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(54) **CONCRETE FORM SYSTEMS**

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E04G 11/08 (2006.01)

(52) **U.S. Cl.** **249/34**; 249/5; 249/6

(58) **Field of Classification Search** 249/34, 249/3, 4, 5, 6, 9, 208, 213, 218, 47, 191, 249/192, 196, 2, 7; 220/4.29, 4.33, 4.34
See application file for complete search history.

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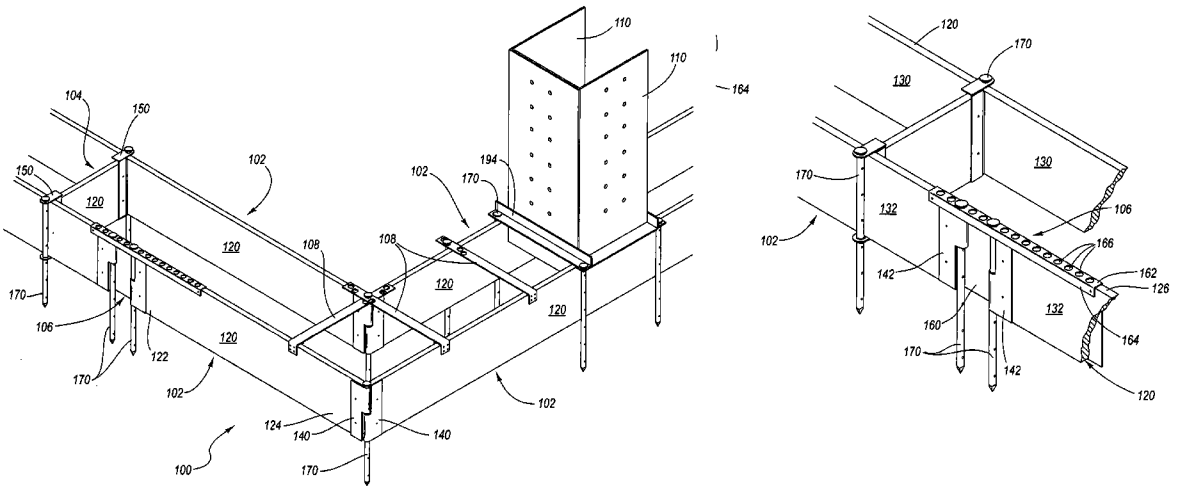
(57) **ABSTRACT**

A system for holding poured concrete in a desired shape until it sets is disclosed. The system can include a plurality of forms having two opposing end sections. Each of the end sections has an end bracket attached to it. A plurality of footing stakes are used to connect the end brackets together such that the forms maintain the desired shape. At least one whaler bracket is secured to a top of the forms to maintain the spacing between them. A skin panel can be used to bridge gaps between forms. Bulkhead brackets can be attached to the ends of the forms and secured to allow end walls to be created where desired. Vertical footing panels can also be used to pour concrete onto adjoining inclined surfaces.

12 Claims, 5 Drawing Sheets



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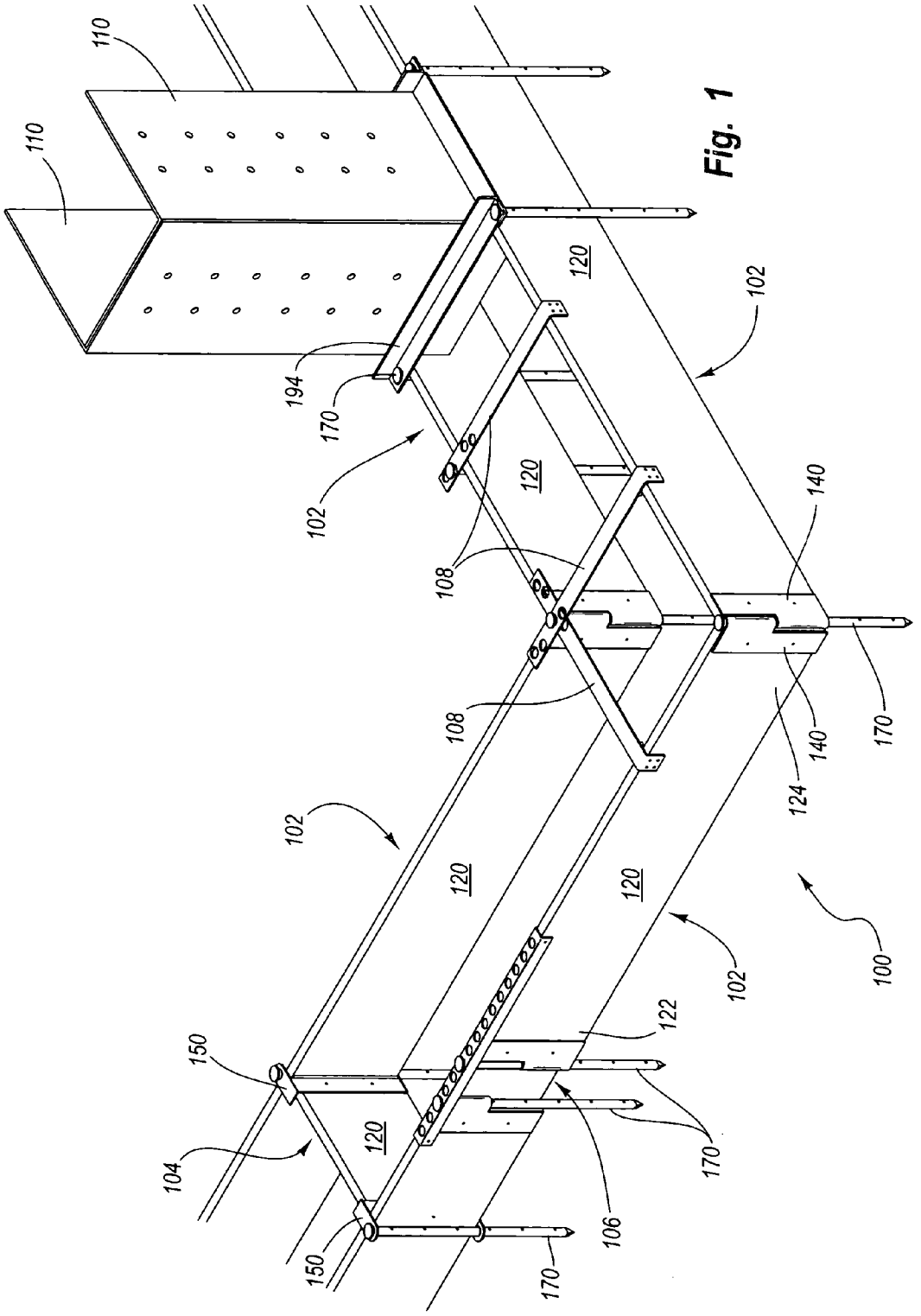
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Fig. 1

