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Tortola

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(54) **APPARATUS AND METHOD FOR LAPAROSCOPIC SKILLS TRAINING**

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(22) Filed: **Aug. 24, 2011**

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(51) **Int. Cl.**
G09B 23/28 (2006.01)

(52) **U.S. Cl.**
CPC ***G09B 23/285*** (2013.01)

(58) **Field of Classification Search**
CPC G09B 23/28; G09B 23/285; G09B 23/30
USPC 434/262
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,403,191 A * 4/1995 Tuason 434/262
5,919,208 A * 7/1999 Valenti 606/232
6,659,776 B1 * 12/2003 Aumann et al. 434/262
7,594,815 B2 * 9/2009 Toly 434/262
7,802,990 B2 * 9/2010 Korndorffer et al. 434/262
7,997,903 B2 * 8/2011 Hasson et al. 434/262
8,007,281 B2 * 8/2011 Toly 434/262
2003/0032863 A1 * 2/2003 Kazakevich 600/173
2004/0033476 A1 * 2/2004 Shun 434/262
2005/0084833 A1 * 4/2005 Lacey et al. 434/262
2005/0142525 A1 * 6/2005 Cotin et al. 434/262
2007/0166682 A1 * 7/2007 Yarin et al. 434/267
2010/0081883 A1 * 4/2010 Murray et al. 600/204
2012/0196258 A1 * 8/2012 Geijsen et al. 434/262

OTHER PUBLICATIONS

"Penrose drain". thefreedictionary.com. Farlex. Retreived from the internet Jul. 12, 2015 from <url:medical-dictionary.thefreedictionary.com/Penrose+drain>.*

Korndorffer JR., et al., "Development and Transferability of a Cost-effective Laparoscopic Camera Navigation Simulator", Surgical Endoscopy and Other Interventional Techniques, Feb. 2005, vol. 19, Issue 2, pp. 161-167.

* cited by examiner

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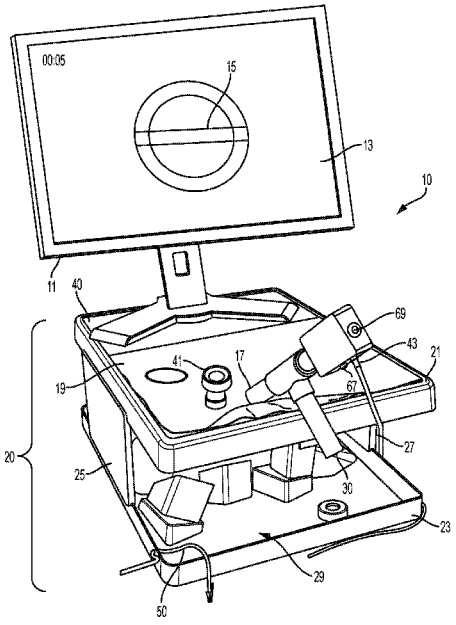
(57) **ABSTRACT**

A laparoscopic trainer platform assembly includes: a training platform; a base, configured to accommodate at least one target array; the target array including a planar surface upon which are disposed a plurality of protruding targets oriented at various angles on the base; a left side support for supporting the training platform on the base; and a right side support for supporting the training platform on the base.

