventilation and monitoring within the respiratory system. It includes dual ventilation lumens, with the second lumen being longer and having an opening and a camera for visualization. The tracheal tube's design aims to facilitate ventilation and provide visual feedback of the respiratory tract, particularly the upper bronchus. The camera's placement and the lumens' configuration suggest a focus on improving patient care through enhanced monitoring and ventilation efficiency. The tracheal tube's operational role involves energy conversion (ventilation) and motion transfer (airflow), with its purpose within the context of medical care, specifically in respiratory therapy and surgery. The practical applications include use in intensive care units, operating rooms, and emergency medical settings.  
  
In contrast, the Compared claims describe an anatomical model designed for training and simulation purposes. This model simulates the trachea and related structures, including artificial skin, foam material, and airway obstructive elements to mimic real-life tracheal conditions and complications. The model's design is intended for educational and training purposes, allowing medical professionals to practice tracheostomy procedures and understand various tracheal complications. The operational role of this model involves load-bearing capacity (simulating the trachea's structure) and motion transfer (simulating airflow through the trachea). Its purpose is within the context of medical education and training, with practical applications in medical schools, training centers, and workshops.  
  
The similarities between the Subject and Compared claims lie in their focus on the tracheal region, but their methodologies, designs, and purposes differ significantly. The Subject's tracheal tube is a functional medical device for patient care, while the Compared's anatomical model is a training tool. The Subject's claims detail specific components like dual lumens, cameras, and cuffs, which are not present in the Compared's model. The Compared's claims focus on simulating anatomical structures and conditions, which are not directly related to the operational components of the Subject's tracheal tube. The underlying functions of the Subject involve direct patient care through ventilation and monitoring, whereas the Compared's functions are educational, simulating tracheal conditions for training purposes. The essential components of the Subject include ventilation lumens and a camera, while the Compared includes a simulated trachea, artificial skin, and obstructive elements. The core interactions in the Subject involve airflow and visual feedback, while in the Compared, they involve simulating tracheal conditions and procedures. The internal dynamics of the Subject focus on efficient ventilation and monitoring, while the Compared focuses on realistic simulation of tracheal anatomy and complications.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.899 suggests a potential for overlap between the Subject and Compared claims. However, upon detailed analysis, the overlap is found to be minimal. The Subject's tracheal tube is a functional medical device designed for patient care, focusing on ventilation and monitoring, while the Compared's anatomical model is designed for educational and training purposes, simulating tracheal conditions. The methodologies, designs, and purposes of the two sets of claims are distinct, with the Subject focusing on operational components and the Compared on anatomical simulation. The essential components, core interactions, and internal dynamics of the two sets of claims differ significantly, indicating little to no overlap in their practical applications and intended use.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: EP3049138B1**ENDOTRACHEAL TUBE  
**Inventor: DHARA SASANKA SEKHAR  
Assignee: NAGA WIRE TRACKING TRACHEAL TUBE PTY LTD  
Priority Date: 09-23-2013  
Publication Date: 12-09-2020  
CPC: A61M16/04  
IPV™ Rating: 6.8431  
Inferred Equivalence: Low**