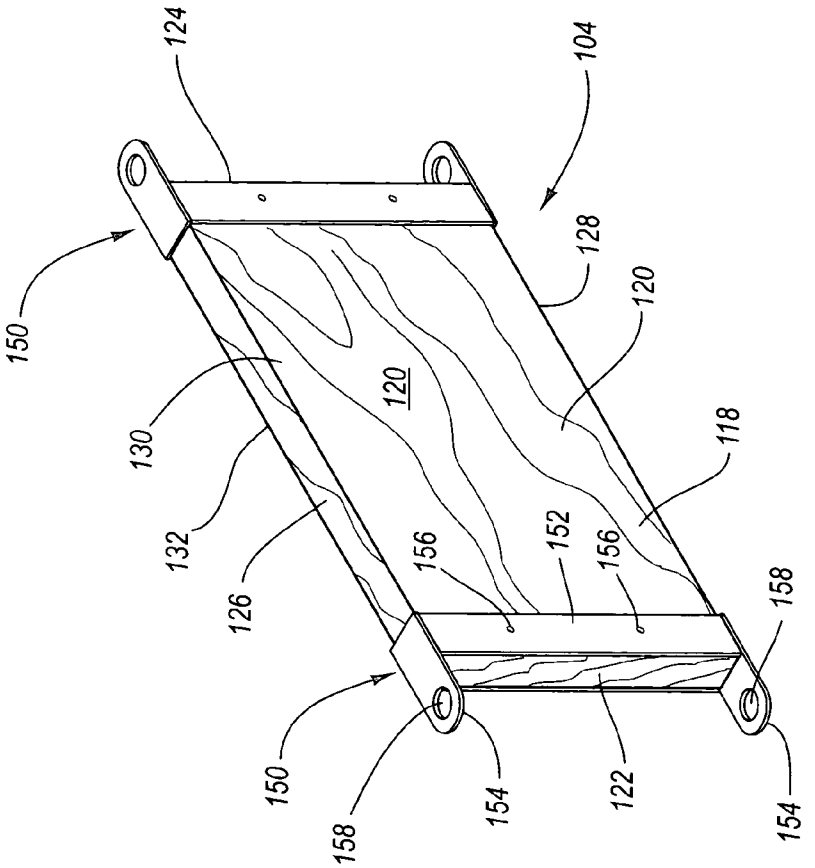
124
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Fig. 3A

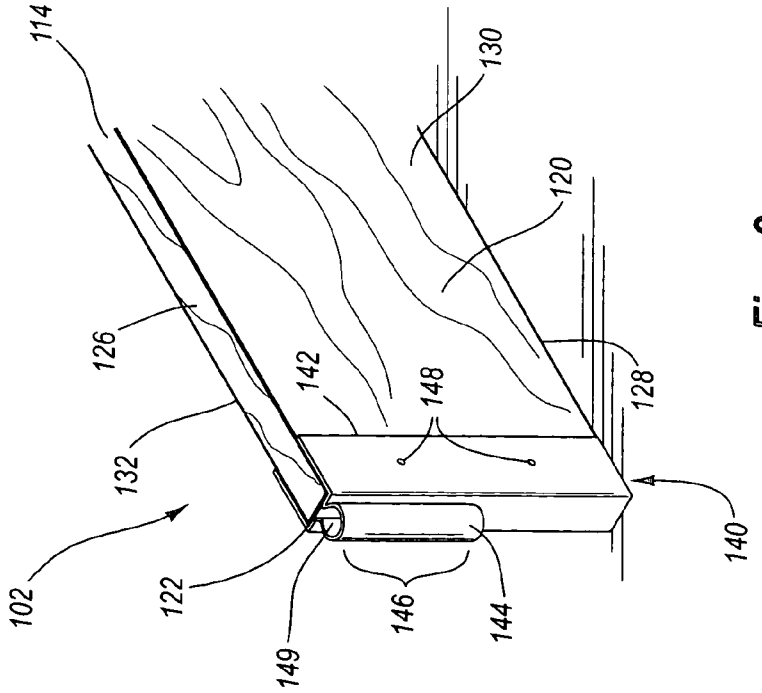
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Fig. 2