25 Claims, 16 Drawing Sheets



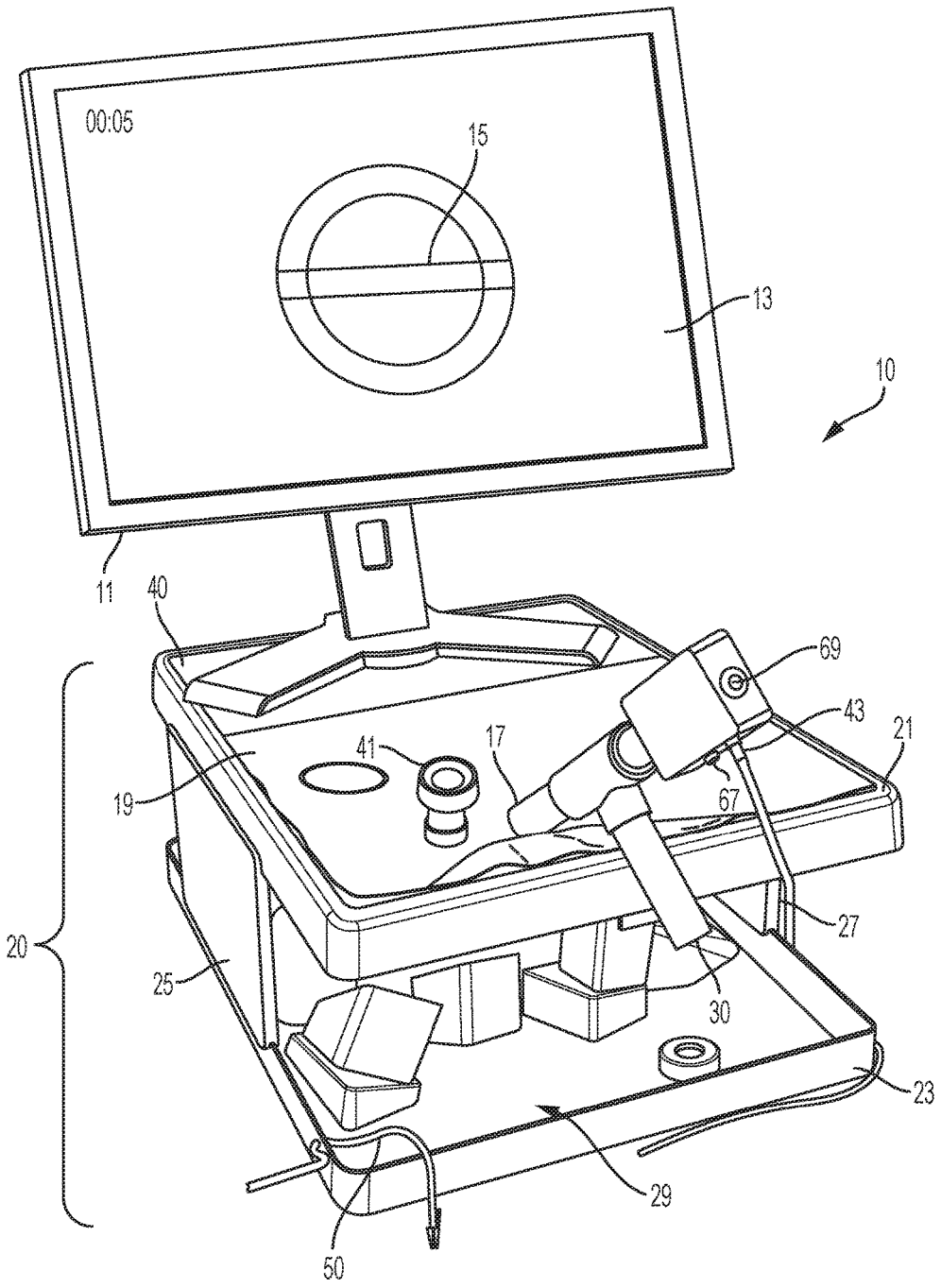


FIG. 1

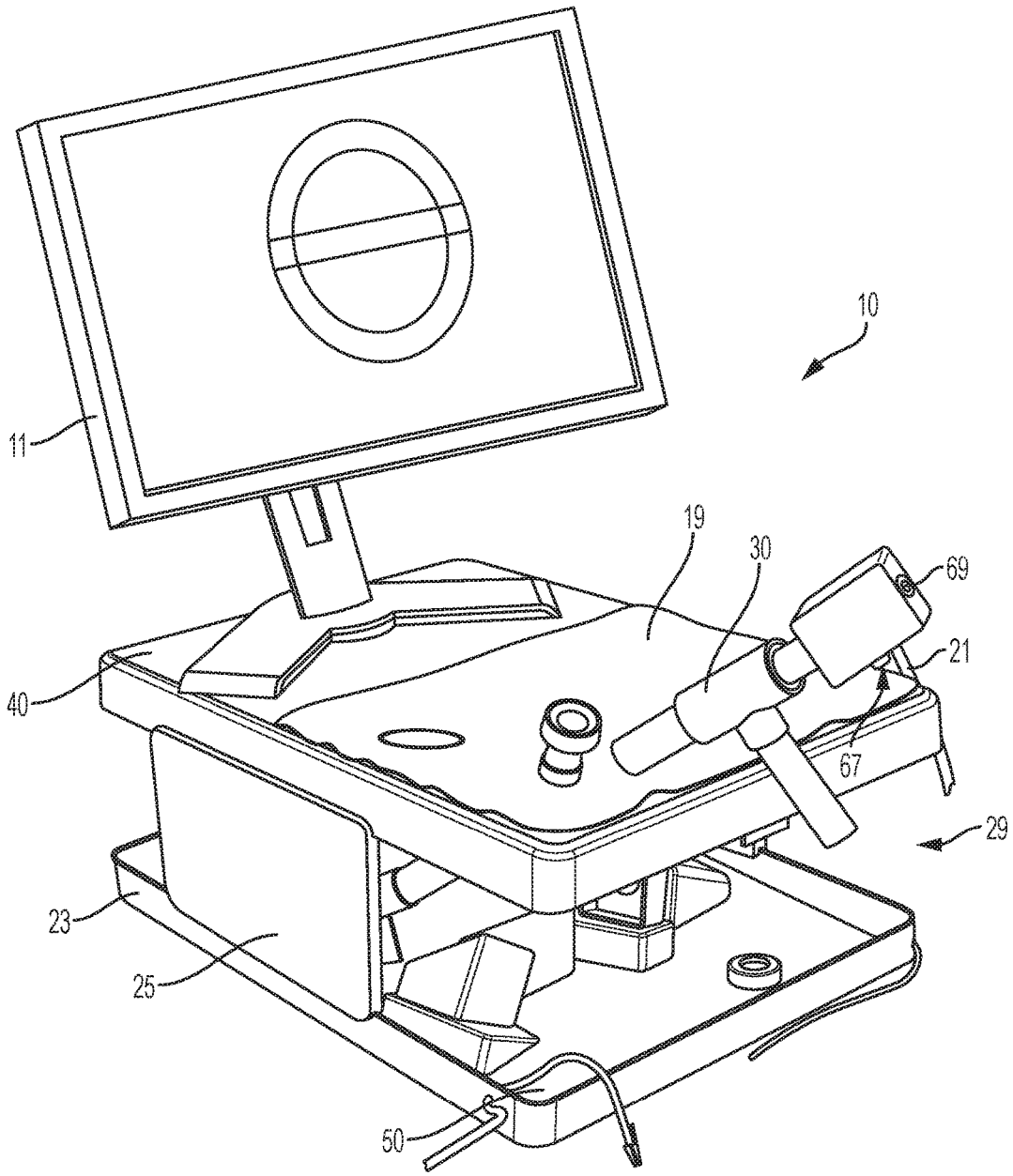


FIG. 2

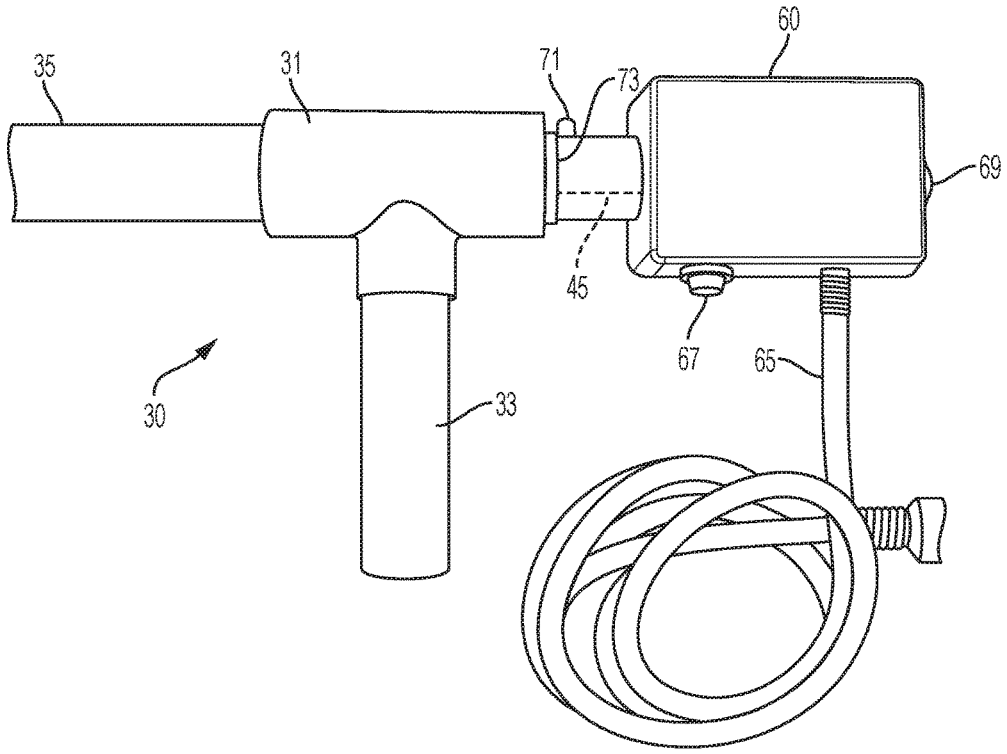


FIG. 3

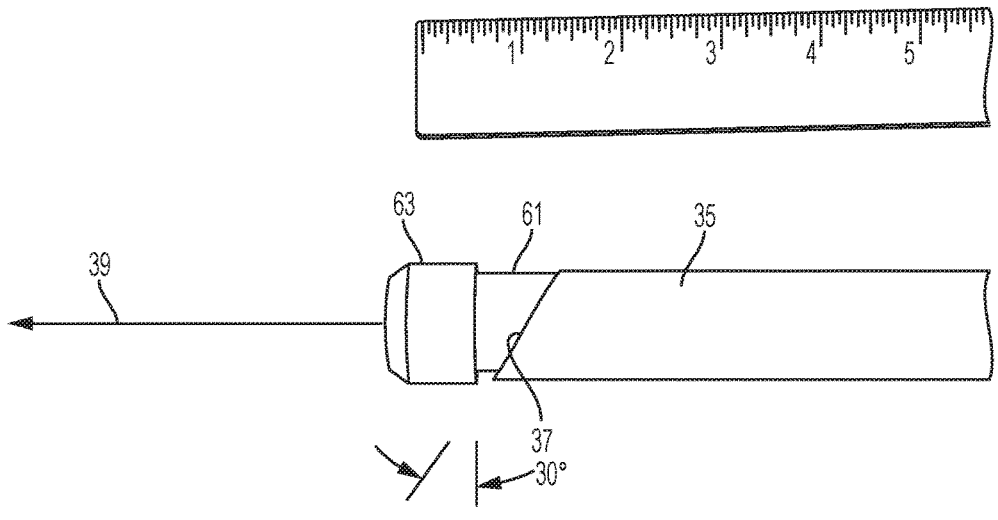


FIG. 4

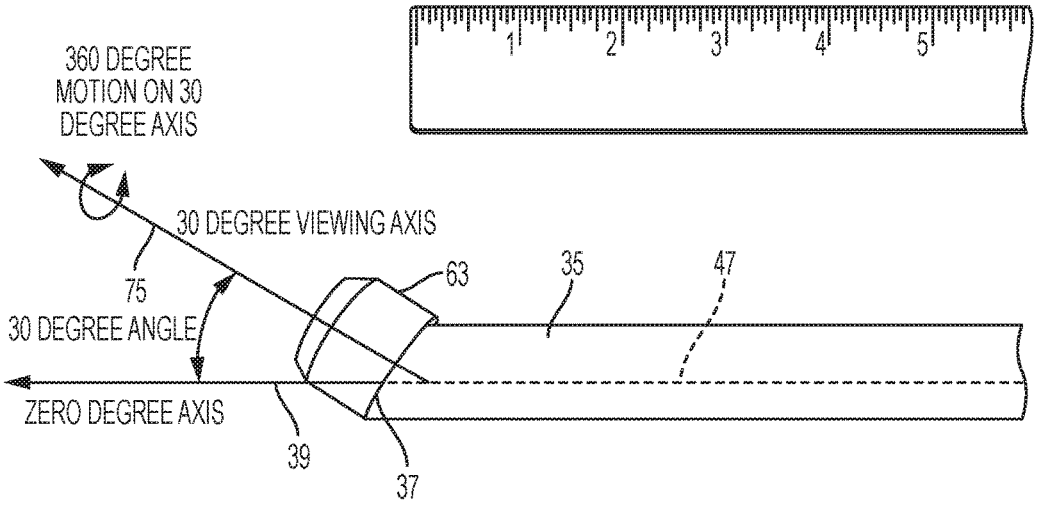

360 DEGREE
MOTION ON 30
DEGREE AXIS
1
2
3
4
5
30 DEGREE VIEWING AXIS
75
63
35