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The Compared invention, classified under CPC A61M16/04, is designed to facilitate wire-guided intubation, allowing for the safe and effective insertion of an endotracheal tube into a patient's trachea. From a mechanical engineering perspective, the primary function involves guiding a flexible tube through the airway path using a guide wire or similar device, ensuring minimal trauma and efficient oxygen delivery during intubation procedures. The tube's design focuses on flexibility and adaptability to anatomical variations, aiming to reduce complications such as airway obstruction or tissue damage.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between the Subject and Compared, there is a low possibility of overlap between the two patents. The Subject's focus on a dual-lumen tracheal tube with integrated visual monitoring capabilities for ventilation and ongoing respiratory care contrasts with the Compared's focus on a single-lumen endotracheal tube designed for wire-guided intubation, emphasizing material flexibility and structural integrity for the initial intubation process. The operational roles, underlying functions, essential components, core interactions, and internal dynamics of the two patents are distinct, leading to different applied contexts and practical applications. The potential commercial impact of the Subject patent lies in advanced respiratory care and diagnostics, potentially revolutionizing how medical professionals monitor and treat respiratory conditions. In contrast, the Compared patent's commercial impact would be in improving the safety and efficiency of intubation procedures, particularly in emergency and surgical settings.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention revolve around the mechanical system's ability to navigate the complex anatomy of the human airway. The underlying functions include the use of a flexible material in the tube's sidewall to follow the airway path, reinforced sections to prevent kinking, and a non-reinforced, deformable bevelled end to traverse the laryngeal inlet. Essential components include the main lumen for oxygen delivery, a proximal end for connection to a breathing circuit, and a distal end designed for insertion. Core interactions involve the tube's interaction with the guide wire, ensuring smooth railroading, and the tube's ability to conform to the airway's shape. Internal dynamics focus on maintaining an unobstructed airway and minimizing pressure on tissues during insertion, which is critical for patient safety and effective intubation.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects in the field of tracheal intubation by integrating a camera system within a multi-lumen endobronchial tube, which significantly enhances the precision and safety of bronchial intubation. This differs from the Compared invention, which focuses on wire-guided intubation without such visualization aids. The Subject's design includes a double-lumen structure with unequal tube lengths, allowing for independent lung ventilation, a feature not present in the Compared invention. The integration of electronic components like cameras and LEDs for real-time visualization represents a significant advancement in managing intubation, particularly in challenging anatomical scenarios. The mechanical underpinnings of the Subject invention focus on ensuring an airtight seal and precise placement, which are critical for patient outcomes. In contrast, the Compared invention's mechanical design emphasizes flexibility and adaptability to reduce trauma during intubation. The Subject's approach to visualization and independent ventilation sets it apart, offering potential advantages in complex medical procedures.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims features a dual-lumen design with a camera and an opening in the second ventilation lumen, aimed at facilitating ventilation and visual monitoring within the respiratory system. The camera's placement and the opening's configuration suggest a focus on improving visibility and access to the upper bronchus, which is crucial for medical procedures involving the lungs. The tracheal tube's design includes various configurations for the camera, such as being embedded in the wall or within an annular collar, and additional features like cuffs, light emitting diodes, and fluid delivery systems to enhance functionality and maintenance. The Compared claims detail an endotracheal tube designed for wire-guided intubation, emphasizing a flexible, reinforced side wall with a guiding channel for a guide wire. This design focuses on ease of intubation and navigation through the airway, with specific attention to the material properties and the structural integrity of the tube during the procedure. While both patents deal with respiratory tubes, the Subject's focus is on ventilation and visual monitoring, whereas the Compared's focus is on facilitating intubation. The methodologies differ significantly; the Subject uses a dual-lumen approach with visual aids, while the Compared uses a single lumen with a guide wire channel. The operational roles also diverge, with the Subject aimed at ongoing monitoring and ventilation, and the Compared aimed at the initial intubation process. The underlying functions, essential components, core interactions, and internal dynamics of the two patents are distinct, with the Subject involving complex interactions between lumens, cameras, and cuffs, and the Compared involving simpler interactions between the tube and the guide wire. In terms of applied context, the Subject is more suited to prolonged medical procedures in settings like intensive care, while the Compared is tailored for emergency or surgical intubation scenarios. The practical applications of the Subject include advanced respiratory care and diagnostics, whereas the Compared is primarily used for intubation in various medical settings.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.8431 suggests a potential for overlap between the Subject and Compared claims. However, upon detailed analysis, the overlap is found to be minimal. The Subject's claims focus on a dual-lumen tracheal tube with integrated visual monitoring capabilities, while the Compared's claims describe an endotracheal tube designed specifically for wire-guided intubation with a focus on material flexibility and structural integrity. The methodologies, designs, and operational roles of the two patents are distinct, with the Subject emphasizing ventilation and monitoring, and the Compared emphasizing ease of intubation. The underlying functions, essential components, core interactions, and internal dynamics of the two patents are different, leading to a conclusion of low overlap despite the high claim\_score.