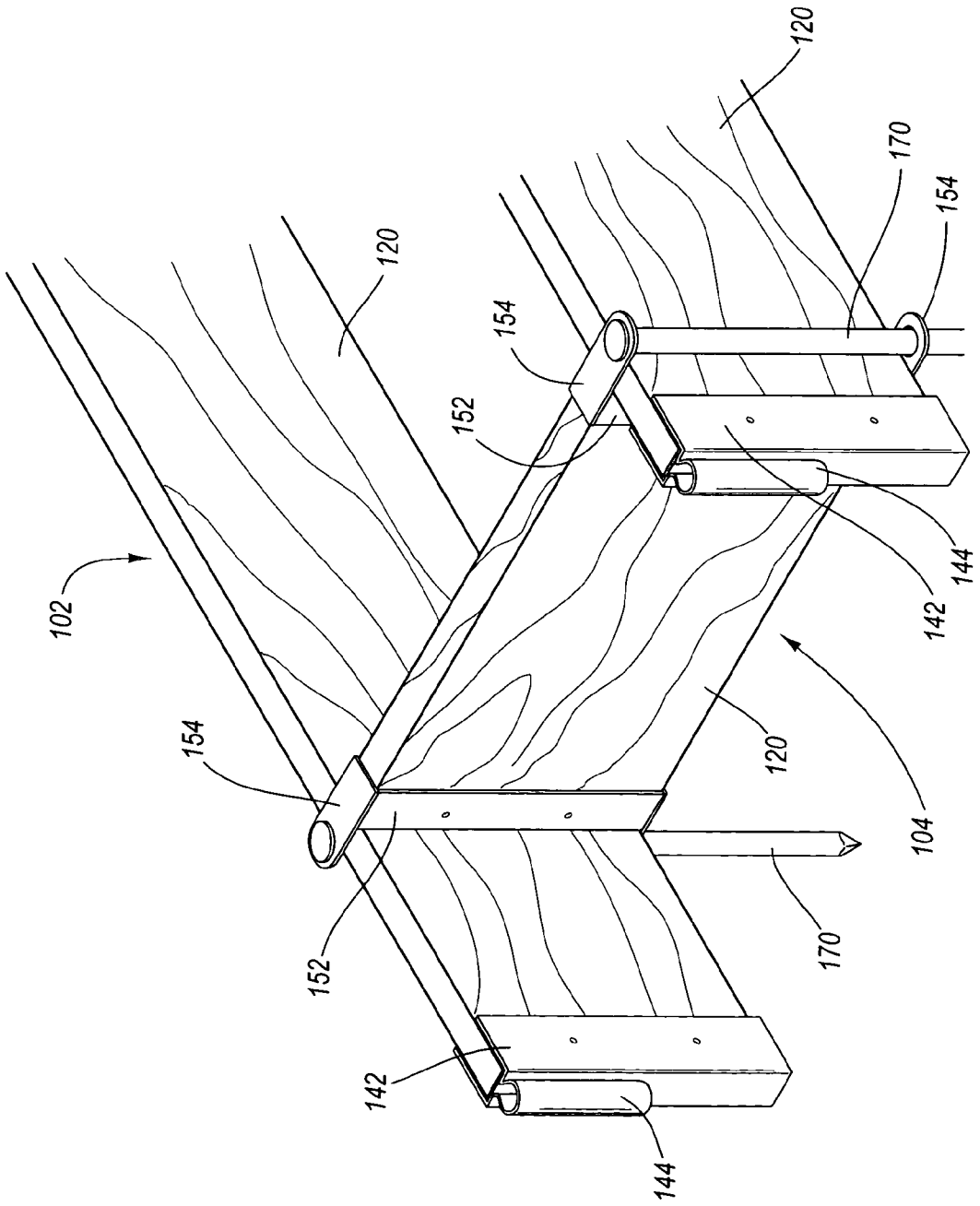
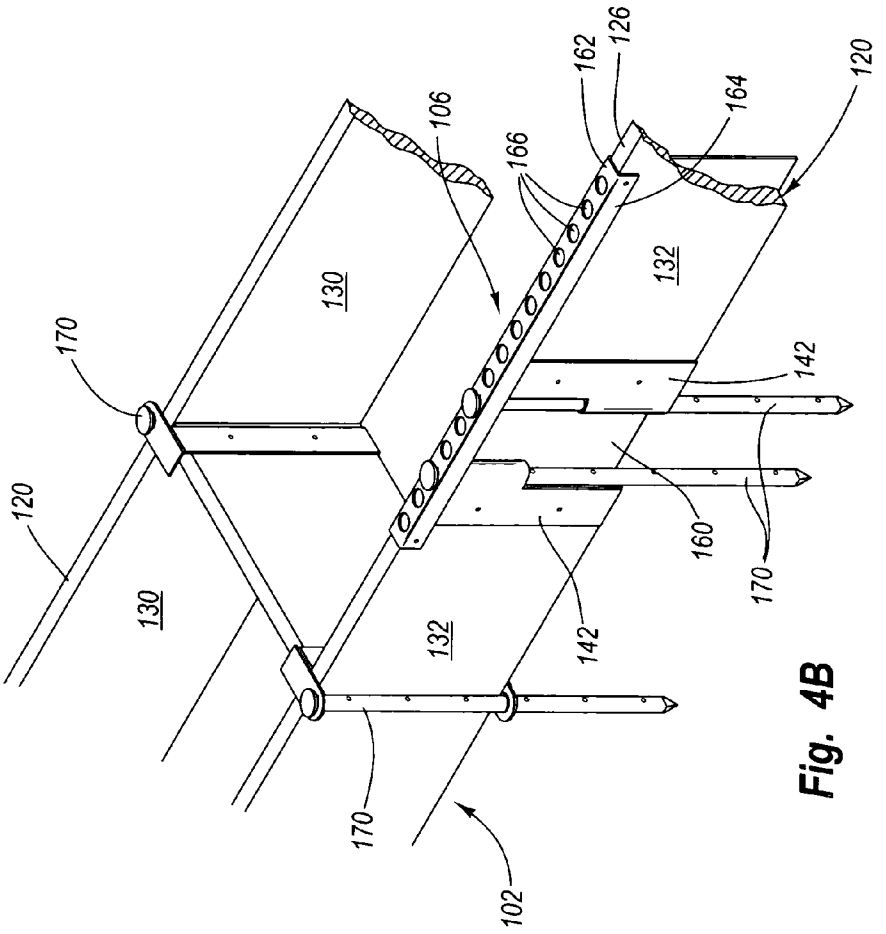


Fig. 3B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142
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Fig. 4B

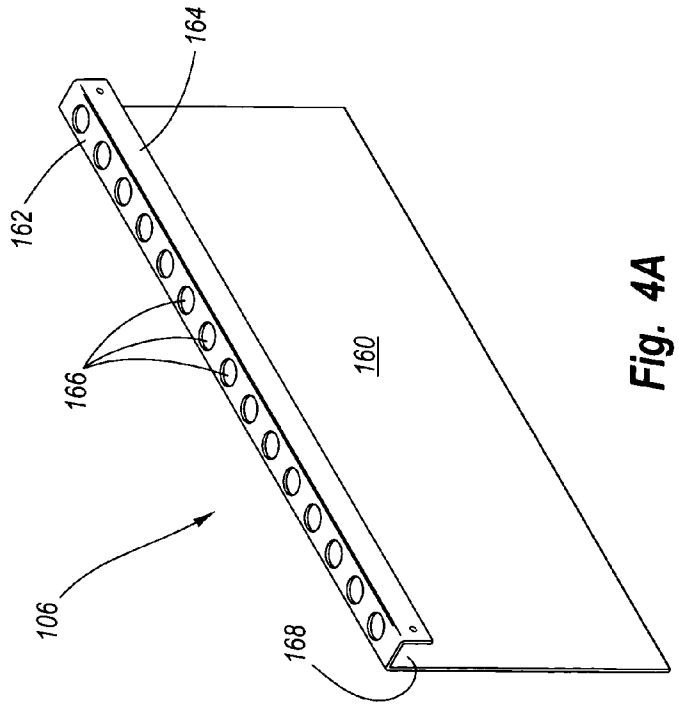
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Fig. 4A

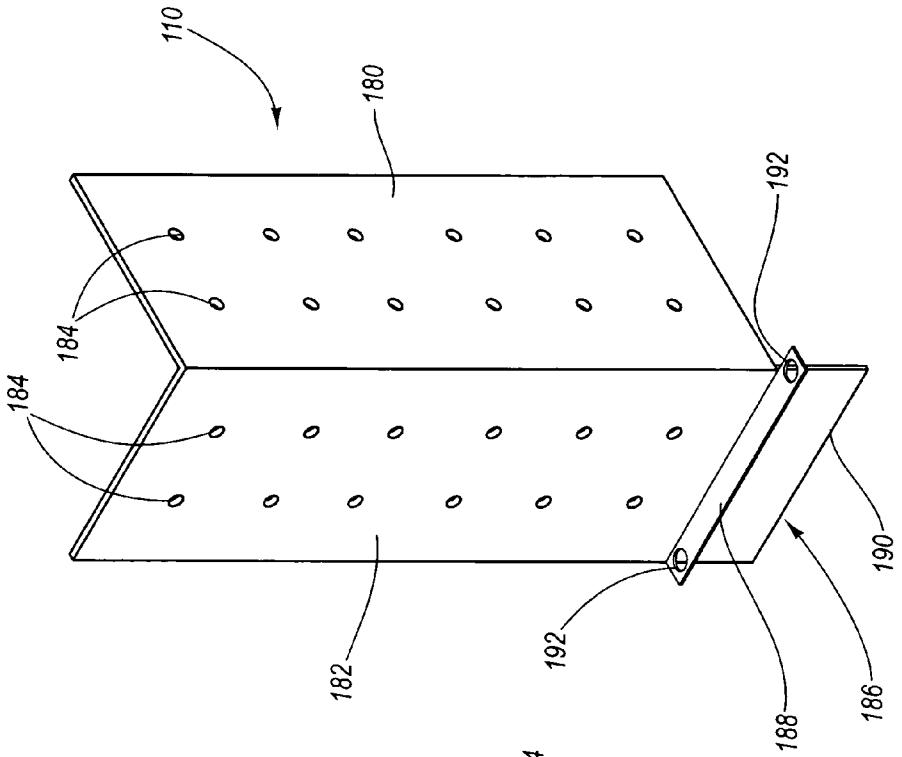
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Fig. 6

