Dec. 5, 1972 F. L. ECKER 3,705,220

METHOD FOR CASTING MATERIAL USING A COLLAPSIBLE STRUCTURE

Filed June 30, 1971 5 Sheets-Sheet 1

FIG. 1

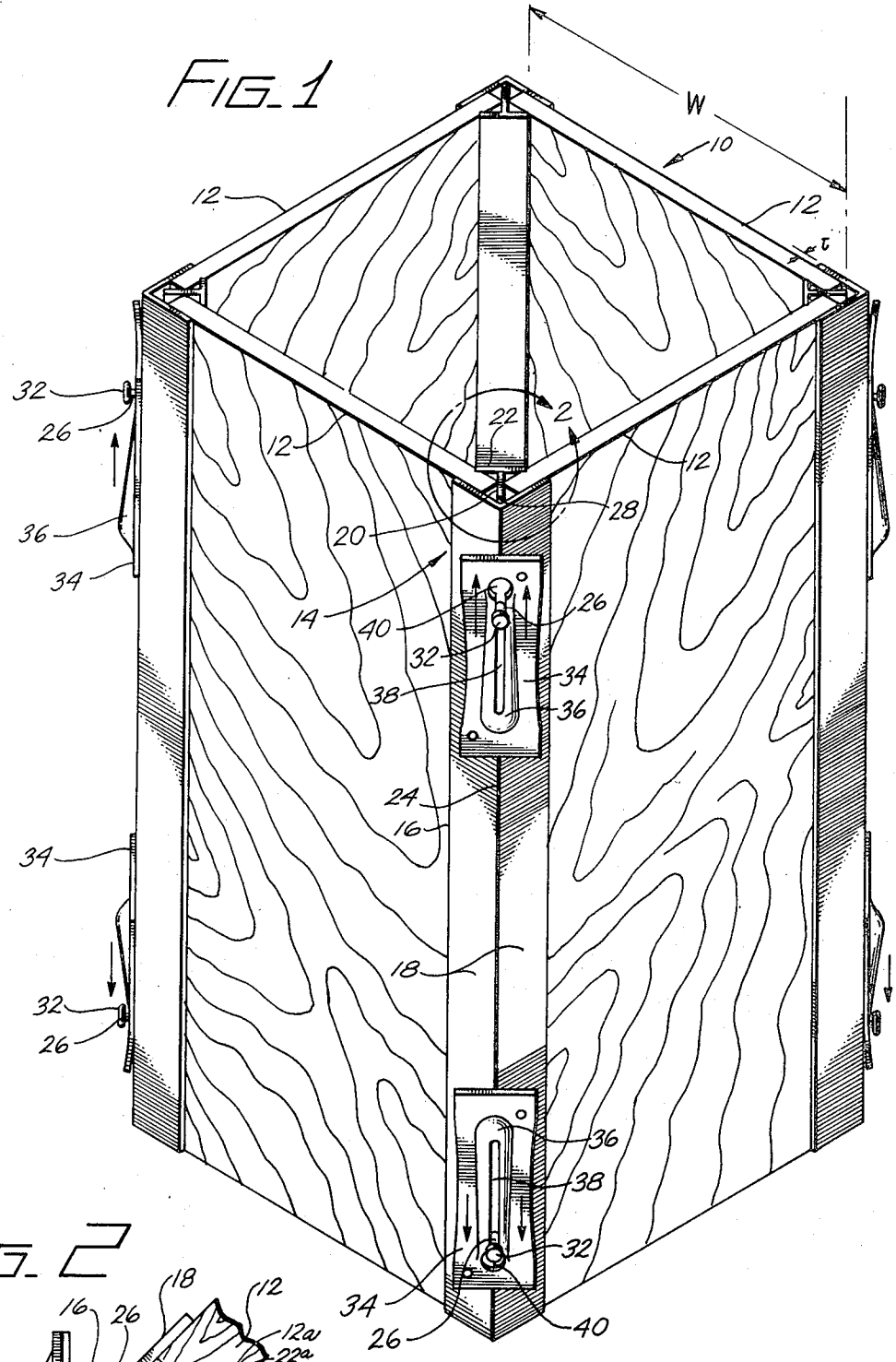
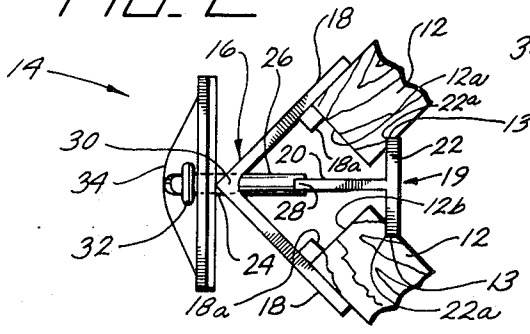