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***Compared file: US7921847B2**Device and method for placing within a patient an enteral tube after endotracheal intubation  
**Inventor: TOTZ KENNETH A  
Assignee: INTUBIX LLC  
Priority Date: 07-25-2005  
Publication Date: 04-12-2011  
CPC: A61M16/00  
IPV™ Rating: 6.8192  
Inferred Equivalence: Low**

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The primary function of the Compared invention (A61M16/00) is to facilitate endotracheal intubation and guide the placement of an enteral tube, such as an orogastric or nasogastric tube, into the patient's esophagus. From a mechanical engineering perspective, this involves the design of an endotracheal tube with an integrated catheter that follows a partial-spiral path around the tube's exterior to direct the enteral tube into the esophagus. The system aims to minimize complications associated with traditional enteral tube placement by providing a guided path, reducing the need for manual intervention by healthcare providers.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between Subject and Compared, there is a low possibility of overlap between the two patents. The Subject's tracheal tube with a camera for visual monitoring during intubation serves a different operational role compared to the Compared's combination device designed for both ventilation and enteral access. The Subject's focus is on enhancing the intubation process through visual feedback, while the Compared's emphasis is on providing dual functionality for respiratory and nutritional support. The potential commercial impact of the Subject patent lies in improving patient safety and procedural efficiency in critical care settings, whereas the Compared patent could impact the market by offering a solution for simultaneous ventilation and enteral feeding, potentially reducing the need for multiple devices in intensive care scenarios.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve the integration of a catheter with the endotracheal tube to guide an enteral tube. The underlying functions include the catheter's ability to define a partial-spiral path around the endotracheal tube, which is crucial for directing the enteral tube into the esophagus. Essential components include the endotracheal tube itself, which defines an arcuate path for tracheal insertion, and the catheter, which has a proximal end for receiving the enteral tube and a distal end with a diagonal cut to facilitate esophageal entry. Core interactions involve the catheter's alignment with the patient's anatomy to ensure proper enteral tube placement. The internal dynamics of the system focus on the catheter's flexibility and positioning to navigate the enteral tube safely and effectively.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novelty through its integration of a camera apparatus within the tracheal tube, specifically designed for bronchial intubation. This differs from the Compared invention, which focuses on guiding an enteral tube into the esophagus. The Subject's camera allows for real-time visualization of the bronchial placement, enhancing the precision and safety of the procedure. The mechanical underpinnings of the Subject include the design of the camera's positioning and the structural integrity of the multi-lumen tube to accommodate the camera and associated electronics. In contrast, the Compared invention's mechanical focus is on the catheter's path and flexibility to guide the enteral tube. The Subject's design approach involves integrating electronic components into a medical device, which is distinct from the Compared invention's focus on mechanical guidance. Both inventions address different mechanical challenges within respiratory therapy, with the Subject aiming to improve bronchial intubation accuracy and the Compared invention focusing on reducing complications in enteral tube placement.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube described in the Subject claims features a dual-lumen design with a camera integrated into the second ventilation lumen, aimed at providing visual feedback during intubation. The camera's placement and the fenestration in the second lumen are designed to enhance visibility within the patient's bronchus. The tracheal tube's operational role focuses on ventilation and visual monitoring, with applications in critical care settings for intubation procedures. In contrast, the Compared claims detail a combination intubation device that includes an endotracheal tube and a catheter for guiding an enteral tube, with a focus on facilitating both ventilation and enteral access. The device's design emphasizes the integration of the catheter along the endotracheal tube, with various configurations to optimize the path of the enteral tube towards the esophagus. The operational role of this device extends to both respiratory support and nutritional management, applicable in intensive care scenarios where dual access is necessary. The methodologies and designs differ significantly, with the Subject focusing on visual enhancement of intubation and the Compared on dual functionality for ventilation and enteral access. The essential components, such as the camera in the Subject and the catheter in the Compared, serve distinct purposes within their respective systems. The core interactions in the Subject involve the camera's field of view through the fenestration, while in the Compared, it involves the guidance of the enteral tube through the catheter. The internal dynamics of the Subject are centered around visual feedback, whereas the Compared focuses on the mechanical guidance of tubes. Both systems are designed for use in medical settings, but their practical applications diverge based on their primary functions.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.8192 suggests a potential for overlap between the Subject and Compared claims. However, upon detailed analysis, the overlap is found to be minimal. The Subject's focus on a tracheal tube with integrated visual monitoring capabilities does not directly align with the Compared's emphasis on a combination device for both ventilation and enteral access. The methodologies, designs, and operational roles of the two systems are distinct, with the Subject's camera and fenestration serving a different purpose than the Compared's catheter and enteral tube guidance system. The essential components and core interactions further highlight the differences, as the Subject's system is designed for visual enhancement during intubation, while the Compared's system is engineered for dual access. The internal dynamics and practical applications of each system also diverge, with the Subject aimed at improving intubation procedures and the Compared at facilitating both respiratory and nutritional support. Therefore, despite the high claim\_score, the actual overlap between the claims is low due to the significant differences in their functionalities and applications.