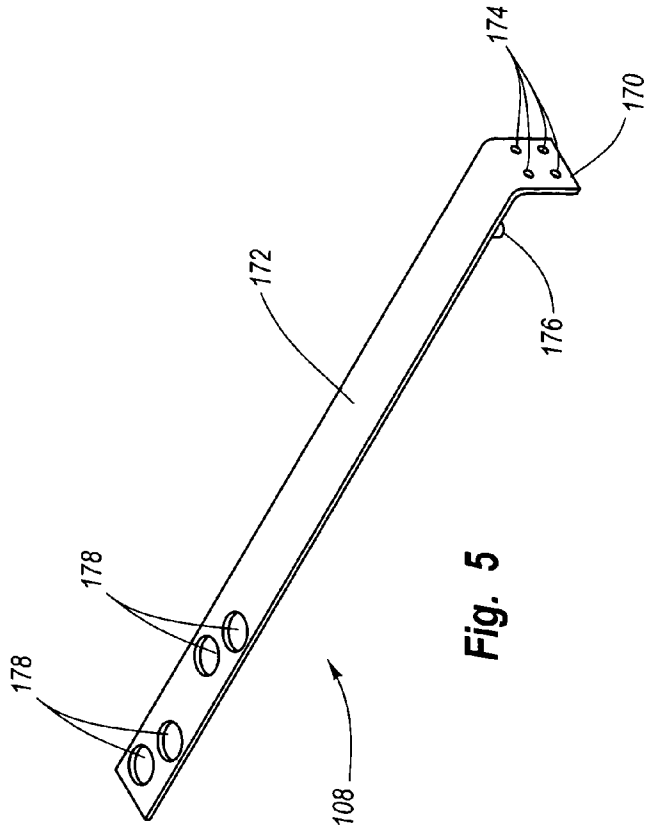
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Fig. 5

CONCRETE FORM SYSTEMS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority to and the benefit of U.S. Provisional Patent Application Ser. No. 60/422,985, filed on Jan. 28, 2003 and entitled "EZ-FOOTING FORM SYSTEM", which is incorporated by reference in its entirety.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention generally relates to concrete form systems, and, more specifically, to concrete form systems with modular components that can be used to construct various types, sites, and shapes of concrete structures, such as concrete footings.

2. Description of Related Technology

Concrete footings are routinely poured all over the world. These footings provide a solid, secure base on which to build walls or other structures. In the United States, concrete footings are poured for nearly every new home or office building at is points where the weight of the building rests. For new homes, footings are generally poured around the perimeter of the building to provide support for the foundation walls, as well as inside the perimeter to support structural columns or posts.

In the past, conventional concrete footings were often constructed by nailing together plywood or other materials into a form with a desired shape and pouring the concrete into the space created by the plywood. After the concrete is cured, the plywood is separated from the concrete, typically using a hammer. This often results in cracking and splintering of the plywood, thus making the plywood unusable creating new footings. This not only wastes material, but can be a safety hazard because splintered wood can cause injury to the unwary.

Some existing systems have attempted to overcome these drawbacks. For example, one system can include numerous panels with complex grooves or channels connected to the ends of each panel. The channels are designed to allow adjacent panels to interlock, which allows a form to be constructed. This known system requires that complex shaped inserts be placed within the channels to connect the panels. In particular, a first insert could be used to fix adjacent panels into a generally parallel configuration. Another type of insert may be used to fix adjacent panels into a perpendicular configuration.

Unfortunately, this known system also has several drawbacks. For example, the channels are difficult to manufacture because they have a complex structure. In addition, due to the complex structure of the channels, mud or other debris can easily clog the channel which makes it difficult or impossible to use the inserts. Further, if channels in adjacent forms are not precisely aligned, the inserts can be difficult or impossible to use. This is particularly true for the inserts used to join two forms at an angle.

Additionally, because the panels have a predetermined length, it is difficult to design a footing system with the exact dimensions that a user would want. Accordingly, it may be necessary to modify one or more panels to create a form with the desired size and configuration. This undesirably increases the time and cost required to construct the footing.

Finally, this conventional system requires the use of multiple different inserts to enable a user to place the panels at different angular orientations. Thus, it is necessary to identify the inserts needed prior to creating the form. Additionally, any changes in the design of the form require additional time while more panels and/or inserts are obtained, which also increases the costs.

BRIEF SUMMARY OF THE INVENTION

A need therefore exists for a concrete system that eliminates the above-mentioned disadvantages and problems. The present invention is generally directed towards a system that allows concrete structures, such as a concrete footing, to be constructed. Advantageously, the system may facilitate quick and easy assembly of one or more forms to define a space that receives concrete or another material to create the desired structure. The system may be designed so that two or more forms may be easily joined together using simple components that allow the relative position of adjacent forms to be quickly and easily changed using the same brackets and stakes.

One aspect is a system that may include a number of different types of forms and each form may include a bracket attached to each of the opposing ends of the form. The brackets desirably enable the relative position of adjacent forms to be fixed in a desired position.

Another aspect is a system that may include a number of forms of varying lengths. In particular, the forms may have different lengths and brackets may be attached to opposing ends of the form. In addition, a bulkhead form can be attached to another form at a suitable location, such as the brackets attached to the ends of the form or at any desired location along a length of the form. This allows the length of a form to be easily and simply changed to accommodate for different footing or structure configurations.

Still another aspect is a system that may use a skin panel to bridge a gap between forms. Advantageously this allows the length or size of the concrete structure to be expanded and/or extended. In addition, when brackets of adjacent forms do not align, the skin panels may bridge the gap between the separated forms. Using the skin panels, footing or structures of any length can be laid out, even when using forms of fixed length. Desirably, the skin panels fit over the top of the adjacent forms. The skin panels may also have holes in the top to accommodate one or more stakes, which can be inserted through the skin panels and the holes in the brackets attached to the ends of the form.