FIG. 2



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FIG. 5

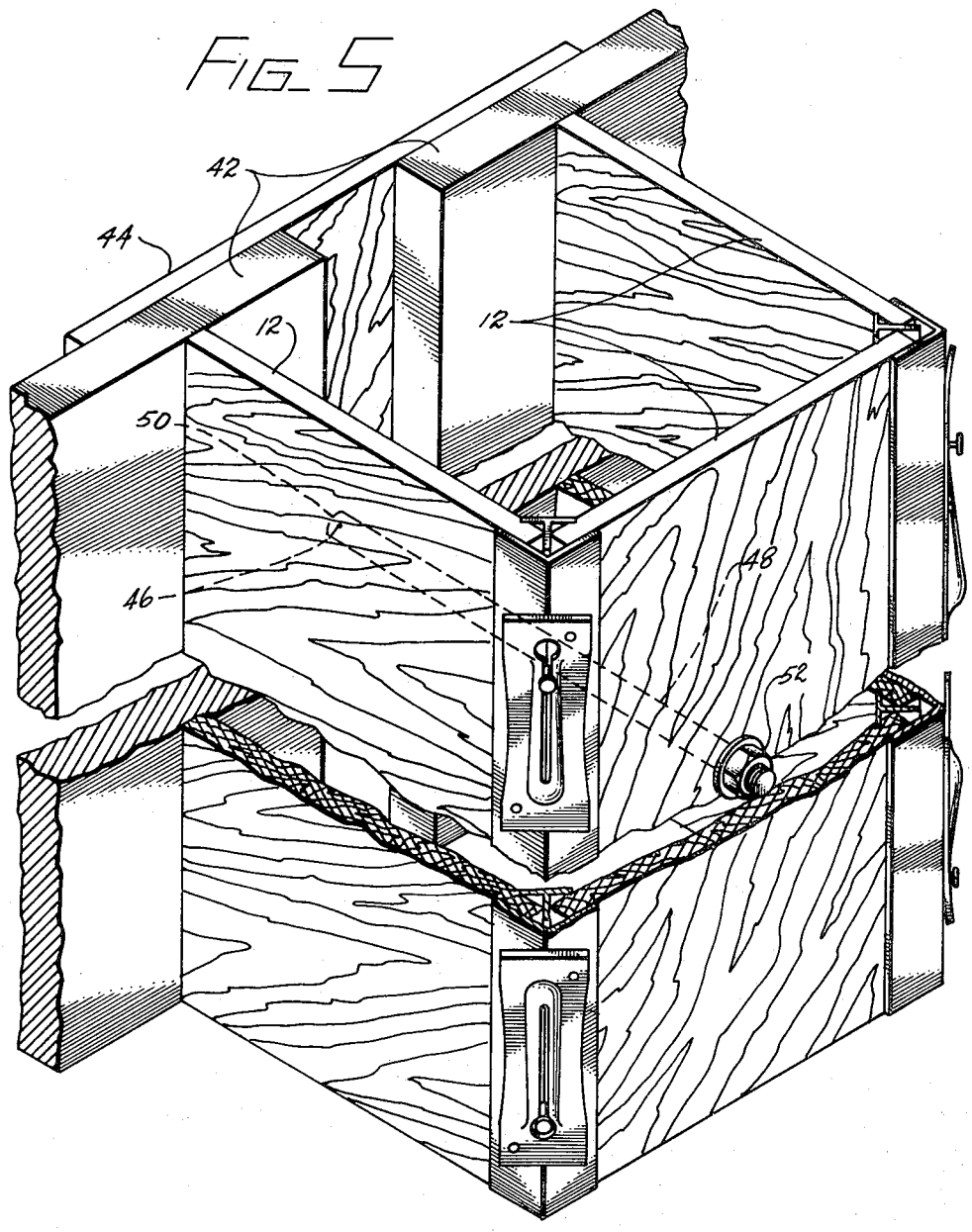


FIG. 3

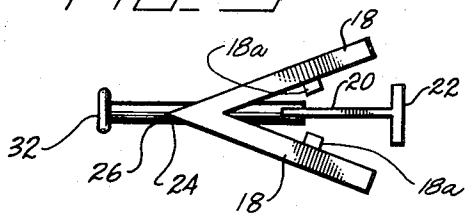
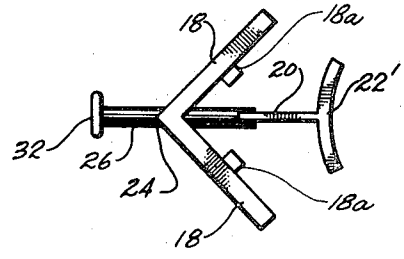