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**Inventor: ANGEL LUIS F  
Assignee: BIO2MEDICAL INC  
Priority Date: 12-28-2007  
Publication Date: 05-04-2016  
CPC: A61M16/04  
IPV™ Rating: 6.8133  
Inferred Equivalence: Low**

[Lens: https://www.lens.org/lens/patent/088-738-095-426-964/frontpage?l=en](https://www.lens.org/lens/patent/088-738-095-426-964/frontpage?l=en)

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The primary function of the Compared invention (A61M16/04) is to facilitate endotracheal intubation for patients requiring mechanical ventilation. From a mechanical engineering perspective, this involves the design of a semi-rigid flexible plastic tube that can be inserted into the trachea to provide an air passageway for lung ventilation. The tube includes a dilatable balloon (cuff) that, when inflated, seals the trachea to prevent air backflow, ensuring effective ventilation. The mechanical system's role is to maintain an open airway and manage air pressure within the trachea, crucial for patient survival in critical care settings.

-------------------------------------------------------------------------------------------------------------------**Summary of Analysis:**

After comparing all claims between the Subject and the Compared, there is a low possibility of overlap between the tracheal tube and the airway assembly. The Subject's focus on dual ventilation and bronchial visualization with a camera contrasts with the Compared's emphasis on achieving a secure and adjustable airway seal through a diametrically expansive seal. The operational roles of the two devices are distinct, with the Subject's device intended for surgical or critical care settings for dual ventilation and monitoring, and the Compared's device aimed at scenarios requiring a secure and adjustable airway seal, such as during anesthesia or emergency airway management. The potential commercial impact of the Subject's patent may be significant in specialized medical fields requiring advanced airway management and visualization, while the Compared's patent could have a broad impact in settings where adjustable and secure airway sealing is critical.

-------------------------------------------------------------------------------------------------------------------**Description Overview:**

The core concepts of the Compared invention involve systemic principles of air pressure management and sealing within the trachea. The foundational process includes the insertion of the endotracheal tube using a laryngoscope for visualization, followed by the inflation of the cuff to create an airtight seal. Underlying functions include the conversion of external air pressure into internal pressure within the trachea, ensuring adequate ventilation. Essential components are the flexible tube, the cuff, and the inflation lumen. Core interactions occur between the cuff and the tracheal wall, where the cuff's expansion creates a seal. Internal dynamics involve the maintenance of cuff pressure to prevent leakage and ensure continuous ventilation. The mechanical system's purpose is to provide a reliable air passageway in emergency and critical care scenarios, addressing challenges such as maintaining sterility and preventing complications like pneumonia.