47
30 DEGREE ANGLE
ZERO DEGREE AXIS
39
37

FIG. 5

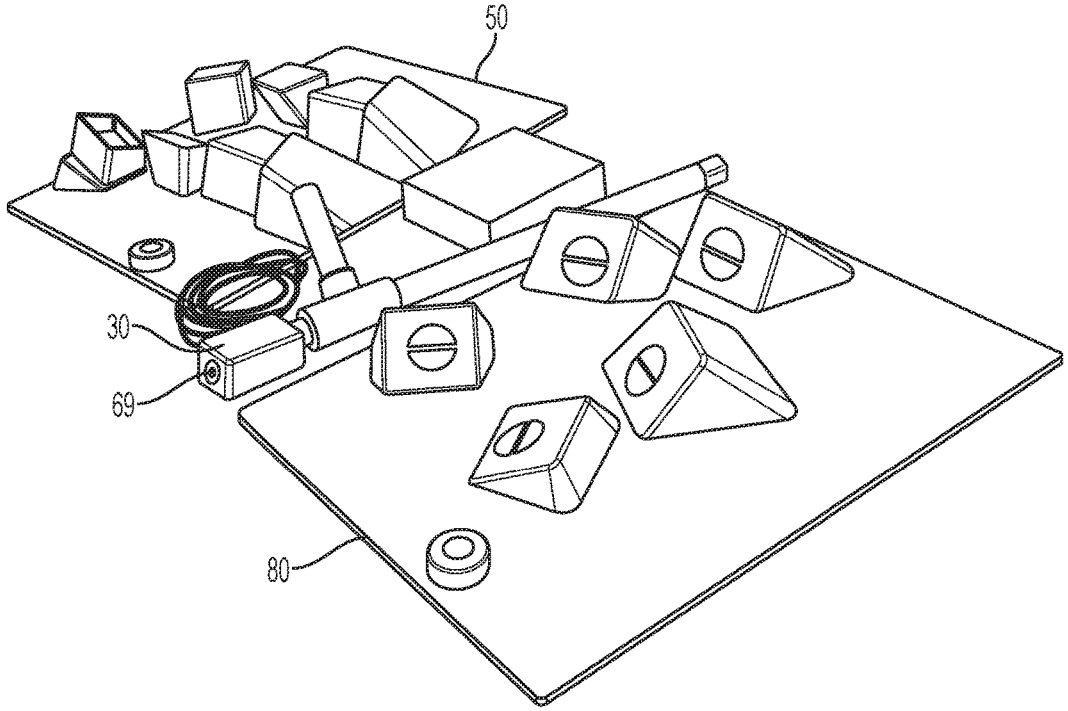

50
30
69
80

FIG. 6

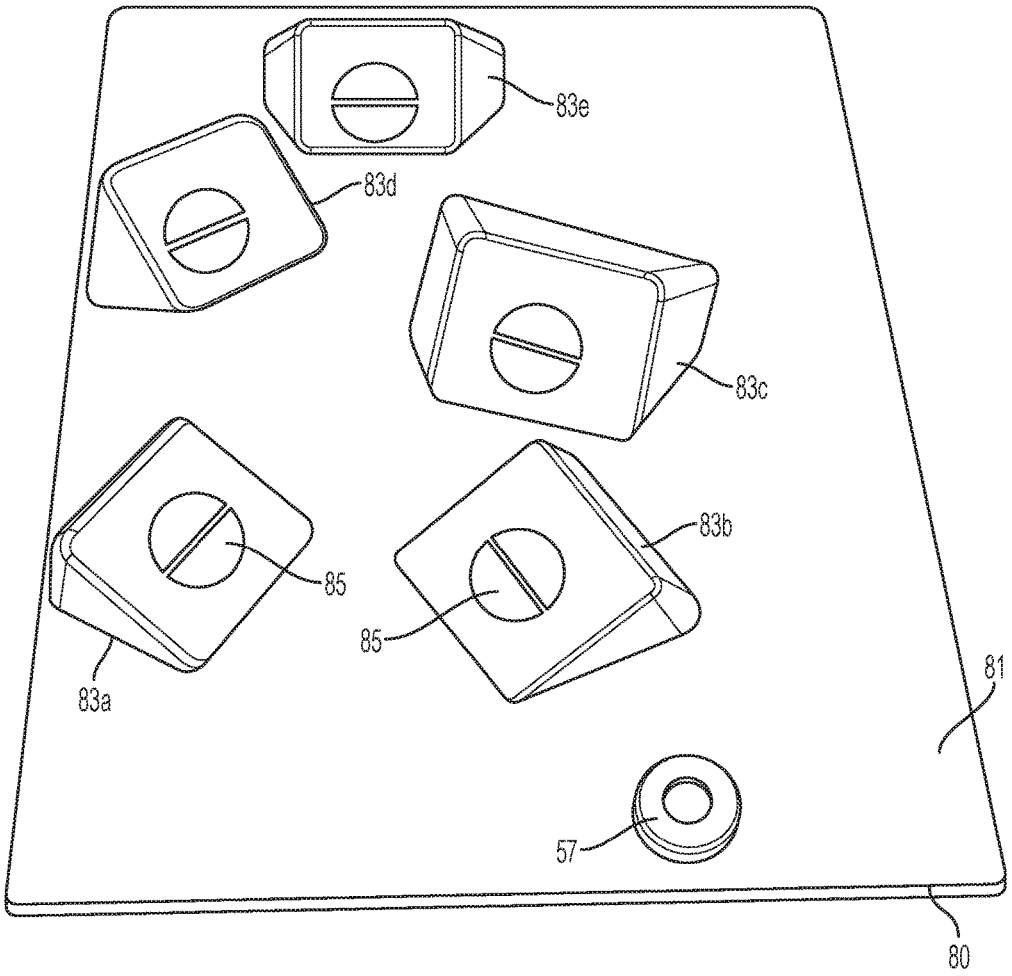


FIG. 7

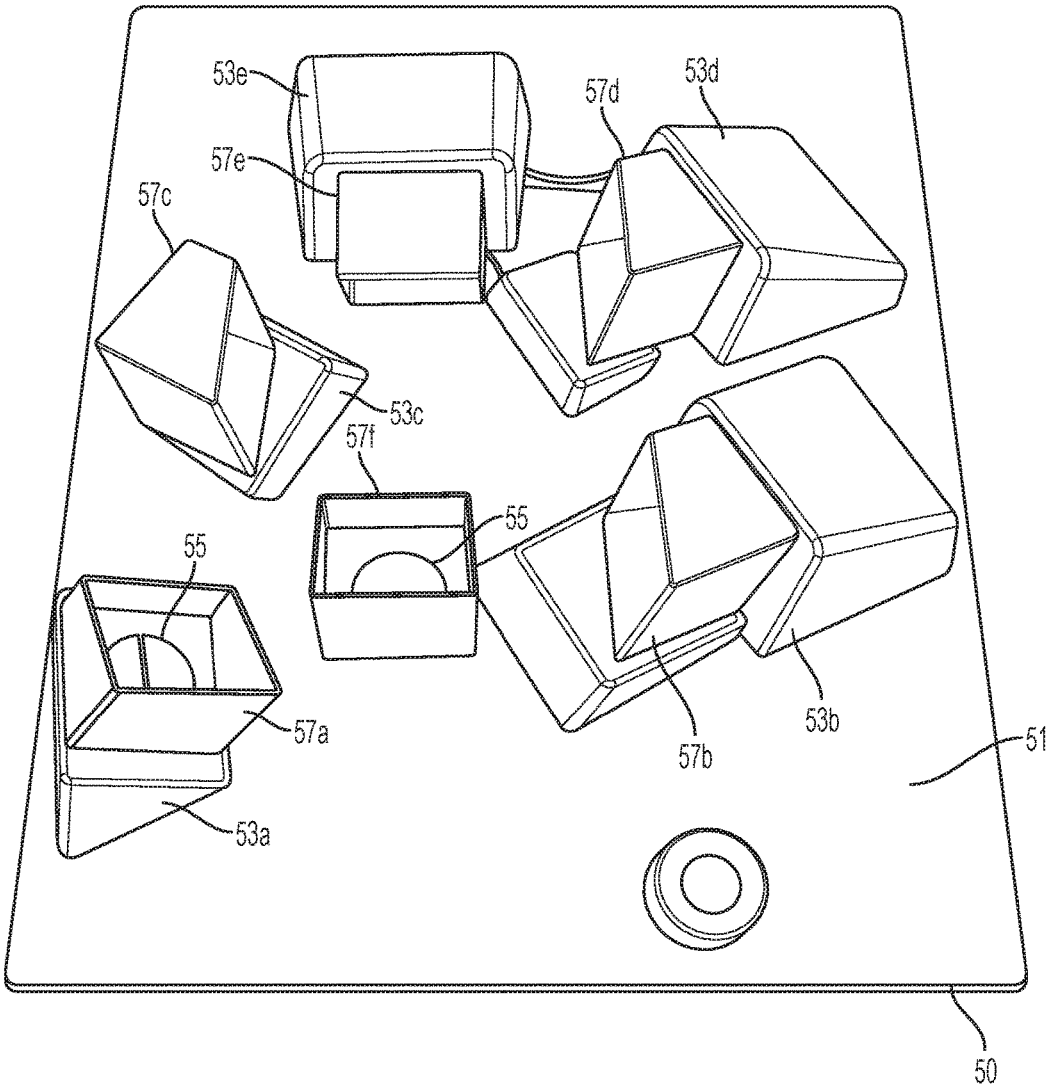


FIG. 8

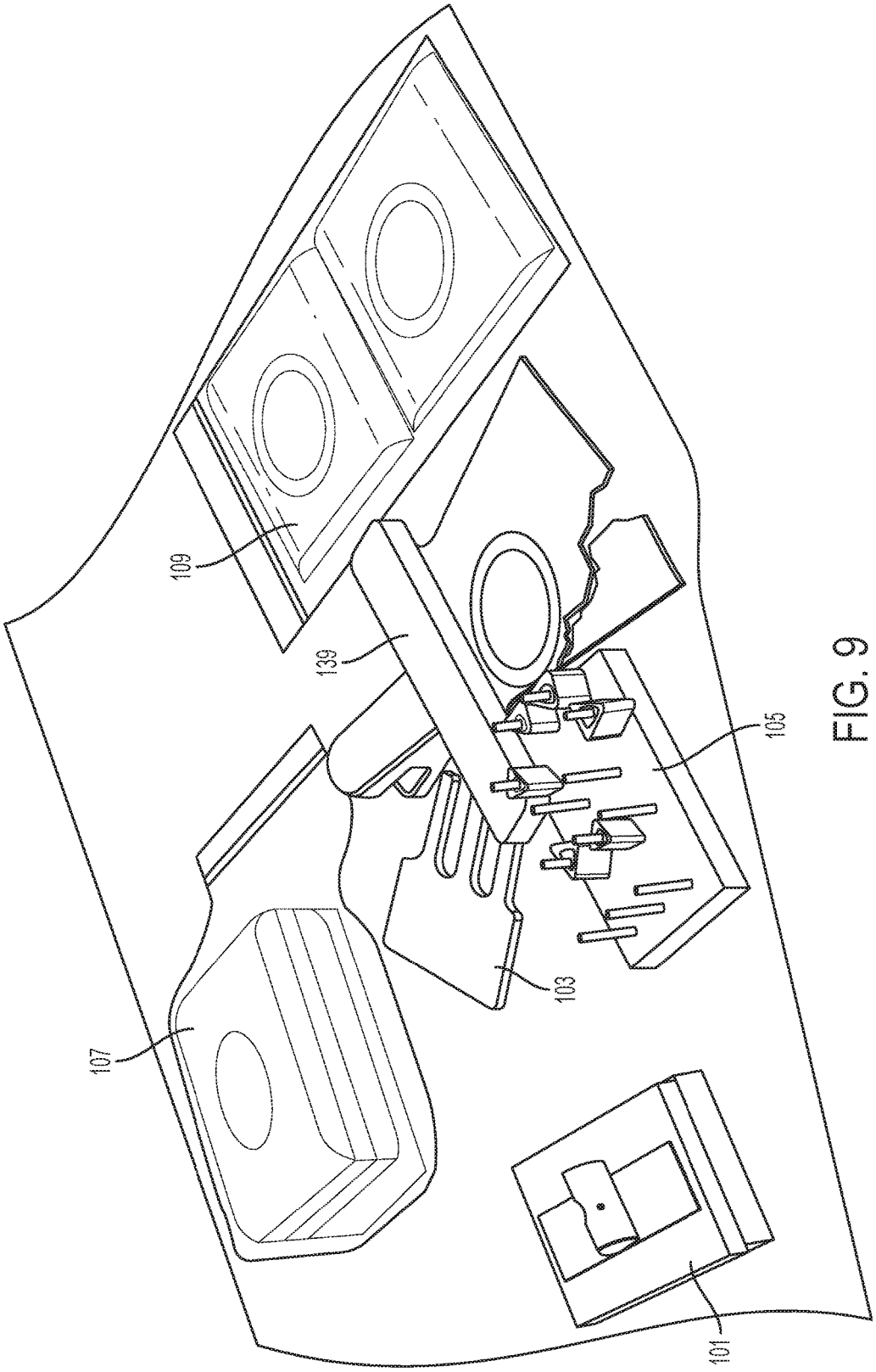


FIG. 9

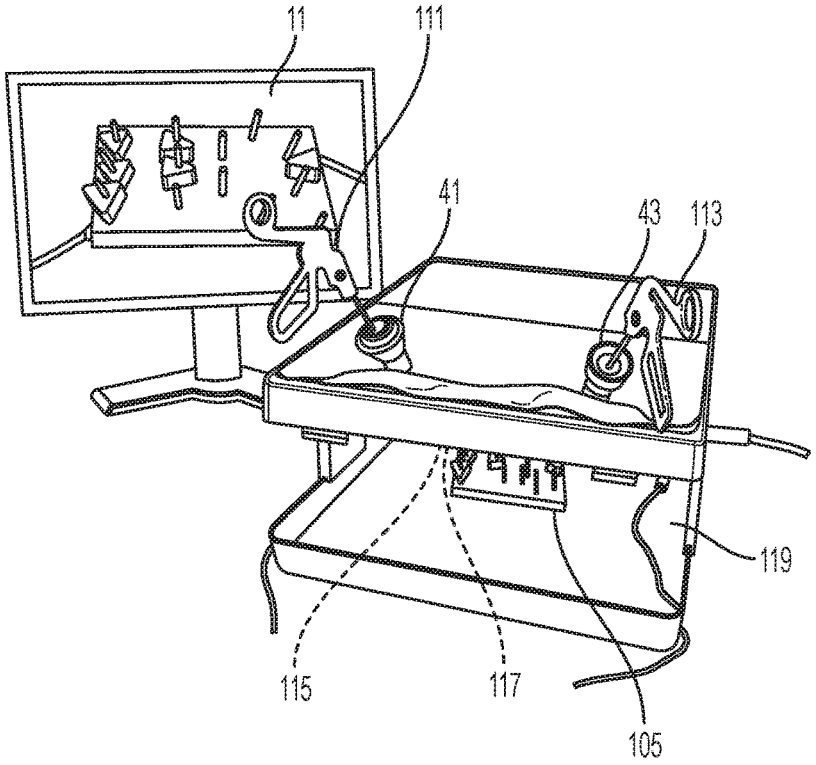


FIG. 10

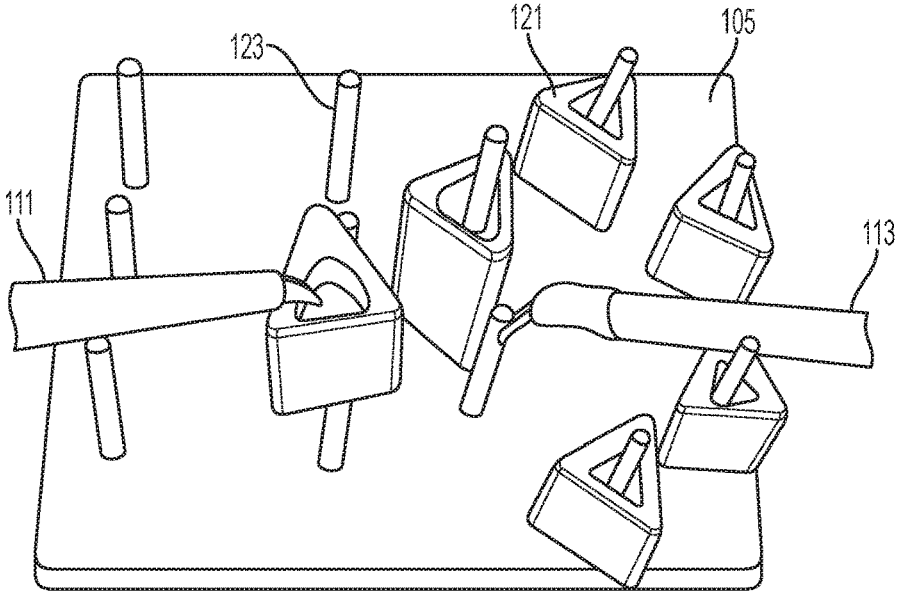