FIG. 4



METHOD FOR CASTING MATERIAL USING A COLLAPSIBLE STRUCTURE

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FIG. 7

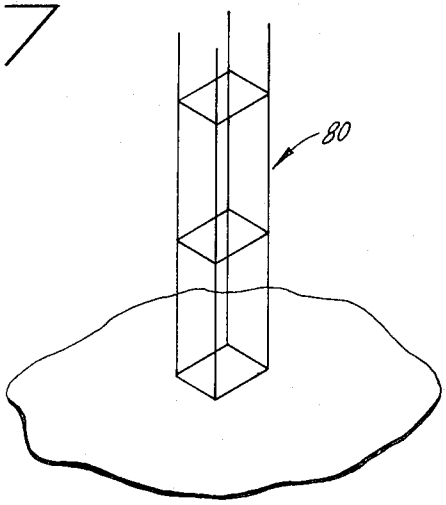


FIG. 8

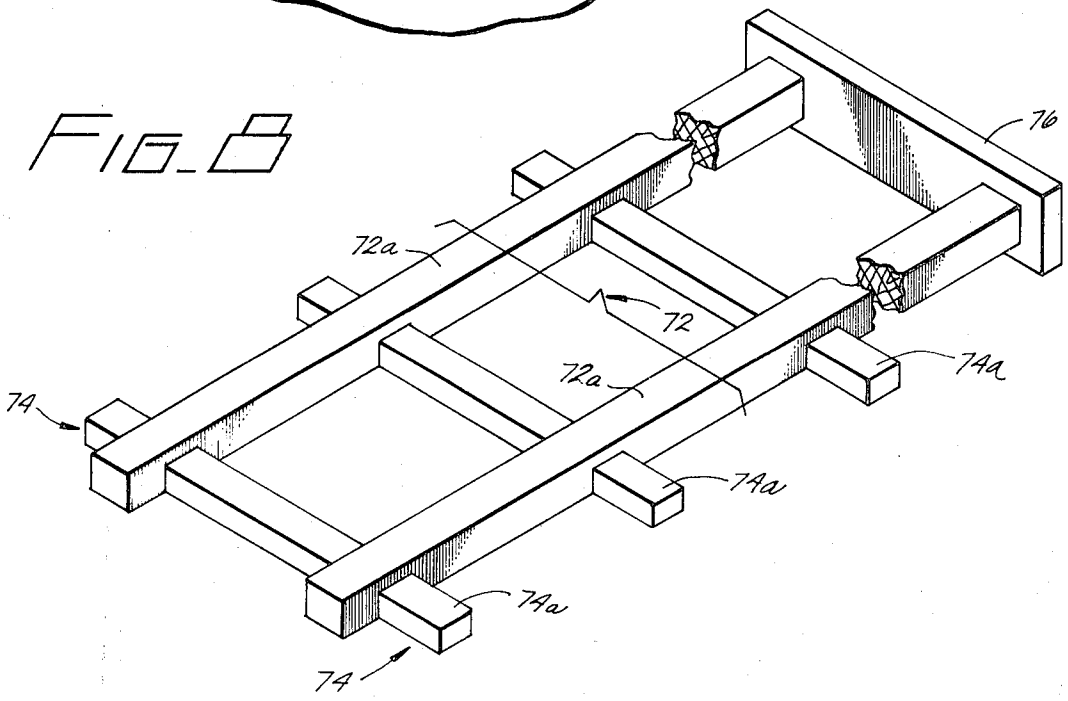
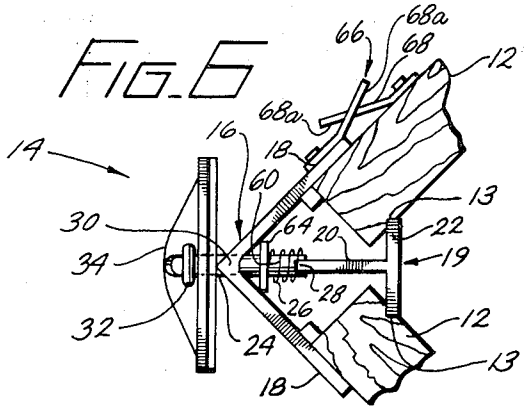


FIG. 6



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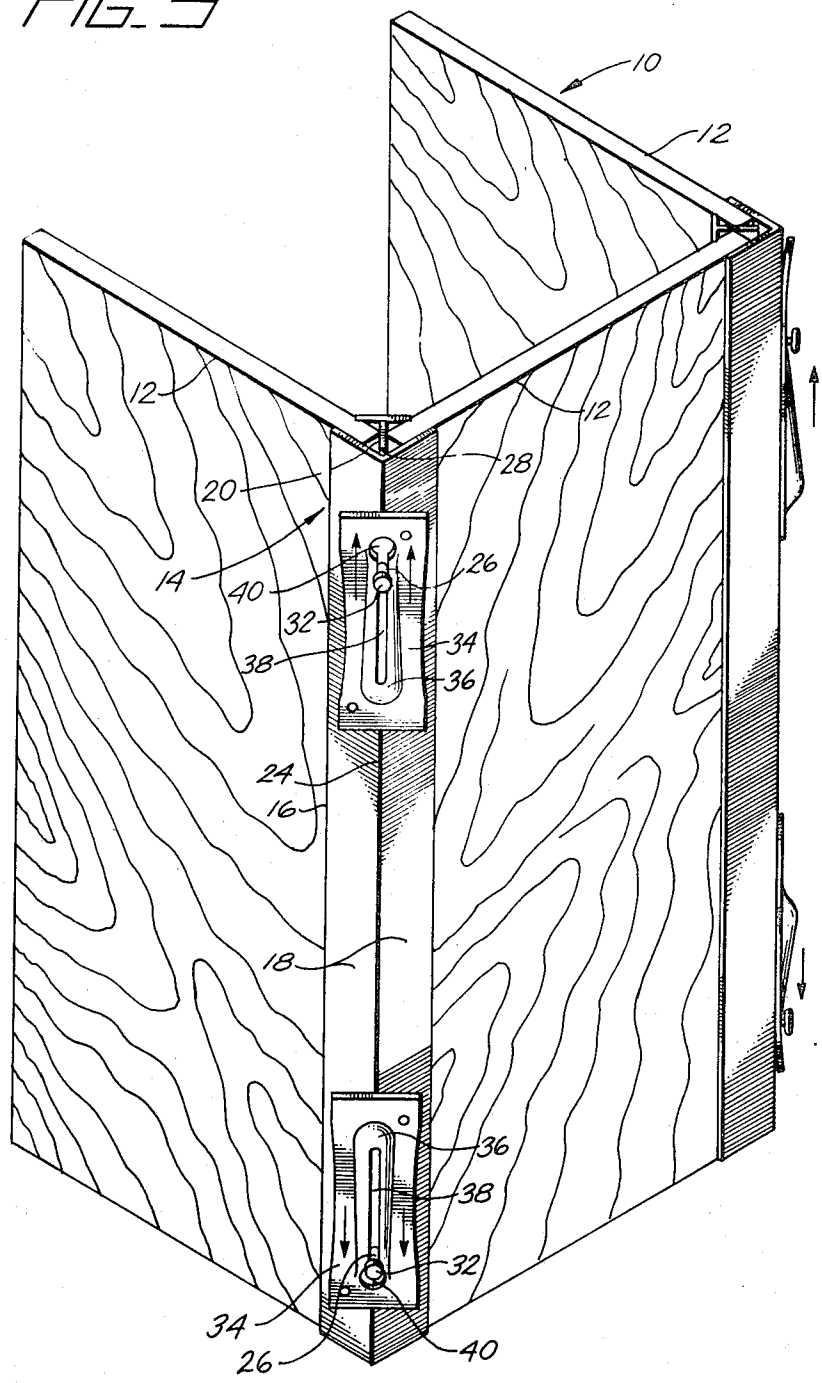
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METHOD FOR CASTING MATERIAL USING A COLLAPSIBLE STRUCTURE