Yet another aspect is a system that allows the forms to be reused. Advantageously, this eliminates much of the waste associated with conventional forms and systems.

Advantageously, the system may include various types of forms that link together in a easily modifiable manner to accommodate for changes in the layout of a footing or other structure. In particular, the system may simply and easily define a space that receives concrete or another material. This allows concrete structures, such as footings or other structures to be quickly and efficiently created.

In one embodiment, the system can include one or more forms that include a panel with two end brackets mounted or attached to opposing ends of the panel. The end brackets may include a flange configured to fit around and be attached to the ends of the panels. The end brackets may also include a tubular portion that extends a distance beyond the ends of the panels. A hole may be disposed in the tubular portion to accommodate a stake that can be used to secure the panel and hence the form in place. By selectively placing one form with an end bracket in an upward position, and an adjacent form with an end bracket in a downward position, the forms can be joined together by inserting a stake through the two

aligned holes in the end brackets. One advantage of the system is that a user can then join the forms at almost any angle since each form can rotate about an axis defined by the holes in the tubular portions receiving the stake.

In another embodiment, the system can include a form that includes a panel with two bulkhead brackets mounted or attached to the ends of the panel. The bulkhead brackets of this bulkhead form may have a top and bottom extension that extends far enough past the end of the panel to allow the brackets to protrude over the top and under the bottom of the panel of another form. The bulkhead form can be located at any position along the length of other forms using the end brackets, which allows a length of a footing or other structure to be changed by simply moving the location of the bulkhead form. Thus, the length of the footing or other structure is not limited by the length of the forms. In addition, the bulkhead brackets may also have holes to accommodate stakes to allow the bulkhead form to be secured in a desired location.

The system may also allow concrete or other material to be poured on an inclined surface. In particular, the concrete or other material can be poured on an upwardly or downwardly sloping surface. For example, the system may include a pair of vertical forms to aid with accomplishing this task. The pair of vertical forms can be fixed on a top surface of the forms and joined together to hold the poured concrete against the inclined surface. The vertical forms may each have two sides that are joined at approximately 90-degree angle. One of the two sides of each of the pair of the vertical forms may be desirably connected together to form a substantially rectangular channel with the inclined surface forming the fourth side. This allows for the pouring of concrete footers and other structures at varying angles and inclined surfaces.

These and other objects and features of the present invention will become more fully apparent from the following description and appended claims, or may be learned by the practice of the invention as set forth hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

To further clarify the above and other advantages and features of the present invention, a more particular description of the invention will be rendered by reference to specific embodiments thereof which are illustrated in the appended drawings. It is appreciated that these drawings depict only typical embodiments of the invention and are therefore not to be considered limiting of its scope. The invention will be described and explained with additional specificity and detail through the use of the accompanying drawings in which:

FIG. **1** is a perspective view of an exemplary embodiment of a system used to construct a footing;

FIG. **2** is a perspective view of a portion of the system shown in FIG. **1**, illustrating an end bracket;

FIG. **3**A is a perspective view of a portion of the system shown in FIG. **1**, illustrating a bulkhead bracket;

FIG. **3**B is perspective view of portion of the system shown in FIG. **3**A in one exemplary operational position;

FIG. **4**A is a perspective view of a portion of the system shown in FIG. **1**, illustrating a skin panel;

FIG. **4**B is a perspective view of the skin panel of FIG. **4**A in one exemplary operational position;

FIG. **5** is a perspective view of a portion of the system shown in FIG. **1**, illustrating a whaler bracket; and

FIG. **6** is a perspective view of a portion of the system shown in FIG. **1**, illustrating a vertical form.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

The present invention is a system used to create concrete footings or other concrete structures. One exemplary embodiment of an exemplary system is shown in FIG. **1**, and designated generally as reference numeral **100**. This system **100** enables forms for footings or other concrete structures to be positioned in a simple and efficient manner, and to any desired dimensions, while limiting waste of wood or other materials. The system **100** can include various forms, brackets, and panels that are used together to accommodate variations in footing layout and configuration.

The system **100** generally can include a number of forms, shown generally as reference numerals **102** and **104**. As mentioned above, a form is a structure that aids with defining a space within which concrete or other material is to be received. One or more forms are used to create a structure layout of the space to receive the concrete or other material. In the exemplary system **100**, various types or kinds of forms are provided, each of which perform different functions and connect to other forms in a different manner. The system **100** facilitates simple joining of forms using simple components that allow the relative position of adjacent forms to be quickly and easily changed.

With reference to FIG. **1**, system **100** can include a form **102** and a form **104**. Each form **102**, **104** may include a panel **120** with a bracket attached to each opposing end of the panel **120**. The brackets can be selected based upon the function to be performed by the form. A general purpose form, such as the form **102**, can include end brackets **140**. In contrast, a bulkhead form **104** may include bulkhead brackets **150**. The bulkhead form **104** can be used to ensure that the spaced defined by system **100** has a uniform width. The system **100** may also include a whaler bracket **108** that acts as a brace between two spaced apart forms **102**, while maintaining a desired separation between the forms **102**.

When using the system **100** to create a space to receive concrete or other material, a lengthwise gap may be left between two adjacent forms **102**. This may occur when the end brackets **140** of two adjacent forms **102** do not align. To bridge this gap, the system **100** can include a skin panel **106**. The skin panel **106** can accommodate various lengths of gap and so using the skin panels **106**, footing or structures of any length can be laid out, even when using forms of fixed length.

The exemplary embodiments will be described in the context of using the system **100** for creating a concrete footing for a building structure. It will be understood, however, that the exemplary embodiments can be used with other concrete structures. Generally, the system is modular and can include a variety of forms, panels, and brackets that can connect together to define a desired space that receives concrete or other material.

With reference to FIG. **2**, the form **102** may include the panel **120** with the end brackets **140** attached to opposing ends of the form **102**. In other configuration, the form **102** can include a single end bracket **140**. The panel **120** may be generally planar and have sufficient rigidity to hold concrete or other materials in place before it cures. In the illustrated configuration, the panel **120** has a proximal end **122** and a distal end **124** (FIG. **1**), each of which can receive the end bracket **140**. Extending between the proximal end **122** and the distal end **124** of the panel **120** is a top surface **126**, a bottom surface **128**, an inside surface **130**, and an outside surface **132**. These terms are specific to the orientation of form **102** illustrated in FIG. **2**. It will be understood that if

the form **102** is inverted, the top surface **126** may not be the "top surface", the bottom surface **128** may not be the "bottom surface", the inside surface **130** may be not the "inside surface", and the outside surface **132** may not be the "outside surface". The exemplary embodiments should not be considered limited by the use of these relative terms.