FIG. 11

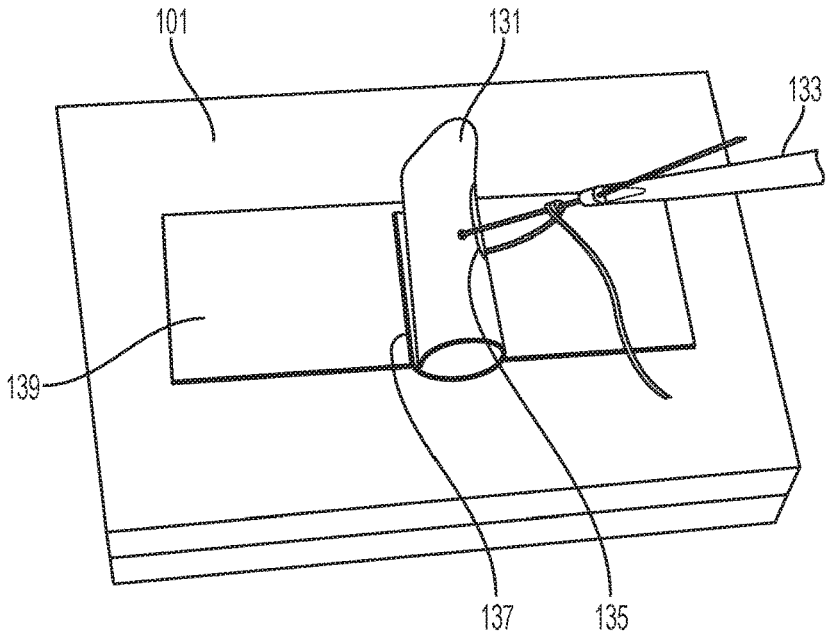


FIG. 12

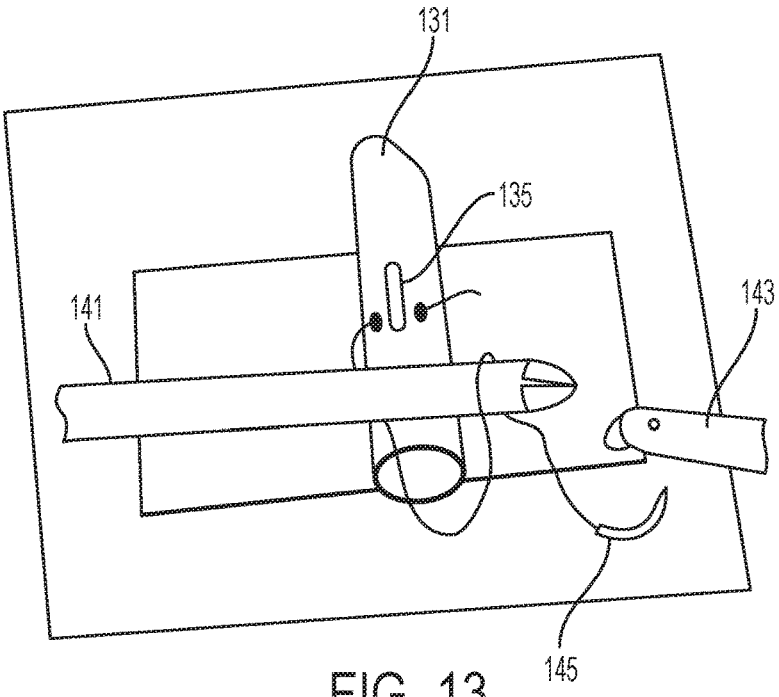


FIG. 13

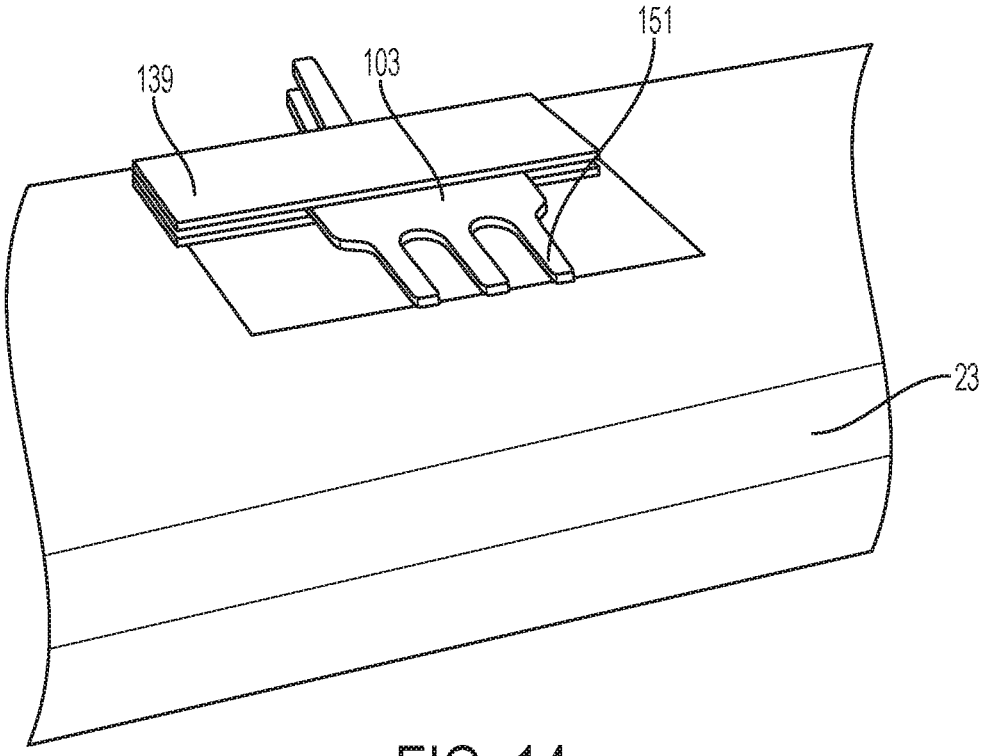


FIG. 14

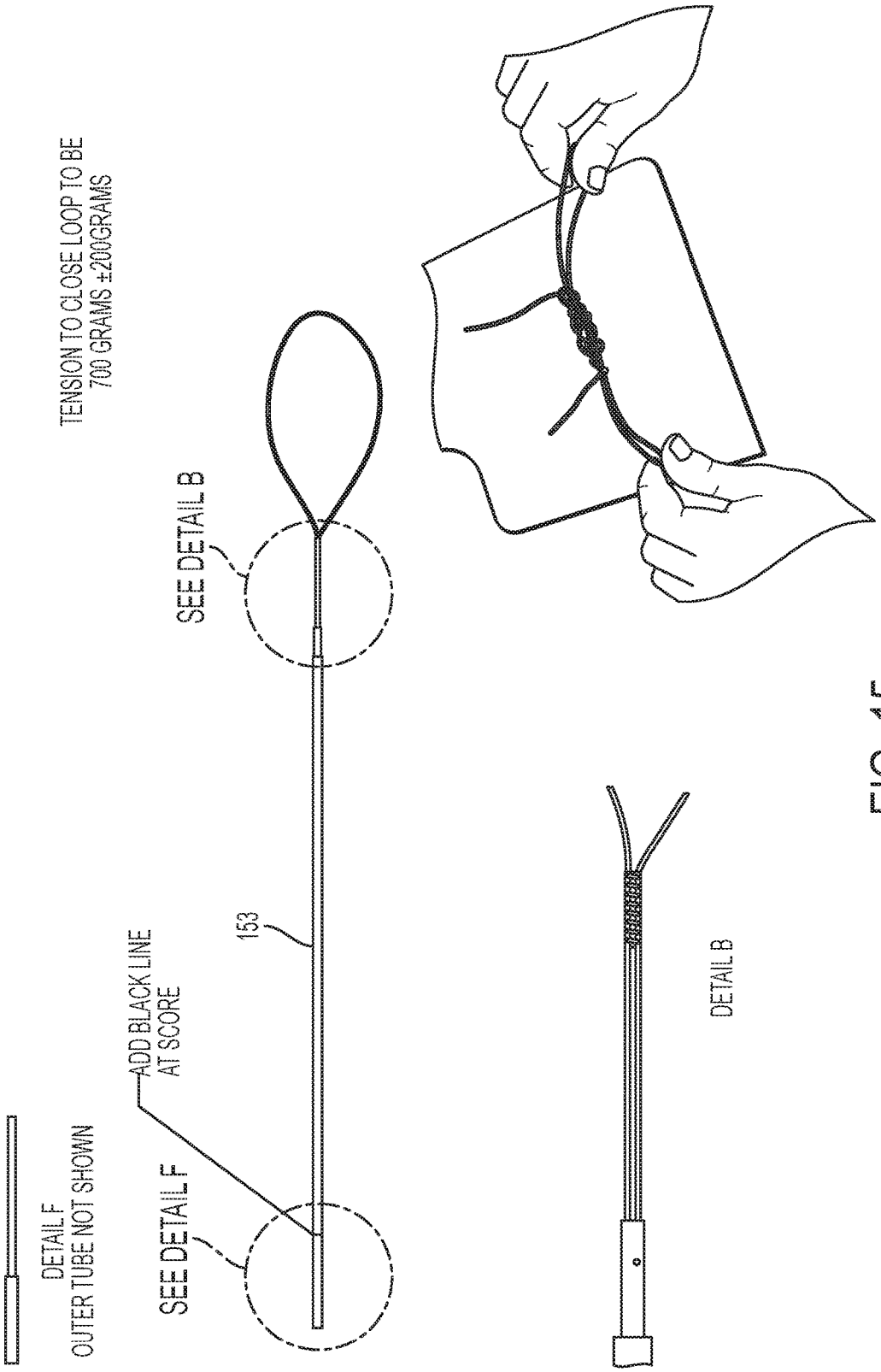

TENSION TO CLOSE LOOP TO BE
700 GRAMS ±200GRAMS
SEE DETAIL B
153
ADD BLACK LINE
AT SCORE
SEE DETAIL F
DETAIL F
OUTER TUBE NOT SHOWN
DETAIL B