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FIG. 9



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FIG_11

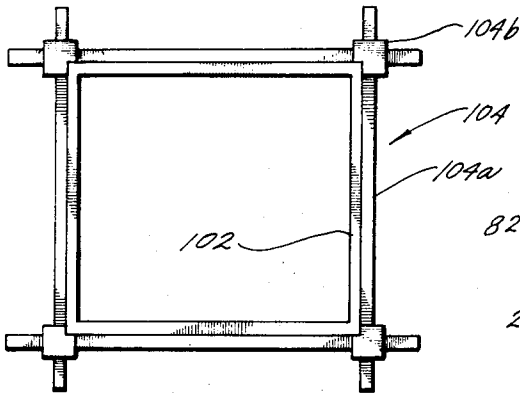
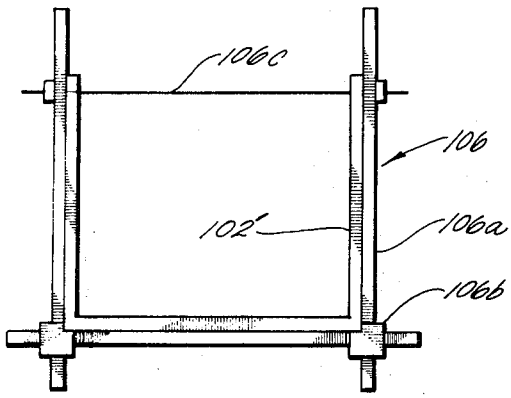


FIG_12



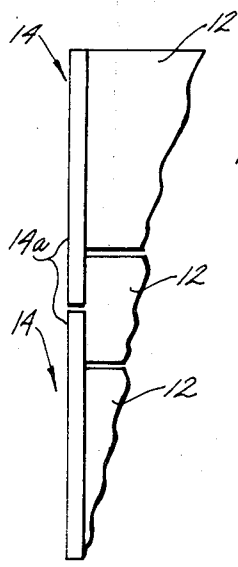
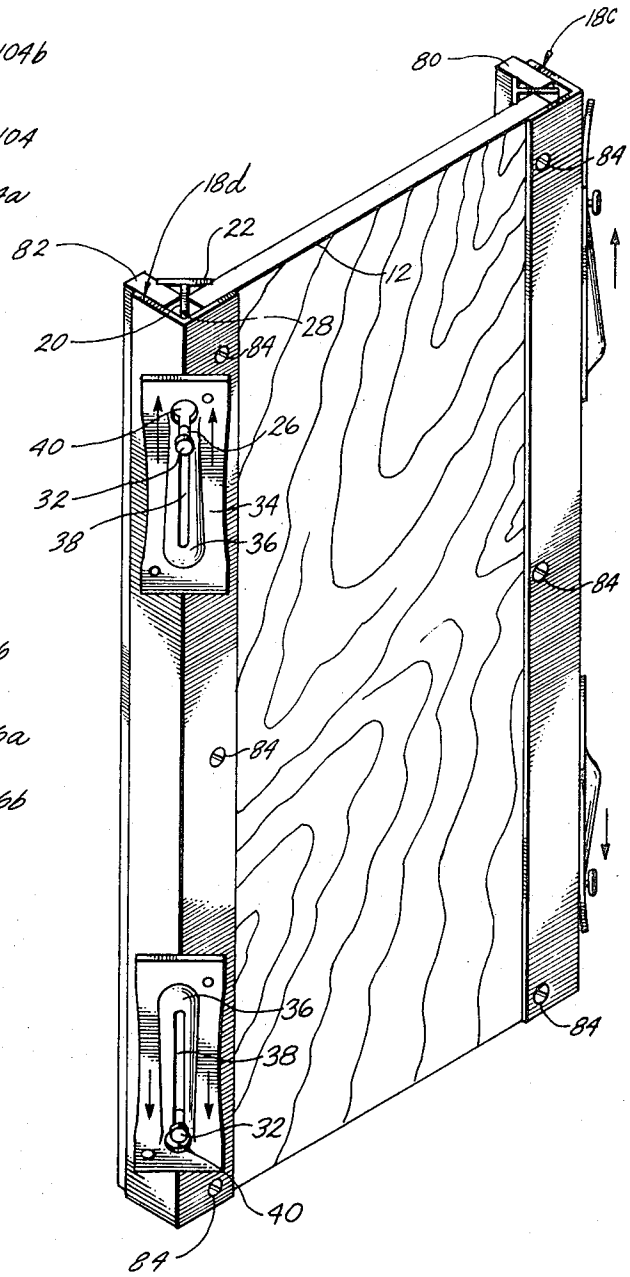


FIG_13

FIG_10



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United States Patent Office

3,705,220

Patented Dec. 5, 1972

3,705,220

METHOD FOR CASTING MATERIAL USING A COLLAPSIBLE STRUCTURE

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Continuation-in-part of application Ser. No. 12,759, Feb. 19, 1970. This application June 30, 1971, Ser. No. 158,490