In one exemplary embodiment, each panel **120** is a wooden board, although other materials are possible, such as plywood, plastic, pressboard, metal, alloy, high density overlaid (HDO) wood, composites, or any other material having the desired rigidity and strength. Additionally, each panel **120** can be fabricated from one or more sections that connect together to create the desired structure of panel **120**. The panels **120** can have various cross-sectional areas or dimensions. In one configuration, the panel **120** has cross-sectional dimensions of about two inches by about twelve inches. In another configuration, the panel **120** can have cross-sectional dimensions of one and one eighth inches by eleven and one eighth inches, one and one quarter inches by eleven and seven eighth inches, or other cross-sectional dimensions depending on the type of material used to make panels **120**. Similarly, each panel **120** can have various lengths, such as but not limited to, from about one foot to about twelve feet in length. It will be understood that lengths lesser than one foot and greater than twelve feet are also possible.

As shown in FIG. **2**, the end bracket **140** may mount to the end **122** and may include a flange **142** that has a tubular portion **146**. The tubular portion **146** can extend from the top surface **126** of the panel **120** toward the bottom surface **128**. To aid with connecting adjacent forms **102**, the end bracket **140** mounted to the distal end **124** (FIG. **1**) of the panel **120** is inverted. The end bracket **140** at the distal end **124** (FIG. **1**) then can include the tubular portion **146** extending from the bottom surface **128** toward the top surface **126**. This allows for easy, quick joining of multiple forms in multiple angular orientations.

In another configuration, the system **100** can include one or more forms **102** that include the panel **120** having both end brackets **140** fitted onto the ends **122**, **124** in the same orientation. For instance, in one configuration, both end brackets **140** are in an upward position, while in another configuration both end brackets **140** are in a downward position.

With continued reference to FIG. **2**, the flange **142** of the end bracket **140** attaches to the end **122**. To aid with attaching the flange **142** to the panel **120**, the flange **142** may include at least two fastening holes **148**. The end bracket **140** attaches to the end **122** of the panel **120** as one or more fasteners pass through the fastening holes **148** and attach to the panel **120**. The fastening holes **148** can accommodate any type of mechanical fastener, such as, but not limited to, nails, screws, bolts, rivets, etc. Alternately, or in addition to mechanical fasteners, various types of adhesives or epoxies can be used to attach the end bracket **140** to the panel **120** of the form **102**. Further, each bracket **140** can include one or more protruding structures that attach to the panel **120** as the end bracket **140** is attached to the panel **120**.

The tubular portion **146** may extend from the top surface **116** towards the bottom surface **128**. In the illustrated configuration, the tubular portion **146** extends towards the bottom surface **128** about half the height of the panel **120**. In other configurations, the tubular portion **146** can extend towards the bottom surface **128** less or more than about half the height of the panel **120**.

The tubular portion **146** may have a hole **149** that receives the stake **170** (FIG. **1**). This stake **170** may pass through the holes **149** in adjacent forms when the form **102** having the tubular portion **146** on the bottom is placed end to end with another form **102** that has the tubular portion **146** on top, as shown in FIG. **1**. The stake **170** can also be driven into the ground to hold the forms **102** in alignment while the concrete or other material is deposited in the space defined by the system **100**.

Returning to FIG. **2**, the end brackets **140** allow adjacent forms to be easily joined together and the relative position of adjacent forms to be quickly and easily changed. The end brackets **140** can be made from a wide range of materials, including, but not limited to, various metals or metal alloys, plastics, composites, fiberglass, or other materials having the desired strength and rigidity. In one exemplary embodiment of the system **100**, the end brackets **140** are metal, sized and configured to slip easily over the end **122**, **124** of the panel **120**. The end brackets **140** can optionally have a completely or partially closed end section to fit flush with the ends **122**, **124** of the panel **120**.

Various other configurations of the end bracket **140** are possible. For instance, in another configuration each tubular portion **146** can have a first portion having a first outside diameter and a second portion having a second outside diameter lesser than the first diameter. The first portion may have an inside diameter that is complementary to the second portion so that a first portion of the end bracket on one form can receive the second portion of the end bracket on an adjacent form. In this manner, adjacent forms interference fit together. Optionally, the stake **170** can pass through the holes **149** of the tubular portions as adjacent forms interference fit together.

In still another configuration, a tubular portion disposed toward the top surface **126** of the panel **120** may include one or more grooves that engage with complementary protrusions fashioned in a tubular portion disposed toward the bottom surface **128** of an adjacent panel **120**. The grooves and protrusions engage to lock the orientation of one form **102** relative to another form **102**. Depending upon the number of grooves and protrusions one form can be locked relative to another form at any angular orientation. In some configuration, each tubular portion can include a locking screw that passes through one or both of the tubular portions to prevent movement of the forms.

As discussed above, the form **104** can cooperate with the forms **102**. With continued reference to FIG. **3**A, the form **104** may include the panel **120** having a bulkhead bracket **150** mounted to either end of the panel **120**. The form **104** can be disposed between two spaced apart forms **102** to define the end limit of the space that receives the concrete or other material. In the exemplary configuration, the form **104** defines the end of a concrete footing.

Generally, the form **104** can be located at any position along the length of forms **102** to enable the length of a footing or other structure to be changed by simply moving the location of the bulkhead. Thus, the length of the footing or other structure is not limited by the length of the forms. Hence, the bulkhead form **104** in combination with the forms **102** can define any sized space that receives concrete or other materials. The changes in length of the footing, for example, resulting from placing the bulkhead form **104** relative to the form **120** is possible without physically changing the length of each form **102**.

The following discussion is directed to the bulkhead bracket **150** mounted to the end **122**. It is understood that a similar discussion can be provided for the bulkhead bracket **150** mounted to the end **124**. As shown in FIG. **3**A, the bulkhead bracket **150** may have a main body **152** from

which extends two flanges **154**. The main body **152** can slide over the end **122** and completely or partially enclose the end **122**. A portion of the main body **152** can contact one or more of the top surface **126**, the bottom surface **128**, the inside surface **130**, or the outside surface **132**. The main body **152** attaches to either the end **122**, **124** of the panel **120** using a similar configuration to that of end bracket **140**. The bracket **150** can, therefore, include one or more fastener holes **156** that accommodate any type of mechanical fastener, such as, but not limited to, nails, screws, bolts, rivets, etc. Alternately, or in addition to mechanical fasteners, various types of adhesives or epoxies can be used to attach the bulkhead bracket **150** to the panel **120**. Further, each bracket **150** can include one or more protruding structures that attach to the panel **120** as the end bracket **150** is attached to the panel **120**.

As mentioned above, the flanges **154** may protrude from the main body **152**. In one configuration, the flanges **154** are symmetrical, so that the panel **120** with the bulkhead bracket **150** has no top or bottom, although those skilled in the art will realize that this need not be the case. Each flange **154** may contain at least one hole **158** that receives the stake **170**, not shown. By placing the holes **158** in the flanges **154** so that the panel **120** can be disposed between a portion of the holes **158** and the main body **152**, the form **104** can be disposed between two forms **102**. The stakes **170** prevent movement of the bulkhead form **104** longitudinally along the forms **102**, while also limiting lateral movement.