FIG. 15

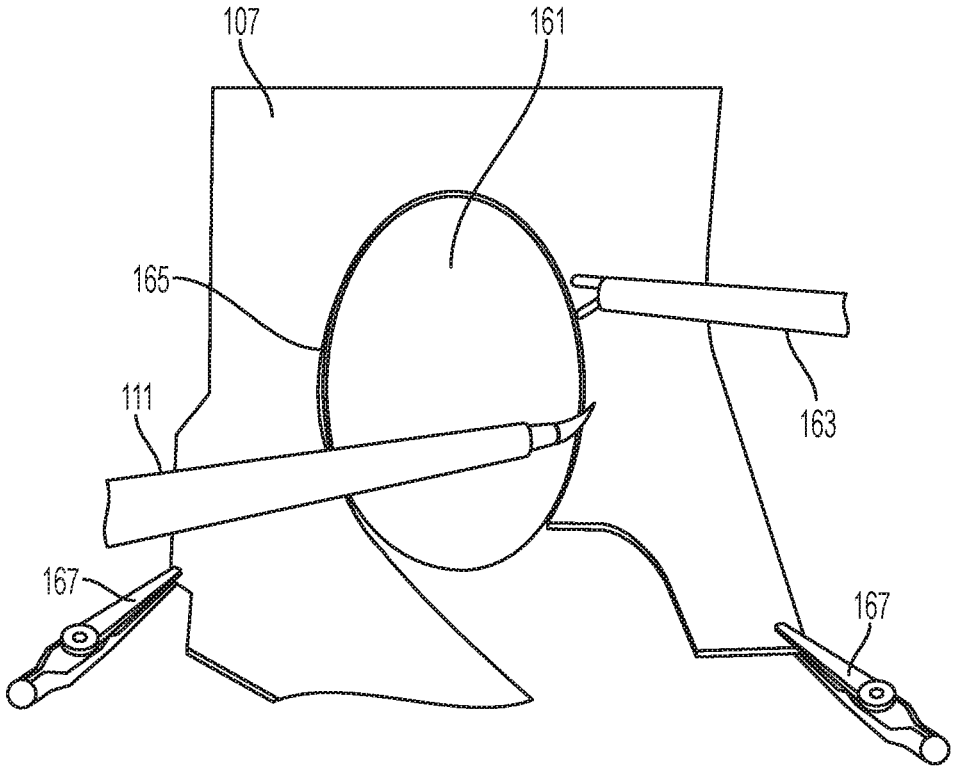


FIG. 16

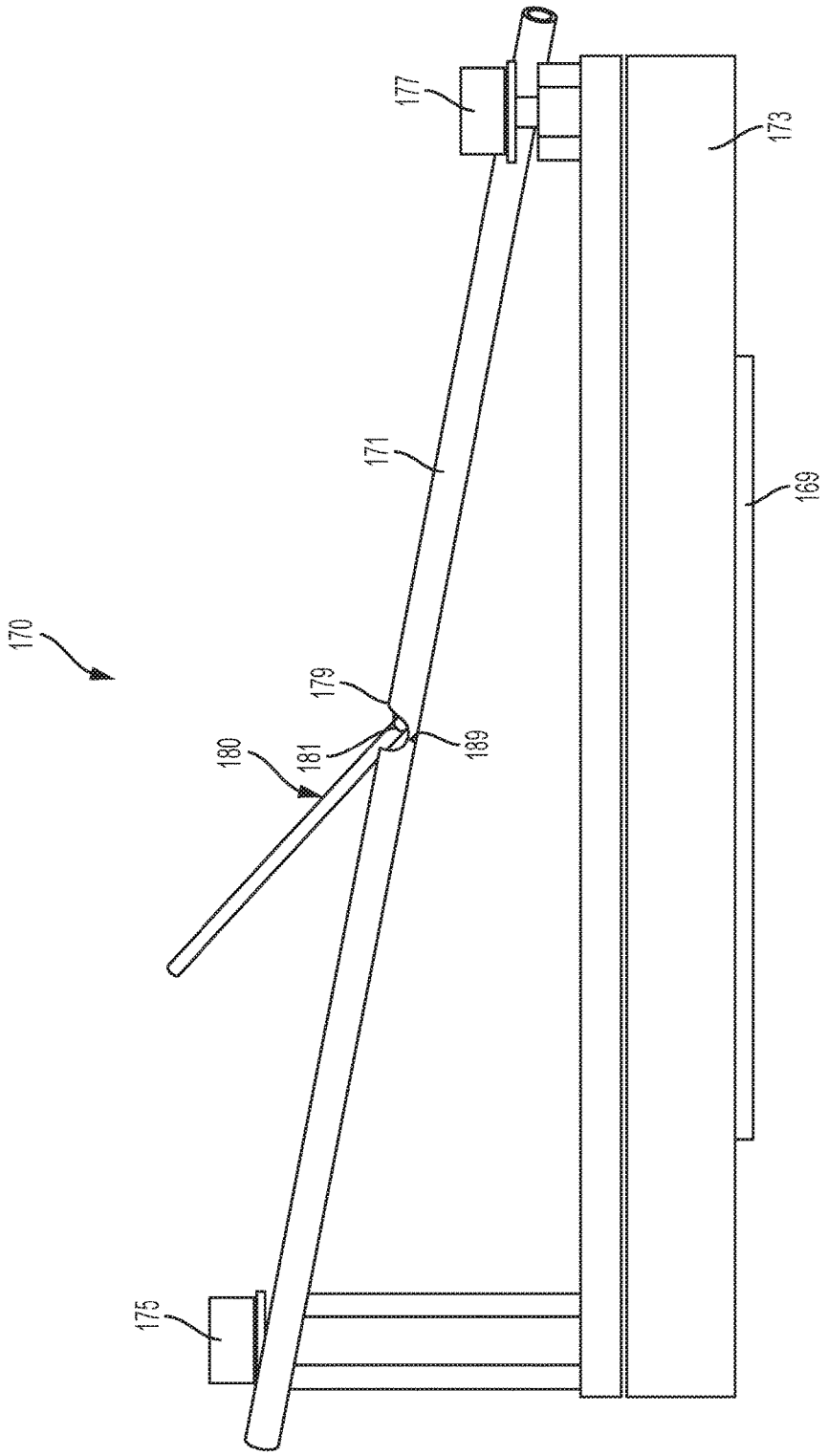


FIG. 17

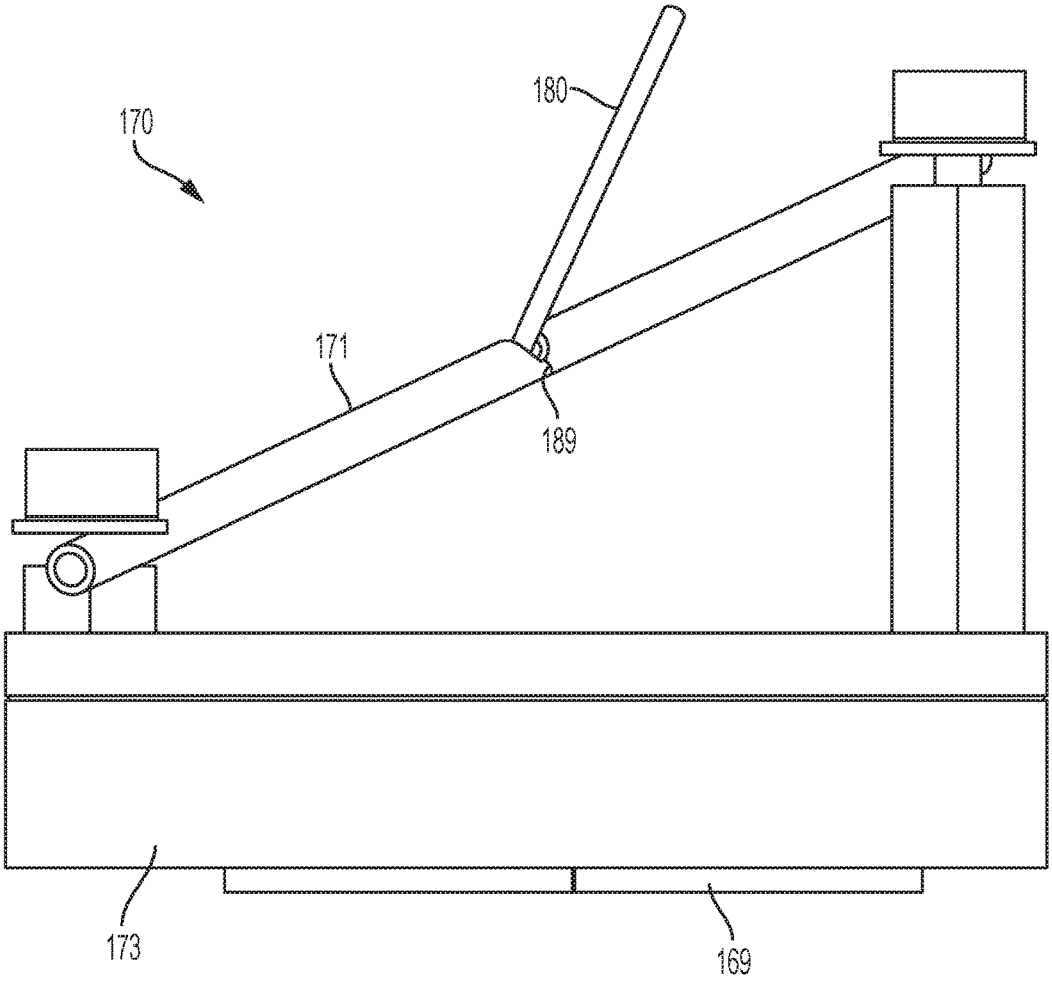


FIG. 18

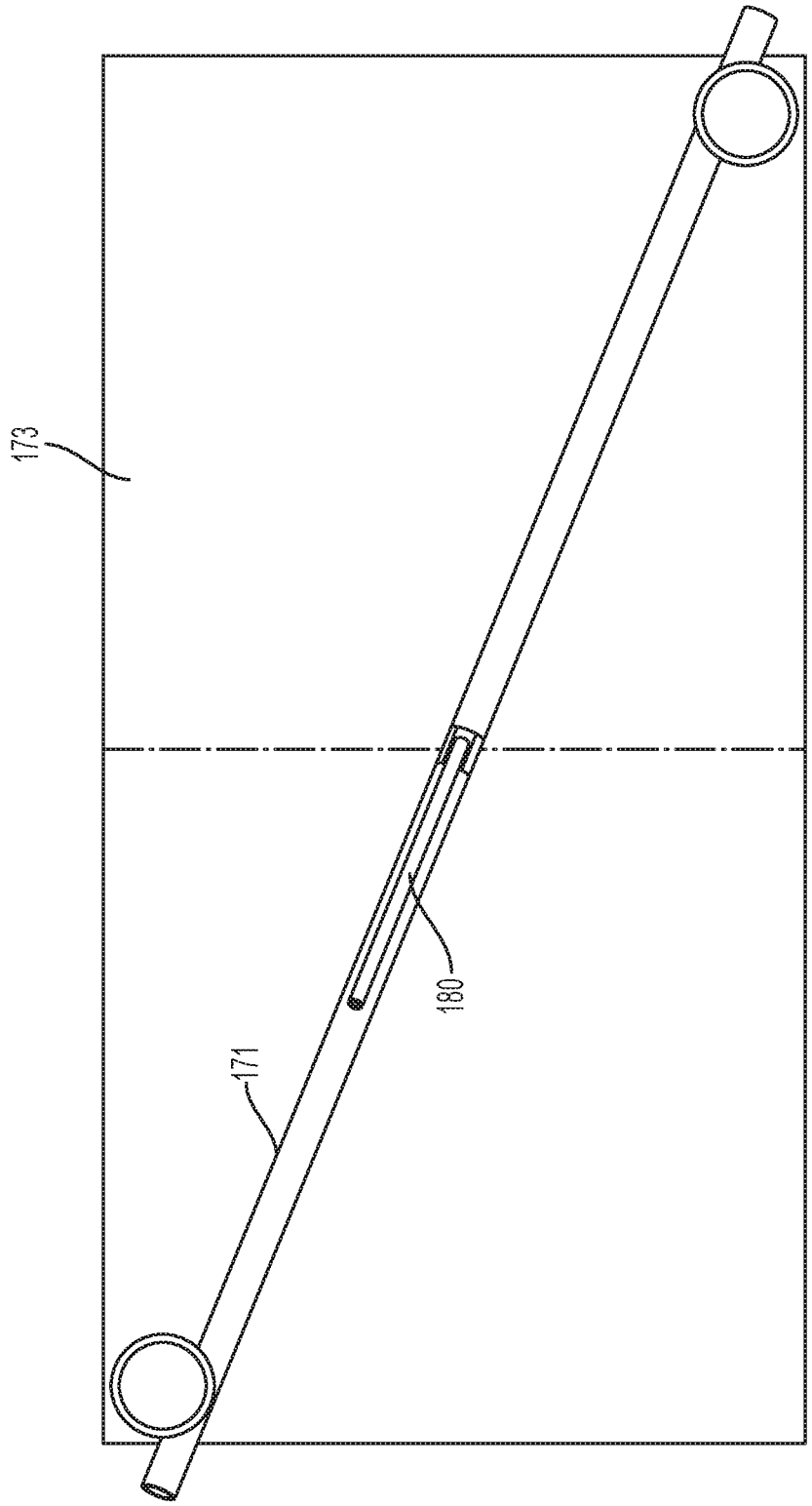


FIG. 19

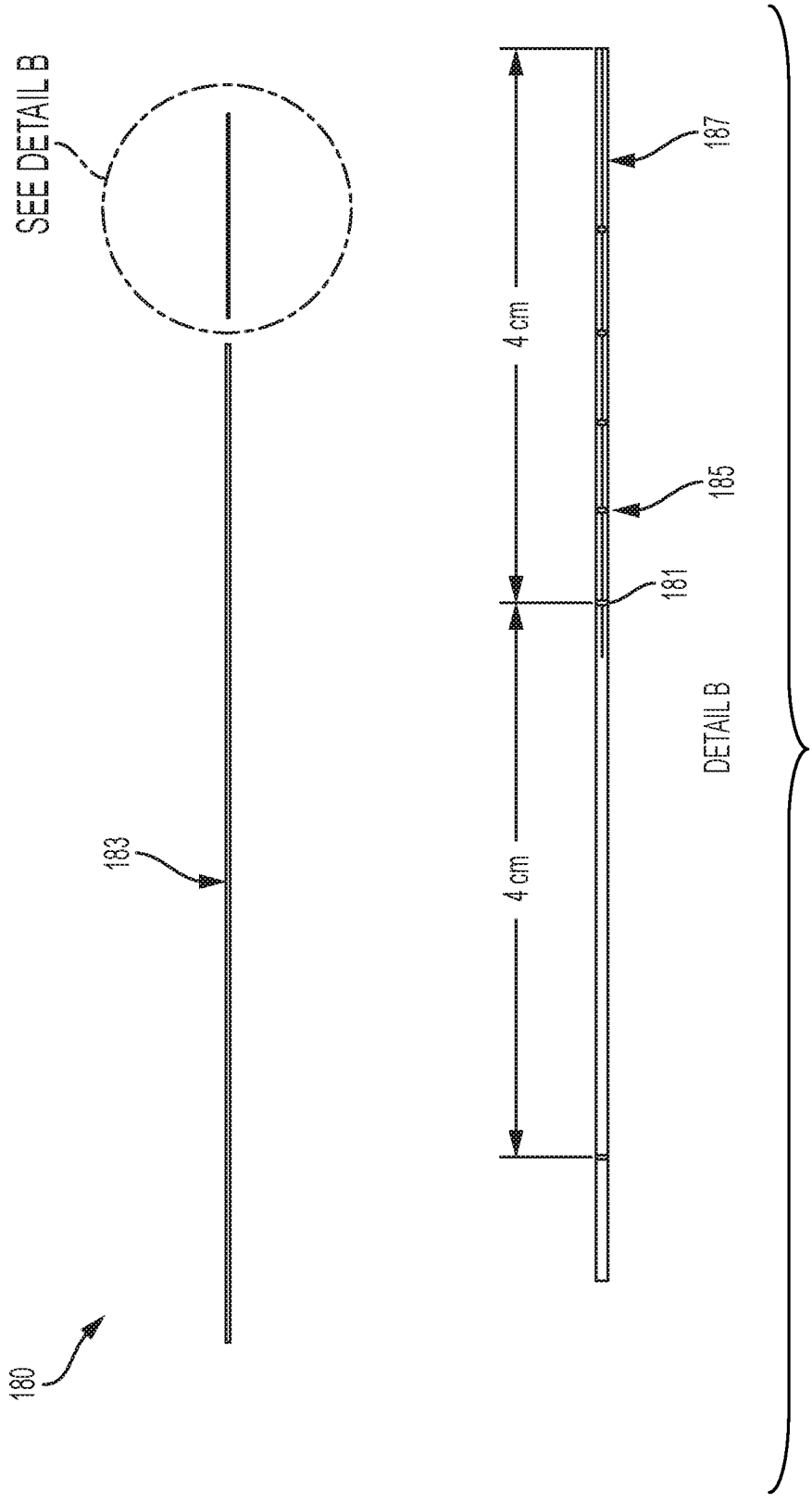


FIG. 20

APPARATUS AND METHOD FOR LAPAROSCOPIC SKILLS TRAINING

CROSS REFERENCE TO RELATED APPLICATION

The present application is related to Provisional patent application entitled "Apparatus and Method for Laparoscopic Skills Training," filed 24 Aug. 2010 and assigned filing No. 61/376,621, incorporated herein by reference in its entirety.

FIELD OF THE INVENTION

This invention relates to a system for surgeon training and, in particular, to an apparatus and method for training a surgeon in the fundamentals of laparoscopic surgery.

BACKGROUND OF THE INVENTION

The procedure of laparoscopic surgery has been in general use for over a decade. However, it has been noted that cognitive and psychomotor skills required to perform laparoscopic surgery may be inadequate among some practitioners, resulting in patient discomfort from, for example, be duct injuries. Accordingly, there is a need for a certifying examination by which a practitioner may be assessed for applicable cognitive knowledge, technical skills, and clinical judgment.

BRIEF SUMMARY OF THE INVENTION

In one aspect of the present invention, a laparoscopic skills training system comprises: a trainer platform assembly including a training platform; a base, the base configured to accommodate at least one target array; the target array including a planar surface upon which are disposed a plurality of protruding targets oriented at a plurality of angles on the base; a left side support for supporting the training platform on the base; and a right side support for supporting the training platform on the base.

In another aspect of the present invention, the laparoscopic skills training system may further comprise: an accessory kit including one or more of a suture block, an appendage, a dexterity peg board, a plurality of single-circle gauze pads, and a plurality of double-circle gauze pads.

The laparoscopic skills training system may be used in conjunction with the performance of a number of different skill sets, including: assessing competence in use of an endoscope; assessing grasper dexterity using a peg board; evaluation of extracorporeal knot or intracorporeal knot tying in a "Penrose drain"; practice in placement of a pre-tied ligating loop or reusable endoloop around an organ appendage; precision cutting of a circular piece of gauze from a gauze pad; and practice in insertion of a catheter into a cannulation tube.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing aspects, uses, and advantages of the present invention will be more fully appreciated as the same becomes better understood from the following detailed description of the present invention when viewed in conjunction with the accompanying drawings, in which:

FIG. **1** is an isometric view of the basic elements of a laparoscopic skills training system, in accordance with the present invention;

FIG. **2** is an isometric view showing a training endoscope retained in a training platform of the laparoscopic skills training system of FIG. **1**;

FIG. **3** is a view of a central portion of the training endoscope of FIG. **2**;

FIG. **4** is a view of an end portion of the training endoscope of FIG. **2** showing a video camera in a zero-degree position;

FIG. **5** is a view of an end portion of the training endoscope of FIG. **2** showing the video camera in a thirty-degree position;

FIG. **6** a view of the training endoscope of FIG. **2** with a zero-degree target array and a thirty-degree target array;

FIG. **7** is a detail view of the zero-degree target array of FIG. **6**;

FIG. **8** is a detail view of the thirty-degree target array of FIG. **6**;

FIG. **9** is an exemplary embodiment of an accessory kit comprising a suture block, a foam organ with appendages, a dexterity peg board, a plurality of single-circle gauze pad, and a plurality of double-circle gauze pads;

FIG. **10** is a perspective view of the dexterity peg board of FIG. **9** placed in a working volume of the laparoscopic skills training system of FIG. **1**;

FIG. **11** is a detail view of the dexterity peg board of FIG. **10**;

FIG. **12** is a detail view of the suture block of FIG. **9** showing a practice suturing operation using an extracorporeal knot;

FIG. **13** is a detail view of the suture block of FIG. **9** showing a practice suturing operation using an intracorporeal knot;

FIG. **14** is a detail view of the foam organ with appendages of FIG. **9**;

FIG. **15** is a diagrammatical view of a re-usable endoloop as may be used with the organ appendages of FIG. **14**;

FIG. **16** illustrates a cutting procedure that may be performed using the single-circle gauze pad of FIG. **9**;

FIG. **17** is a diagrammatical illustration of a cannulation fixture suitable for insertion of a training catheter, in accordance with an exemplary aspect of the present invention;

FIG. **18** is a side view of the cannulation fixture of FIG. **17**;

FIG. **19** is a top view of the cannulation fixture of FIG. **17**; and

FIG. **20** is a diagrammatical illustration of the training catheter inserted into the cannulation fixture of FIG. **17**.