Int. Cl. E04g 13/02

U.S. Cl. 264—31 7 Claims

ABSTRACT OF THE DISCLOSURE

Apparatus for rigidly locking together a collapsible structure including an outer clamping structure having first and second interconnected sides. The sides are spaced apart and each side receives one of a pair of form sides to be clamped. The facing surfaces of the first and second sides each have a stop defining a plane against which the edges of one of the form sides may be positioned. The outer clamping structure has at least one opening therethrough intermediate the sides. A wedge is positioned for engagement on opposite sides of each of the form sides from the first and second sides of the outer clamping structure. A coupling member movably extends through the opening and has an end coupled to the inner clamping member. A retracting and lock member retracts the wedge toward the first and second sides to thereby wedge the pair of form sides therebetween.

A method for constructing a concrete structure is disclosed utilizing a collapsible form which includes form sides and corner clamps, and assembled form clamps. Each corner clamp has a pair of interconnected and diverging side members, a wedge and a retracting lock member for drawing the wedge toward the side members. The steps comprise the following: Position the edges of at least two of such form sides in between the side members and wedge of at least one corner clamp. Actuate the retracting lock member of the corner clamp to draw the wedge thereof into engagement with the form sides thereby rigidly locking the form sides between the wedge and the side members to form a multi-sided form assembly. Affixing the assembled form clamps to the form assembly to thereby rigidly hold the form assembly in place while pouring liquid concrete therein. Position liquid concrete into the thus formed form assembly.

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of application Ser. No. 12,759, filed Feb. 19, 1970, now abandoned.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to clamping devices for clamping together a pair of members and a method for using such clamping devices for fabricating structures out of a liquid concrete.

Description of the prior art

Structures, such as concrete columns or pillars and walls with doorways and/or corners, have long been cast or molded using a form or mold of the corresponding geometric configuration. The liquid, in an initial liquid state, is poured into the form or mold and then left to harden. After the hardening process is complete, the form is disassembled, leaving the desired upstanding structure.

A typical form or mold, useful in fabricating such structures, generally employs the use of a plurality of planar form sides tied together so that the edges from each of two form sides are effectively joined. Most geometrically configured forms can be fabricated simply by using the needed number of form sides and joining their edges at predetermined angular relationships.

The casting of concrete has posed a serious problem because of the need to reduce or minimize the ever increasing cost of labor and material. Also, construction of concrete structures pose special problems due to the large size of many of these structures.

Several different kinds of forms and techniques have been used in the past to cast concrete structures. First, it is quite common to fabricate forms out of wood form sides by nailing theme together. However, this fabrication technique is slow and costly. It is slow and costly because of the large amount of time involved to cut and nail the wood form sides together and because the form sides normally cannot be used over once or twice. An additional serious drawback is that when the cement is in a liquid state, the liquid tends to run out at the corners or joints in the form sides. This is true as it is virtually impossible to form a tight seal in the corner joints to prevent leakage.

To cut labor and material costs and reduce the time for fabrication, corner ties of various types have been used to clamp the wood form sides together. One type of clamp consists of a network of metal bars with a tie member at the joint of the metal bars to rigidly hold the bars together. For example, when making a four-sided column form, a network of four metal bars is positioned around the wooden form sides at predetermined increments along the form sides. However, such devices are difficult to assemble and a certain amount of nailing of the form sides is still required. A most serious drawback of such devices is that there is leakage at the corners of the wooden form sides causing defective corners in the cement being cast. Additionally, support is only given to the form sides at the point where each network of metal ties is positioned.

Another type of prior art collapsible form is the magnesium wrap around column form. However, this form only comes in circular shapes and it must be cut to the desired length.

Another type of prior art collapsible form is known which has four large aluminum angles spaced apart and rigidly held in a fixed relationship by locking bars or column clamps. An angle fillet is provided in between each aluminum angle and a bolt is connected to the fillet for holding the corresponding angle and fillet together. After the aluminum angles have been rigidly affixed together by the column clamps, a number of panels are slipped in between the angles and fillets to form the actual form sides for the concrete form. A nut threaded on each of the bolts is then tightened to draw the angle fillet against the panels to thereby hold them in place in between the angle fillet and the corresponding angle sides. However, it should be noted that the sides of angle fillets are generally flat and press against the sides of the panel, and as a result cannot be used to form a rigid form structure independently of the locking bars.

SUMMARY OF THE INVENTION

Briefly, an embodiment of the present invention is an apparatus for rigidly locking together a collapsible form structure. Included is an outer clamping structure having diverging first and second interconnected sides. Each of the sides is adapted for providing support for one of a pair of form sides to be clamped. In contrast to the above-mentioned prior art device, the facing surfaces of each of the first and second sides have a stop defining a plane against which the edge of one of the form sides may be positioned. The outer clamping structure has at least one opening therethrough intermediate the sides. A wedge is positioned for engagement on opposite sides of each of the pair of form sides from the first and second sides. A coupling member movably extends through the opening and has an end coupled to the wedge. A retracting and lock member retracts the wedge toward the first and second sides to thereby wedge the pair of form sides therebetween.

With such structure, the outer clamping structure and the wedge can be used to rigidly clamp a pair of form sides independently of any separate locking bars or the like. The stop defines a plane against which the edges of the form sides can be reliably repositioned each time the form side is placed into the clamping and wedging structure. Additionally, due to the fact that a wedge is provided for engagement with the form sides, a stop and wedge provides a rigid structure for rigidly locking the form side in place.