When assembling the system **100** a lengthwise gap may be created between adjacent forms **102**, as shown in FIG. **1**. This occurs because the holes **149** (FIG. **2**) in the end brackets **140** do not align. The system **100** can include skin panel **106**, as illustrated in FIGS. **4**A and **4**B, to bridge this gap between the forms.

With reference to FIG. **4**A, the skin panel **106** may have a first portion **160** and a second portion **164** that is separated from the first portion **160** by an intermediate portion **162**. The separation between the first portion **160** and the second portion **164** provided by the intermediate portion **162** define a channel **168**. This channel **168** may be sufficient to enable placement of the skin panel **106** over at least a portion of two adjacent forms **102**. More specifically, the panel **120** can locate within the channel **168** of the skin panel **106**.

Generally, the skin panel **106** may be fabricated from a unitary piece of metal or metal alloy. Those skilled in the art will realize that other materials can also be used to form the skin panel **106**, such as, but not limited to, plastics, wood and/or wood products, composites, combinations thereof, or other materials having the desired strength and rigidity. Although reference is made to the skin panel **106** being fabricated from a unitary piece of a material, alternate configuration of the present invention can utilize a modular construction where the first portion **160**, the second portion **164**, and/or the intermediate portion **162** interference fit together through complementary structures in the first portion **160**, the second portion **164**, and/or the intermediate portion **162**. Alternately, the second portion **164**, and/or the intermediate portion **162** can fit together, whether alone or through the use of mechanical fasteners, welds, adhesives, or other techniques for joining two or more members.

With reference to FIG. **4**B, the first portion **160** of the skin panel **106** may be placed adjacent the inside surface **130** of the panel **120** of the form **102**. The channel **168** may receive the panel **120** so that the top surface **126** may contact or be close to the intermediate portion **162**. One or more holes **166** in the intermediate portion **162** can receive one or more stakes **170**. These stakes **170** pass through the holes **166** and the holes **149** (FIG. **2**) when they align. If desired, the stakes **170** can be driven into the ground to secure the forms **102** in place and to provide structural support when concrete or other material is poured into the space defined by the system **100**.

In one configuration, the skin panel **106** can be twenty-four inches long. Those skilled in the art will realize that other shorter and longer lengths are possible. Such shorter and longer lengths fall within the scope of the exemplary configuration of the system **100**.

As the system **100** is assembled, a whaler bracket **108** may be used to brace spaced-apart forms **102** to ensure a uniform separation between the forms **102**. Uniform separation of the forms results in the width of the concrete or material deposited between the forms **102** and **104** being uniform. In one configuration, the whaler bracket **108** is made from angle iron, or other metals or metal alloys. Those skilled in the art will realize that other materials can be used, including plastics, wood and/or wood products, composites, etc.

With reference to FIG. **5**, the whaler bracket **108** can have a generally L-shaped configuration, with a first portion **170** and a second portion **172** that is can be generally perpendicular to the first portion **170**. Although reference is made to the first portion **170** and the second portion **172** being generally perpendicular one to another, one skilled in the art will understand that other angular orientations of first portion **170** to second portion **172** are possible. Similarly, even though reference is made to the whaler bracket **108** being generally L-shaped, one in the art will understand that other configurations of the whaler bracket **108** are possible. For instance, the whaler bracket **108** can be J-shaped, planer, curved, polygonal, or any other shape.

Disposed in the first portion **170** of the whaler bracket **108** are fastener holes **174** that can accommodate any type of mechanical fastener, such as, but not limited to, nails, screws, bolts, rivets, etc. Extending from the second portion **172**, in the same direction as the first portion **170**, is a blocking pin **176**. This blocking pin **176** contacts the inside surface **130** (FIG. **2**) of the panel **120** to assist in fixing the whaler bracket **108** in place. It is understood, however, that other configurations of the whaler bracket **108** need not include the blocking pin **176**.

In addition to the exemplary configuration of the whaler bracket **108** including the blocking pin **176** on the second portion **172**, one or more stake holes **178** can be located through the second portion **172**. Multiple stake holes **178** allow the whaler bracket **108** to be placed at various positions to ensure uniform spacing of spaced apart forms **102**.

It is occasionally desired to pour vertical or angled concrete structures, such as footings, as well as horizontal footings or structures. Such a need arises, for example, when the footings need to conform to ground that is uneven. The system **100** may accommodate this need with a vertical panel **110**, as shown in FIG. **6**. In one configuration, the vertical panel **110** is fabricated from metal or metal alloys. Those skilled in the art will realize that other materials are also possible, including, but not limited to, plastics, wood and wood products, composite materials, or other materials having the desired strength and rigidity.

With reference to FIG. **6**, a single vertical panel **110** is shown. However, with reference to FIG. **1**, the vertical panel **110** can be used as a pair of panels that form three or four closed sides, with a fifth side being the uneven ground discussed above and the sixth side being open to receive the concrete or other material poured into the spaced defined by the two vertical panels **110**. The vertical panel **110** can include a first panel member **180** and a second panel member

182. The panel members 180 and 182 are disposed generally perpendicular one to another. Although reference is made to first the panel member 180 and the second panel member 182 being generally perpendicular one to another, one skilled in the art will understand that other angular orientations of the first panel member 180 to the second panel member 182 are possible.

Disposed in the first panel member 180 and the second panel member 182 is a plurality of fastener holes 184. The fastener holes 184 can accommodate any type of mechanical fastener, such as, but not limited to, nails, screws, bolts, rivets, etc. The fastener holes 184 allow additional structural reinforcements to be attached to the vertical panel 110, such as when the vertical panel 110 is used to abut uneven ground at an angle. These additional reinforcements can be attached on either an inside or an outside surface of the vertical panel 110 and can be fabricated from wood, plastic, metal, composites, or any other suitable material that provides the desired reinforcement properties or characteristics.

In the exemplary configuration of the vertical panel 110 shown in FIG. 6, the panel 110 can include a mounting member 186 attached to the second panel member 182, however the mounting member 186 can optionally attached to the first panel member 180. This mounting member 186 can include a stop 188 and a positioning member 190. The stop 188 can include a plurality of holes 192 that can receive the stakes 170 (FIG. 1). The stop 188, of one of the vertical panels illustrated in FIG. 1, contacts a portion of the form 102 to both support the vertical panel 110 and prevent the vertical panel 110 from moving toward the bottom surface of the form 102. Another one of the vertical panels illustrated in FIG. 1 contacts a portion of another one of the forms 102. In both cases, the stop 188 can rest upon top surface 126 (FIG. 1) of panel 120. Similarly, the positioning member 190 of each vertical panel abuts one of the vertical surfaces of the form 102 or 104, and more specifically the panel 120, to prevent the vertical panel 110 from shifting when the concrete or other material is deposited into the space define by the forms and panels. To aid with preventing movement of the vertical panel 110, the stakes 170 pass through the holes 192 and through holes formed in optionally tie 194, which extends between the two vertical panels 110, to be driven into the ground or surface upon which the system 100 is disposed. This tie 194 also partially extends along a surface of vertical panels 110 prevent movement of the vertical panels 110 during pouring or depositing of the concrete or other material deposited into the space defined by the vertical panels 110 and other forms or panels of system 100.