-------------------------------------------------------------------------------------------------------------------**Asserted Novelty and Innovation:**

The Subject invention introduces novel aspects in the field of tracheal intubation by incorporating a camera within the second ventilation lumen, which significantly enhances the precision and safety of bronchial intubation. This feature allows for direct visualization of the bronchial stem, addressing the challenge of correct placement faced by physicians. In contrast, the Compared invention relies on traditional methods of visualization, such as laryngoscopes, without integrated imaging capabilities. The Subject's design also includes a double-lumen configuration with unequal lengths, enabling independent ventilation of one lung, which is not present in the Compared invention. From a mechanical engineering perspective, the Subject's integration of electronic components and the camera system represents a significant advancement in terms of force distribution and energy efficiency, as it minimizes the need for additional external devices. The design approaches and protocols, such as the use of a camera for real-time guidance, distinguish the Subject's mechanical identity and operation from the Compared invention. Both inventions aim at the medical field, specifically respiratory care, but the Subject's innovation offers a competitive advantage in terms of precision, safety, and potential reduction in complications like pneumonia due to improved placement accuracy. The practical applications of the Subject invention extend to critical care settings where precise bronchial intubation is crucial, potentially influencing industry practices by setting new standards for intubation procedures.

-------------------------------------------------------------------------------------------------------------------**Similarities Analysis:**

The tracheal tube claims from the Subject and the airway assembly claims from the Compared both relate to medical devices used for airway management, but they differ significantly in design and functionality. The Subject's tracheal tube includes dual ventilation lumens with specific configurations for ventilation and monitoring, including a camera and an opening for visualization within the second lumen. This design focuses on providing dual ventilation paths and visual access to the bronchial area, which is particularly useful in surgical or critical care settings for monitoring and managing patient airways. The camera's placement and the use of cuffs for sealing are key components that enhance the tube's functionality in terms of visualization and isolation of different lung segments.  
  
In contrast, the Compared's airway assembly features an inner and outer tube system with a diametrically expansive seal that can be adjusted to fit the airway. This design emphasizes adaptability and sealing efficiency, with reinforcing members to facilitate the seal's movement and maintain pressure against the airway. The assembly also includes features like position marks for user guidance and apertures for fluid flow management, which are not present in the Subject's claims. The operational role of the Compared's device is centered around achieving a secure and adjustable seal within the airway, which is crucial for effective ventilation and preventing leakage.  
  
The underlying functions of the Subject's tracheal tube involve ventilation and bronchial visualization, supported by components like the camera, lumens, and cuffs. The Compared's airway assembly focuses on sealing and adaptability, with components like the diametrically expansive seal and reinforcing members playing critical roles. The core interactions in the Subject's device are between the ventilation lumens and the patient's respiratory system, while in the Compared's device, interactions occur between the inner and outer tubes and the diametrically expansive seal to adjust to the airway's size.  
  
In terms of internal dynamics, the Subject's tracheal tube involves the flow of air through dual lumens and the operation of the camera for visualization, whereas the Compared's airway assembly involves the mechanical adjustment of the seal's diameter in response to the relative movement of the tubes. The practical applications of the Subject's device are primarily in surgical and critical care settings for dual ventilation and monitoring, while the Compared's device is applicable in scenarios requiring a secure and adjustable airway seal, such as during anesthesia or emergency airway management.  
  
Overall, while both devices are used in airway management, their methodologies, designs, and operational roles are distinct, with the Subject focusing on dual ventilation and visualization, and the Compared emphasizing sealing and adaptability.

-------------------------------------------------------------------------------------------------------------------**Overlap Analysis:**

The claim\_score of 6.8133 suggests a potential for overlap, but upon detailed analysis, the overlap between the tracheal tube claims and the airway assembly claims is minimal. The Subject's claims focus on dual ventilation lumens with a camera for visualization, while the Compared's claims emphasize a diametrically expansive seal with reinforcing members for adjustable sealing. The methodologies, designs, and operational roles of the two sets of claims are fundamentally different, with the Subject's device aimed at ventilation and monitoring, and the Compared's device focused on achieving a secure and adjustable seal. The essential components, underlying functions, core interactions, and internal dynamics of the two devices are distinct, leading to little to no overlap in their practical applications within their respective contexts of use.

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