In a preferred embodiment, each of the pair of form sides has a groove formed along the edge of the form side which engages the stop. The groove is a prefixed distance away from the edge so that when the form side is positioned in between the outer clamping structure and wedge, the stop provides a reference which allows the wedge to be positioned into the groove and thereby give secure rigidity to the form assembly during raising and lowering of the assembly.

Preferably, the wedge has first and second spaced apart edges which engage and extend into the groove on each of the pair of form sides to thereby rigidly lock the form sides into place against the sides of the clamping structure.

Briefly, a method according to the present invention is for constructing a concrete structure having a chamfered corner utilizing a collapsible form which includes form sides and corner clamps, and assembled form clamps. Each corner clamp has a pair of interconnected and diverging side members, a wedge and a retracting lock member for drawing the wedge toward the side members. Interconnected are multiple form sides and at least one corner clamp thereby forming a portion of a form assembly for containing liquid concrete by the steps of positioning the edges of at least two of the form sides in between side members and the wedge of the corner clamp and retracting the retracting and lock member of the corner clamp to drive the wedge into engagement with the form side and thereby rigidly lock the form side between the wedge and side members to form a rigid, multi-sided form assembly. Subsequent to the formation of the rigid, multi-sided form assembly, it can be positioned at the proper place and then an assembled form clamp is affixed to the multi-sided form assembly to thereby rigidly hold the form assembly in place while pouring liquid concrete therein.

Also, a method according to the present invention is for constructing a cement puller having a chamfered corner utilizing a collapsible form which includes the above form sides and corner clamps. Each corner clamp has a pair of interconnected and diverging side members, a wedge member and a retracting lock member for drawing the wedge toward the side members. A first and second corner tie is affixed along the opposite edges of the first form side to form a single form side assembly leaving free the side member on one side of the wedge of each

corner tie. The steps of the method are as follows: Position opposite first and second edges of a second form side in between the side members and wedge, respectively, of third and fourth corner clamps. Position third and fourth form sides, respectively, in between the wedges and the remaining side members of the third and fourth corner clamps. Actuate the retracting and lock members of the third and fourth corner clamps to drive the wedges thereof into engagement with the second, third and fourth form sides, thereby rigidly locking the form sides between the wedges and the side members to form a three-sided form assembly. Position the single form side assembly against the open end of the three-sided form assembly with edges of the third and fourth form sides in between the three side members and the wedge of the first and second corner clamps. Actuate the retracting and lock members of said first and second corner ties to drive the wedges thereof into engagement with the first, third and fourth form sides, thereby rigidly locking the form sides between the wedges and side members to form a four-sided column form assembly. Positioning liquid concrete into the four-sided column form assembly.

The method in accordance with the present invention for casting columns is of special importance. The method provides a labor-saving procedure which is of prime importance in today's high cost labor market. Thus, it is possible to form a partial three-sided collapsible form assembly, position the form assembly about implanted steel reinforcing rods and then add the remaining single sided form assembly to complete the assembly. Considerable labor saving is achieved by eliminating the need for placing external locking members to hold the angles in place as required in the aforementioned prior art apparatus. Also, the time consuming task of placing form sides into the locked corner clamps is eliminated.

BRIEF DESCRIPTION OF THE DRAWING

These and other aspects and advantages of the present invention are more clearly shown, and described below, with reference to the drawing in which:

FIG. 1 shows a column form with form clamps and embodies the present invention;

FIG. 2 shows a top elevation view of one corner of the column form shown in FIG. 1;

FIG. 3 represents an alternative embodiment of the form clamp and embodies the present invention;

FIG. 4 represents another alternative embodiment of the form clamp and embodies the present invention;

FIG. 5 shows a form for fabricating a tilt-up panel and embodies the present invention;

FIG. 6 shows a top elevation view of one corner of an alternate embodiment of the column form shown in FIG. 1;

FIG. 7 is a perspective view of a steel reinforcing rod structure embedded in a floor about which the column form of FIG. 1 may be placed by practicing the method in accordance with the present invention;

FIG. 8 is a jig for use in practicing the method in accordance with the present invention;

FIG. 9 shows a three-sided column form assembly constructed practicing the method of the present invention;

FIG. 10 shows a single sided column form assembly constructed practicing the method of the present invention;

FIG. 11 is an end view of a collapsible form structure having assembled form clamps placed around the collapsible form after assembly of the collapsible form;

FIG. 12 is an alternate embodiment of a collapsible form structure having an assembled form clamp added to the collapsible form structure after assembly; and

FIG. 13 is a sketch illustrating the way in which the form sides are positioned in the corner clamps when multiple corner clamps are positioned end to end.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A column form **10** is shown in FIG. 1 consisting of four flat, rectangular-shaped form sides **12**. Each form side is clamped at two of its ends to an adjacent form side by means of one of form clamps, also called corner clamps, **14**. Thus, a concrete column, rectangular in cross-section, may be fabricated by pouring liquid concrete into form **10**, allowing it to harden and then disassembling form **10**.

Liquid concrete as used herein includes any number of materials, each of which have the characteristic that it is initially in a liquid or semi-liquid state and after appropriate curing, harden and become solid.

This invention involves a method and apparatus for fabricating most desired types of structures out of liquid cement. Corner clamp **14** is an integral part of such method and apparatus. Thus, corner clamp **14** may be used to assemble forms or molds adapted for the fabrication of doorways, ends of walls, corners, and tilt-up panels (the latter being shown in FIG. 5 and described below) as well as columns.