DETAILED DESCRIPTION OF THE INVENTION

There are shown in FIGS. **1** and **2** isometric views of the basic elements of a laparoscopic skills training system **10**, in accordance with the present invention. The laparoscopic skills training system **10** includes a trainer platform assembly **20** comprising a training platform **21**, a base **23**, a left side support **25**, and a right side support **27**, where the trainer platform assembly **20** is secured to the base **23** by the left side support **25** and the right side support **27**. A display device **11**, such as a laptop or a computer monitor, may be placed on or near the trainer platform assembly **20**, for use as described in greater detail below.

Emplacement of the training platform **21**, the base **23**, the left side support **25**, and the right side support **27** as shown define a working volume **29** for performing training skills, as described in greater detail below. In an exemplary embodiment, the left side support **25** and the right side

support **27** are removably attached to the training platform **21** and the base **23** such that these components can be disassembled for compact storage or transport.

The platform **21** provides a generally planar platform surface **40**, here shown supporting a simulated skin **19**, configured so as to enable a user to practice one or more tasks in a predefined skill set. The platform **21** may include one or more openings, configured so as to provide at least an endoscope opening **17**, extending through the simulated skin **19** and the planar surface **40**.

The endoscope opening **17** is sized and positioned to accommodate a standard endoscope (not shown) or a training endoscope **30**. The standard endoscope or training endoscope **30** may be used in conjunction with a thirty-degree target array **50**, as described in greater detail below. The platform surface **40** may further include a left port **41** and a right port **43**, each sized and positioned to accommodate a grasper (not shown) for use as described in greater detail below.

The components and operation of the training endoscope **30** may be described with reference to FIGS. **3** through **5** in which are shown an endoscope housing **31** into which are fitted a handle **33** and a viewing barrel **35**. The viewing barrel **35** has a first end fitted into the endoscope housing **31**, as best shown in FIG. **3**, and a second end having a skewed barrel end **37** oriented at about thirty degrees with respect to a barrel axis **39**, as best shown in FIG. **4**. An inner barrel **61** is slidably retained within the viewing barrel **35**. The inner barrel **61** comprises a longer length than the length of the viewing barrel **35**.

As best shown in FIG. **3**, a video electronic module **60** is connected to a first end of the inner barrel **61**, and a video camera **63** is connected to a second end of the inner barrel **61**. An electronic cable **45** runs inside the length of the inner barrel **61** to convey electronic digital image data from the video camera **63** to the video electronic module **60**, as is known in the art. An output cable **65** may be connected to an output of the electronic module **60** so as to provide an image **13**, and optional electronically-generated cross hairs **15**, on the display device **11** (shown in FIG. **1**). The video electronic module **60** may include switches **67** and **69** to begin a countdown timer (not shown) and an elapsed-time timer (not shown), for example, for use in a training session.

In a first mode of operation, camera navigation skills are developed, the optical axis of the video camera **63** is generally aligned with the barrel axis **39**, i.e., "zero degree axis." In a second mode of operation, best shown in FIG. **3**, the video electronic module **60** is moved away from the endoscope housing **31**, causing the inner barrel **61** to move rearward within the viewing barrel **35**, until a latching button **71** protrudes to engage an end **73** of the viewing barrel **35**. This causes the video camera **63** to pivot approximately thirty degrees so as to orient the camera optical axis along a 30-degree viewing axis **75**, as best seen in FIG. **5**.

An elastic member **47**, disposed within the inner barrel **61**, is configured and attached to the video camera **63** such that the video camera **63** is urged to rotate and to position itself against the skewed barrel end **37** of the viewing barrel **35** when the inner barrel **61** has moved rearward within the viewing barrel **35**. If the latching button **71** is subsequently depressed, allowing the inner barrel **61** to move forward within the viewing barrel **35**, the video camera **63** returns to the first mode of operation and the camera optical axis is again aligned with the barrel axis **39**, or zero degree axis, as best shown in FIG. **4**.

In an alternative embodiment, the angle of the video camera **63** can be varied continuously, in addition to using detents for viewing at zero degrees or thirty degrees. In the alternative embodiment, position indicators (not shown) may be provided on the inner barrel **61** such that the sliding movement of the inner barrel within the viewing barrel **35** can be adjusted so as to position the video camera **63** at varying angles, according to which position indicator on the inner barrel remains visible at the end of the viewing barrel **35**.

As best shown in FIG. **6**, the training endoscope **30** can be used with either the thirty-degree target array **50**, emplaced as shown in FIG. **1**, or a zero-degree target array **80**, which can be substituted for the thirty-degree target array **50** in FIG. **1**. As can be appreciated by one skilled in the art, either or both the thirty-degree target array **50** or the zero-degree target array **80** may be vacuum and heat-formed from a plastic sheet. When used with the zero-degree target array **80**, the training endoscope **30** is placed into the first mode of operation in which the optical axis of the video camera **63** is aligned with the zero degree axis **39**. When used with the thirty-degree target array **50**, the training endoscope **30** is placed into the second mode of operation in which the optical axis of the video earners **63** is aligned with the 30-degree viewing axis **75**.

As best seen in FIG. **7**, in an exemplary embodiment the zero-degree target array **80** may comprise a generally planar surface **81** from which protrude a plurality of raised features **83***a*-**83***e*. Each of the raised features **83***a*-**83***e* includes a surface having provided thereon a target **85**. In performing a first skill set using the laparoscopic skills training system **10**, the user begins by inserting the training endoscope **30** through the simulated skin **19** into the working volume **29** via the endoscope opening **17**.

The training endoscope **30** is placed into the first mode of operation. The user conducts a first skill set by maneuvering the training endoscope **30** so as to successively acquire each of the targets **85** by the video camera **63** and superimpose each target **85** within the electronically-generated cross hairs **15** on the display device **11**. Preferably, the series of acquisitions is performed within a predetermined amount of time. The predetermined time may be set by the user, via the switch **67**, and a countdown time value may be displayed on the display device **11** (see FIG. **1**). The zero-degree target array **80** may include a finger hole **87** to enable the user to remove the zero-degree target array **80** from within the base **23**.

As best seen in FIG. **8**, in an exemplary embodiment the thirty-degree target array **50** may comprise a generally planar surface **51** from which protrude a plurality of raised features **53***a*-**53***e*. Each of the raised features **53***a*-**53***e* includes a surface having provided thereon the target **55**. Each of the raised features **53***a*-**53***e* also includes a respective cowl **57***a*-**57***e* positioned so as to prevent a direct view of the respective target **55** from the endoscope opening **17**. Cowl **57***f* is situated on planar surface **51**, and is not situated on raised feature. In performing a second skill set using the laparoscopic skills training system **10**, the user inserts the training endoscope **30** into the working volume **29** via the endoscope opening **17**, places the training endoscope **30** into the second mode of operation, and maneuvers the training endoscope **30** so that each of the targets **85** are successively acquired by the video camera **63** and appear within the electronically-generated cross hairs **15** on the display device **11** within a predetermined amount of time. The switch **69** may be used to begin an elapsed time, for example, and the video electronic module **60** may generate the elapsed time value for display on the display device **11**. Additionally,

thirty-degree target array **50** may include a finger hole **58** to enable the user to remove the thirty-degree target array **50** from within the base **23**.

Additional skill sets may be performed using any of a plurality of Laparoscopic Surgery Training (LST) simulation components provided in an accessory kit **100**, shown in FIG. **9**. The accessory kit **100** may include a LST suture block **101**, a LST foam organ **103** with appendages comprising a red foam material, a LST dexterity peg board **105**, a LST single-circle gauze pad **107**, a LST double-circle gauze pad **109**, and a clip **139**. Each of the LST suture block **101**, the LST appendage **103**, and the LST dexterity peg board **105** may include a mechanical fastener, such as a hook-and-pile fastener (not shown), on the underside of the respective component for removable attachment to a mating mechanical fastener, such as a hook-and-pile fastener (not shown), on the base **23**. The mechanical fastener serves to prevent movement of the particular component while the user is performing a skill set, as described in greater detail below.

In an exemplary embodiment, the LST foam organ **103** may comprise two layers of a foam material, heat sealed at the perimeter of the foam organ **103** so as to give the foam organ **103** a "puffy" configuration. It can be appreciated by one skilled in the art that the single circle and the double circle can be imprinted onto the respective gauze pads **107** and **109** by any practical means such as, for example, silk screening or stamping with ink.

For example, in a third skill set, shown in. FIGS. **10-11**, the user can position a first grasper **111** through the left port **41** and a second grasper **113** through the right port **43**, such that the graspers **111** and **113** protrude into a working volume **29**. A video camera **115** and at least one light source **117** can be mounted to the underside of the platform **21** to illuminate the LST dexterity peg board **105**, for example, and allow the user to view the actions of the graspers **111**, **113** on the display device **11**.

In an exemplary embodiment, the user may use the graspers **111**, **113** to manipulate a plurality of triangular rings **121** among a plurality of pegs **123** on the LST dexterity peg board **105**. The LST dexterity peg board **105** may be removably fastened to the base **23** using the hook and pile fastening pair secured to the underside of the LST dexterity peg board **105** and to the surface of the base **23**. In an exemplary embodiment, the triangular rings **121** may be fabricated by an extrusion process, or any other comparable fabrication process known in the relevant art.

The third skill set includes the process of transferring the plurality of triangular rings **121** from a first group of pegs **123** to a second group of pegs **123**. A triangular ring **121** is grasped by the grasper **111**, lifted from the corresponding peg **123**, transferred to the grasper **113** in midair, and placed over another peg **123**. Once all triangular rings **121** have been so transferred, the process may be repeated in reverse. In an exemplary embodiment, performance of the third skill set may be timed by using the video electronic module **60** with an elapsed or remaining time display provided on the display device **11**.