Generally, the vertical panel 110, with the panel members 180, 182 and the mounting member 186 can be fabricated from a unitary piece of a material or from multiple pieces attached or joined together. Attaching or joining multiple pieces of material can occur through use of mechanical fasteners, welds, adhesives, or other techniques for joining two or more members together. In this configuration, the vertical panel 110 is made from metal, however, the vertical panel 110 can be fabricated from wood, plastic, metal, allow, composites, or any other suitable material that provides the desired strength and rigidity.

Returning to FIG. 1, in an exemplary configuration, the stakes 170 can be made from metal, and be about 0.75 inches in diameter. The stakes 170 can be of a sufficient length to be easily driven into the ground through holes in the various components discussed above. This provides for additional support when the concrete is poured into the forms. Those skilled in the art will realize that other materials, diameters, and varying lengths for the stake 170 are also possible. For example, the stake 170 can be made from plastic, wood, composites, or other suitable materials.

The system 100 provides many advantages over the prior art. The system 100 eliminates the old way of nailing boards together, which causes weak corners, extreme wear, and splintering of the lumber. Both the end brackets 140 and the bulkhead brackets 150 fit at least partially over the exposed ends of the panels 120 of the forms 110, thus eliminating the cracking, splitting and splintering caused by nailing, while increasing the life of the forms by many times that of conventional lumber forms. The system 100 also eliminates the wasting of expensive nails and lumber, since the forms can be reused.

The system 100 allows the connection of two forms 110 with a steel pin or stake. Once pinned together, the system 100 allows forms to be connected together in a straight line, ninety-degree inside and outside corners, and any corner or angle in between. This is a great improvement over prior art systems that use channels and inserts, since these prior art systems can only be joined at angles of about 90 degrees.

Using the skin panel 106, the system can define a space to receive concrete or other materials of any desired dimension, regardless of the specific length of the individual forms. Any gaps between the forms 102 are bridged with the skin panel 106. Finally, the system 100 using the form 104 allows the end of the space that receives the concrete or other material to be placed anywhere inside the spaced apart forms 102. This allows for a system 100 that can include a fixed number of forms each having a fixed length, yet still accommodates a space of any required dimension.

The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

What is claimed is:

1. A system for holding poured material in a desired shape until the concrete sets, the system comprising:

a plurality of forms, each said form having a panel with a first end, a second end, and a first surface and a second surface extending between said first end and said second end, and two end brackets, a first end bracket attached to said first end and a second end bracket attached to said second end, each of said first end bracket and said second end bracket comprising a flange mounted to said panel and a tubular portion extending from said flange, said tubular portion of said first end bracket extending from said first surface toward said second surface and terminating distal to said second surface and said tubular portion of said second end bracket extending from said second surface toward said first surface;

a plurality of stakes slidably cooperating with said plurality of forms, one stake of said plurality of stakes slidably cooperating with two adjacently positioned forms of said plurality of forms when said hole of said first end bracket of one form of said plurality of forms aligns with said hole of said second end bracket of another form of said plurality of forms;

at least one skin panel mounted between two spaced apart forms of said plurality of forms, wherein said skin panel comprises a first portion separated from a second portion by an intermediate portion, said first portion

and said second portion extending form said intermediate portion in the same direction and forming a channel that receives a portion of said at least two forms; and

at least one bracket secured to a top of one or more of said forms to maintain a spacing between spaced apart and parallel forms of said plurality of forms.

2. The system of claim **1**, further comprising at least one bulkhead form mountable between two of said plurality of forms that are spaced apart one from another, said at least one bulkhead form maintaining a spacing between said two forms.

3. The system as recited in claim **2**, wherein said at least one bulkhead form comprises:

a panel comprising a first panel end, a second panel end, and a first panel surface and a second panel surface extending between said first panel end and said second panel end; and

two bulkhead brackets mounted to said panel, each said bulkhead bracket comprising a first flange extending from said panel and a second flange extending from said panel, one of said plurality of forms being disposed between said first flange and said second flange.

4. The system as recited in claim **3**, wherein said first flange and said second flange each further comprise a hole, said hole receiving one of said plurality of stakes to prevent movement of said at least one bulkhead bracket relative to said plurality of forms.

5. The system as recited in claim **1**, wherein each said panel is fabricated from a material selected from a group consisting of a natural material, a synthetic material, a metallic material, a composite material, or a metallic alloy.

6. A system for holding poured material in a desired shape until the concrete sets, the system comprising:

a plurality of forms, each said form having a panel with a first end and a second end and a first end bracket mounted to the first end and a second end bracket mounted to the second end, each said end bracket comprising a flange mounted to said panel and a stake receiving portion, said stake receiving portion of said first end bracket extending from a top portion of said panel toward a bottom portion and said stake receiving portion of said second end bracket extending from said bottom portion toward said top portion;

a plurality of stakes slidably cooperating with said plurality of forms, one stake of said plurality of stakes slidably cooperating with two adjacently positioned forms of said plurality of forms when said hole of said first end bracket of one form of said plurality of forms aligns with said hole of said second end bracket of another form of said plurality of forms;

a pair of vertical panels, each said vertical panel being fixed on a top surface of said at least one of said plurality of forms;

at least one bracket secured to a top of one or more of said forms to maintain a spacing between spaced apart and parallel forms of said plurality of forms; and

at least one bulkhead form mounted to two spaced apart forms of said plurality of forms.

7. The system as recited in claim **6**, further comprising at least one skin panel mountable to two of said plurality of forms.

8. The system as recited in claim **7**, wherein said at least one skin panel comprises a first portion separated from a second portion by an intermediate portion, said first portion and said second portion extending from said intermediate portion in the same direction and forming a channel that receives a portion of said at least two forms.

9. The system recited in claim **8**, wherein said first portion and said second portion have the same length.

10. The system recited in claim **8**, wherein said intermediate portion further comprises a plurality of stake receiving holes.

11. The system as recited in claim **10**, wherein one of said plurality of stakes passes through at least one of said plurality of holes in said intermediate portion and said hole in said end bracket, said stake being driven into a portion of ground to secure said system in place.

12. The system as recited in claim **6**, wherein each said vertical panel further comprises a mounting member that prevents vertical movement of said vertical panel relative to at least one of said plurality of forms.

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