As shown in FIGS. 1 and 2, corner clamp **14** includes a V-shaped outer metallic locking member **16** having a pair of elongated planar sides **18**. The sides **18** have ends rigidly joined together and the opposite free ends spaced apart from each other. The sides can be fabricated with any desired angular relationship therebetween. Thus, since corner clamp **14** is used with a form **10** having a rectangular-shaped cross section, the sides **18** are disposed at 90° relative to each other. Each side **18** is adapted to receive in juxtaposed relation, an end portion of one of form sides **12**. Thus, each outer locking member **16** is in juxtaposed receipt of the ends of a pair of form sides **12**. This relationship establishes the desired geometric configuration of form sides in order to cast the shape of structure.

Corner clamp **14** also includes an inner metallic wedge **19**. The wedge **19** is T-shaped, having members **20** and **22**. The wedge **19** is elongated, extending along the entire length of the outer locking member **16**. The member **22** is positionable so that it extends in between the sides **18** of the outer locking member **16** and has a face extending out of the V-shaped outer locking member **16**. The member **22** locks a form side in place against the sides **18** and prevents leakage of liquid from the form. The member **20** gives rigidity to the inner locking member. The member **20** extends perpendicular to member **22** and toward a vertex **24** defined at the intersection of sides **18**.

Also of special importance in a preferred embodiment, the form sides **12** each have a notched groove **13** (see FIG. 2) into which the two edges **22***a* of the member **22** of the inner clamping member extend. The notches **13** allow the wedge member **22** to interlock with the form sides and provide a self-contained, rigid structure. Thus the edges **22***a* of the wedge member **22** extends into the grooves **13** formed in the corresponding form sides and, as a result, the member **22** forms a wedge extending diagonally in between the form sides to rigidly wedge and hold the form sides against the sides **18** and prevent slippage.

Also of considerable importance to the present invention are stops **18***a* provided along each of the opposing faces of sides **18**. Actually the stop **18***a* is a series (only one being shown) of raised members affixed along the side **18** perpendicular into the paper as seen in FIG. 2, thereby defining a plane against which the end **12***a* of form side **12** may be positioned. The position of stop **18***a* is selected to that the edges **22***a* and **22***b* of the member **22** fit into the groove **13** formed in the corresponding form sides **12** each time it is reinserted and clamped. In this manner, the wedge **19** can be released allowing the form sides **12** to be removed and subsequently reinserted into the corner clamp **14**, the position of stop **18***a* permitting the edge

22*a* of the member **22** to be reactuated back precisely into the groove **13**. Thus the stop **18***a* forms a reference against which the end **12***a* of the form side **12** may be positioned. In addition, it will be recognized that the stop **18***a* cooperates with the wedge **19** to help form a rigid structure. Due to the structure, the need for external ties and bracing while setting up the forms is eliminated. External bracing is only needed to hold the form together due to the much greater pressures of liquid material being poured into the form for casting.

Corner clamp **14** further includes a plurality of metallic pins **26** spacially connected longitudinally along the free end **28** of member **20**. Each pin is welded to a predetermined spot along free end **28**. Each pin has a corresponding aperture **30** defined within outer plate member **16** through which the pin is movably positioned. Each pin contains an enlargement or head **32** which is larger than aperture **30**. Thus, movement of pins **26** through apertures **30** is limited in one direction by heads **32** and in the other direction by member **22** contacting the inner surfaces of sides **18**. This relationship allows the lateral movement of the wedge **19** relative to outer locking member **16**.

Each of corner clamp **14** lastly includes a tie wedge **34** which forms means for forcibly moving the inner locking member laterally toward outer locking member **16** until member **22** bitingly engages the inside of the pair of form sides **12** in juxtaposition with sides **18**. The tie wedge **34** then locks (as will be explained below) the form sides **12** by maintaining the force which causes inner and outer locking member **16** and **19** to engage the pair of form sides.

Tie wedge **34** is substantially rectangular in shape and has an inclined surface portion **36**. Within the inclined portion is an elongated slot-shaped aperture **38** adapted for sliding receipt of pin **26**. The width of the aperture is larger than the smaller diameter of pin **26** but smaller than the enlarged head **32**. An enlarged opening **40** is defined at one end of elongated aperture **38** at the low end of the tapered portion **36** through which the head **32** will pass for assembly and disassembly.

The tie wedge is used by positioning pin **26** through opening **40** and then moving the wedge in a direction so that the shoulder formed by the enlarged head **32** is slidably moved up the inclined portion **36**. As a result, the head **32** is necessarily forced further away from the outer locking member **16** as it is progressed along the incline. The direct result is that the inner locking member is forcibly moved toward outer locking member **16** until member **22** forcibly engages the respective pair of form sides **12** in the position shown in FIG. 2. A further movement of the tie wedge **34** in the same direction causes an acute frictional engagement of head **32** with the inclined portion, thereby effectively locking the two together.

It will be evident to those skilled in the art that the pins need not have an enlarged head. For example, the pins may have a pair of grooves along the sides into which the sides of the elongated aperture **38** in the inclined portion extend.

What has been disclosed is a wedge and head **32** which form a means for retracting and locking the wedge **19**. It will be evident to those skilled in the art that other retracting and locking means may be used to retract and lock the wedge **19** in place. Thus, the pin **26** may be threaded and a nut threaded thereon to engage outer locking member **16** and draw the wedge into wedging relation with form sides **12**.

It should now be obvious to those skilled in the art that column corner clamp **14** may be used to assemble most any geometrically desired form or mold merely by using outer locking member **16** having the appropriate angular relationship between its planar sides **18**. Thus, FIG. 3 shows an angle less than 90° by way of example.