In a fourth skill set, shown in FIG. **12**, the user performs a simple suture in a LST Penrose drain **131** that may be fabricated from an elastic material, such as rubber or latex. The user sutures the LST Penrose drain **131** using an extracorporeal knot by manipulating a knot-pusher **133** and a grasper (not shown). This operation requires the user to place a simple stitch through two marks in a longitudinal slit **135** in the LST Penrose drain **131** and to tie the suture extra-corporeally, using the knot pusher **133** to slide the knot down. This suturing operation may be timed by using the electronic module **60**.

The LST Penrose drain **131** may include a hook-and-pile fastener **137***a* for removable attachment to a corresponding hook-and-pile fastener **137***b* on the base **23**. In an exemplary embodiment, the LST Penrose drain **131** may be fabricated by molding and may include the longitudinal slit **135** as part of the molding process. The two marks provided on the LST Penrose drain **131** are preferably produced by ink, or similar material, applied to the surface of the LST Penrose drain **131** by any method known in the art, including via manual application. A pair of protrusions (not shown) on the LST Penrose drain **131** may serve as guides in the application of the ink or similar material to the LST Penrose drain **131** to produce the two marks.

In a fifth skill set, shown in FIG. **13**, the user performs a simple suture in the LST Penrose drain **131** using an intra-corporeal knot by manipulating two needle drivers **141** and **143**. This operation requires the user to place the suture through two marks in the longitudinal slit **135** and to tie the suture intra-corporeally, transferring a needle **145** between the needle drivers **141** and **143** between knot-tying throws. This suturing operation may be timed by using buttons **67** and **69** provided on the electronic module **60**.

In a sixth skill set, shown in FIGS. **14** and **15**, the user attaches the foam organ **103** to a clip **139** which is secured to the base **23**, such that a plurality of appendages **151** are free to move. The user can manipulate a grasper (not shown) to place a pre-tied ligating loop or reusable endoloop **153** around one of the appendages **151**. The user can then secure the knot of the pre-tied ligating loop or reusable endoloop **153** on the appendage **151**, and simulate cutting the thread with a grasper **111**. This operation may be timed by using either of the buttons **67** and **69** on the electronic module **60**. In an exemplary embodiment, the reusable endoloop **153** may be placed into a folded sheet of corrugated paper (not shown) for protection in shipping or storage.

A seventh skill set, shown in FIG. **16**, includes the process of precision cutting a circular piece of gauze **161** from the LST single-circle gauze pad **107**. A pair of cups **167**, such as alligator cups, may be used to place the gauze in tension so as to enable cutting. Alternatively, a less skilled user may elect to cut the circular piece of gauze **161** from the LST double-circle gauze pad **109** (shown in FIG. **9**). The LST single-circle gauze pad **107** may be grasped by the grasper **111**, and cut using endoscopic scissors **163**. A penalty may be assessed if the user deviates from a circular line **165**. In an exemplary embodiment, performance of the seventh skill set may be timed by using the buttons **67** or the button **69** on the video electronic module **60** with an elapsed or remaining time display provided on the display device **11**.

In an eighth skill set, the user may perform a cannulation task by first emplacing in the base **23** a LST cannulation fixture **170**, shown in FIGS. **17-19**. The LST cannulation fixture **170** includes a cannulation tube **171** secured to a cannulation base **173** by a first clamp **175** and a second clamp **177**. The cannulation base **173** may be attached to the base **23** by a hook-and-pile fastener **169**. The task requires the user to insert a LST catheter **180** into a cannulation tube opening **179** in the cannulation tube **171** such that a catheter mark **181** is moved into position proximate the cannulation tube opening **179**.

The catheter **180** may be provided with a metal pin (not shown) at the entry end to assist in guiding the catheter **180** into the cannulation tube opening **179**. Moreover, the catheter **180** may include circumferential lines (not shown), in

black ink for example, to indicate to the practitioner of the eighth skill set the depth to which the catheter **180** has entered the cannulation tube **171** via the cannulation tube opening **179**.

The LST catheter **180** may alternatively include a marking string **185** placed inside a catheter outer tube **183**, as shown in FIG. **20**. The marking string **185** is attached to a catheter pin **187**, and includes the catheter mark **181** placed adjacent a cannulation tube mark **189**, as shown. The marking string **185** may function to indicate to the practitioner of the eighth skill set the depth to which the catheter **180** has entered the cannulation tube **171** via the cannulation tube opening **179**.

It is to be understood that the description herein is exemplary of the invention only and is intended to provide an overview for the understanding of the nature and character of the invention as it is defined by the claims. The accompanying drawings are included to provide a further understanding of various features and embodiments of the method and apparatus of the invention which, together with their description serve to explain the principles and operation of the invention.

Thus, as stated above, while the invention has been described with reference to particular embodiments, it will be understood that the present invention is by no means limited to the particular constructions and methods herein disclosed and/or shown in the drawings, but also comprises any modifications or equivalents within the scope of the claims. Further, the purpose of the Abstract is to enable the U.S. Patent and Trademark Office, the public generally, and in particular practitioners in the art who are not familiar with patent or legal terms or phraseology, to determine from a cursory inspection the nature and essence of the technical disclosure of the application. Accordingly, the Abstract is not intended to define nor limit the claims in any way.

What is claimed is:

1. A system suitable for use in surgical skills training, said system comprising:

a trainer platform assembly including:

a training platform, wherein said training platform has one or more openings, wherein at least one said opening is configured for at least an endoscopic opening;

a base, said base configured to accommodate at least one target array;

said target array including a planar surface upon which are disposed a plurality of protruding targets oriented at a plurality of angles on said base;

a left side support for supporting said training platform on said base; and

a right side support for supporting said training platform on said base such that said training platform, said base, and said left and right side supports define a working volume; and

a training endoscope for extending into said working volume by passing through said endoscopic opening, wherein said training endoscope includes:

an endoscope housing and a viewing barrel, said viewing barrel having a barrel axis, a first end secured to said endoscope housing, a second end having a skewed barrel end, and an inner barrel slidably retained within said viewing barrel, wherein said inner barrel has a first end, a second end, and a length longer than that of said viewing barrel; and

a video electronic module connected to said first end of said inner barrel, a video camera connected to said second end of said inner barrel, wherein said video electronic module is connected to said video camera, said video electronic module configured to transmit from said video camera to a display device an electronic image with electronically-generated cross hairs and a countdown time value superimposed on said electronic image, and wherein said second end of said inner barrel extends beyond said second end of said viewing barrel to align said video camera with said barrel axis, and moving rearward said inner barrel to position said second end of said inner barrel within said viewing barrel causes said video camera to swivel relative to said second end of said viewing barrel so as to provide a viewing axis that can be varied from zero degrees to thirty degrees with respect to said barrel axis.

2. The system of claim **1**, wherein said working volume comprises one or more of a suture block, a foam organ with at least one appendage, a dexterity peg board, a single-circle gauze pad, and a double-circle gauze pad.

3. The system of claim **1**, wherein said video camera is rotatable 360 degrees at said viewing axis and said skewed barrel end is 30 degrees from an axis perpendicular to said barrel axis.

4. The system of claim **1**, wherein said target array is a thirty-degree target array for use with said viewing axis at thirty degrees with respect to said barrel axis, wherein said thirty-degree target array includes said plurality of protruding targets each situated on a respective raised feature, and wherein said thirty-degree target array includes a plurality of respective cowls positioned so as to prevent a direct view of each respective protruding target from said endoscope opening.

5. The system of claim **4**, wherein said thirty-degree target array is vacuum and heat formed from a plastic sheet, and further includes a finger hole to enable a user to remove said thirty-degree target array from within said base.

6. The system of claim **1**, wherein said target array is a zero-degree target array for use with said viewing axis at zero degrees with respect to said barrel axis, and wherein said zero-degree target array is vacuum and heat formed from a plastic sheet, and includes said plurality of protruding targets each situated on a respective raised feature.

7. The system of claim **6**, wherein said zero-degree target array further includes a finger hole to enable a user to remove said zero-degree target array from within said base.

8. The system of claim **1**, further comprising a simulated skin layer disposed on said training platform.

9. The system of claim **8**, wherein said simulated skin layer includes at least one cut-thru configured for said training endoscope to extend through said cut-thru and into said working volume via said endoscope opening.

10. The system of claim **1**, wherein said electronically-generated cross hairs define an electronically-generated target, said electronically-generated target configured such that a user can operate said training endoscope so as to electronically superimpose said electronically-generated target on one of said plurality of protruding targets on said base appearing in said electronic image.

11. The system of claim **1**, wherein said video electronic module further comprising a countdown timer displayed on said display device.

12. The system of claim **1**, further comprising at least one of a pre-tied ligating loop and a reusable endoloop that can be placed around an appendage of a foam organ using a grasper.

13. The system of claim **1**, wherein said inner barrel further includes at least one detent positioned approximately

near said second end of said inner barrel so as to provide guidance for setting said viewing axis at a desired angle with respect to said barrel axis.

14. The system of claim **1**, wherein said training endoscope further includes a detent configured for setting said viewing axis to zero degrees with respect to said barrel axis.

15. The system of claim **1**, wherein said training endoscope further includes a detent configured for setting said viewing axis to thirty degrees with respect to said barrel axis.

16. The system of claim **1**, wherein said training platform further comprising at least one grasper port suitable for allowing at least one grasper to extend into said working volume by passing through said at least one grasper port.

17. The system of claim **1**, further comprising a cannulation fixture disposed on said base, wherein said cannulation fixture includes a cannulation tube, a cannulation base, a first clamp, and a second clamp, wherein said cannulation tube is secured to said cannulation base by said first clamp and said second clamp, and wherein said cannulation tube has a cannulation tube opening.

18. The system of claim **17**, further comprising a catheter configured for insertion into said cannulation tube opening, wherein said catheter includes (i) a flexible, transparent outer tube having at least one open end, and (ii) a metal pin configured for insertion into said open end of said outer tube.

19. The system of claim **18**, wherein said metal pin includes a marking string so as to indicate a depth in which said catheter has entered said cannulation tube via said cannulation tube opening.

20. The system of claim **19**, wherein said outer tube further includes at least one circumferential line so as to indicate a depth in which said catheter has entered said cannulation tube via said cannulation tube opening, and wherein said circumferential line is ink.

21. The system of claim **2**, wherein said foam organ comprises at least two layers of a foam material and a heat-sealed perimeter.

22. The system of claim **1**, wherein said working volume comprises a Penrose drain.

23. The system of claim **22**, wherein the Penrose drain is made of an elastic material.

24. The system of claim **22**, wherein the Penrose drain is configured to be sutured using an extracorporeal knot.

25. The system of claim **22**, wherein the Penrose drain is configured to be sutured using an intra-corporeal knot.

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