An important aspect of the present invention resides in the absence of leakage between the clamped edges of the

form sides. As more clearly seen in FIG. 2, liquid material and/or water is prevented from leaking out between the free edges because of the engagement of member **22** with form sides **12** and the continuous contact of the inner locking member **20** along its longitudinal extent with the form sides. Thus, even though only a couple of tie wedges are used in correspondence with pins **26**, the engagement force of member **22** with the form sides is substantially constant along its longitudinal extent.

Another important aspect of the present invention resides in the inherent chamfering of the edges of any structure formed. This is a direct result of the angular position of inner clamping member **22** (see FIG. 2). In regard to such chamfering, it should be noted that a rounded edge could also be fabricated by using a semi-circular configured member **22** as shown in FIG. 4. In fact, other shapes for member **22** can be fabricated so as to achieve any desired edge configuration to the corner of the formed structure. However, to provide the rigid structure, the edges of member **22** must be designed to engage the form sides and form a wedge therebetween to rigidly hold the form sides in place against the sides **18** apart of the structure in the grooves **13** in each form side into which the edge of the wedge is inserted.

FIG. 5 shows the corner clamp **14** employed in the assembly of a tilt-up panel form. The exact same principles are involved as in the use shown in FIG. 1. Here, however, only a pair of clamps **14** are used to clamp three form sides **12** at right angles so as to form three sides of a form of rectangular cross section. The three-sided form is then positioned with its open side in juxtaposition with walls **42**. A fourth form side **44** is placed in juxtaposition with the walls **42** on their other side with mid-portion **46** of form side **44** disposed between the walls **42**.

A form side tie bolt **48** rigidly connects the form side **44** to the form side **12** in parallel relationship, the bolts passing through corresponding apertures **50** in the above two form sides and secured by nuts **52** (shown only on one end) on the bolt ends. A completed form is thereby attained. The hardening liquid poured into the form and allowed to harden has the effect of pinning the walls **42** together.

Refer now to the alternate form clamp shown in FIG. 6. Form clamp shown in FIG. 6 is essentially the same as that shown in FIG. 2 except that a spring **60** is added to normally bias or force the wedge **19** to the right or away from the sides **18** of the outer locking member **16**. To this end, spring **60** is a coil compression spring having one end acting against the free end **28** of member **20** and its opposite end acting through a washer **64** against the opposing faces of the sides **18**. Thus when the tie wedge **34** is deactuated, the coil compression spring **60** will tend to force the wedge **19** to the right away from the sides **18** and thereby allow the form sides **12** to be easily positioned between the wedge **19** and the opposing faces of the sides **18**.

It will be understood to those skilled in the art that other types of springs can be used for actuating the wedge **19** away from the sides **18**. For example, a bent or arcuate-shaped leaf spring can be positioned in between the diverging sides **18** and the free end of the member **20** of the wedge. With such an arrangement, a hole can be provided through the leaf spring through which the pin **26** passes. The leaf spring then bears against the member **20**, normally forcing the wedge away from the sides **18**.

FIG. 6 also shows another alternate embodiment of the invention wherein a pair of guides **66** and **68** are provided to aid in positioning one of the form sides **12** in proper relation in between the side **18** of the outer locking member **16** and the wedge **19**. The function and purpose of the guides **66** and **68** will be disclosed in more detail with reference to FIGS. 8 and 9.

Consider now a method for constructing a cement pillar and embodying the present invention. FIG. 11 is a schematic representation of an end view of an assembled form structure **102** having the components shown in FIG. 1. Affixed around the outside of the assembled form assembly **102**, and placed after assembly **102** is formed, is an assembled form clamp assembly **104**. Form clamp assembly **104** includes four rectangular-shaped bars **104***a* which are interconnected at their corners or points of intersection by clamps **104***b*. Clamps **104***b* hold the rods tightly against the form assembly **102** so that during the extremely high pressures created by liquid concrete therein, the form assembly **102** is held tightly and prevented from deforming.

Clamps of the assembled form clamp type are well known in the art for rigidly clamping and holding a form structure to prevent deformation. For example, see Pat. Nos. 1,687,976; 2,112,868 and 1,632,141.

Consider now a method for constructing a concrete structure in accordance with the broad aspects of one embodiment of the present invention. The collapsible form structure includes four form sides **12** and four corner clamps **14** as seen in FIG. 1, all generally represented at **102** in FIG. 11. The method also includes the use of assembled form clamps **104**. Each corner clamp has a pair of interconnected and diverging side members, a wedge and a retracting lock member for drawing the wedge toward each side member, all of which has been shown and described and depicted with reference to FIG. 1. Multiple form sides are interconnected using the corner clamps. The step of interconnecting the form sides includes the steps of positioning the edge of the four form sides in between the side members and wedge of each of the four corner clamps and subsequently actuating the retracting and lock member to drive the wedges into engagement with the form sides and thereby rigidly lock the form sides between the wedges and members to form a rigid multiple-sided form assembly as depicted in FIG. 1. Subsequent to these steps, a series of assembled form clamps **104** are affixed along the length of the form structure **102**, each form clamp **104** being affixed around the multiple-sided form assembly **102** to thereby rigidly hold the form assembly in place while pouring liquid concrete therein. Preferably, the form assembly is then stood on end as seen in FIG. 1, thus extending perpendicular to the paper as seen in FIG. 11 and liquid concrete is poured into the form and allowed to cure. The assembled form clamp **104** holds the multiple-sided form structure **102** in place under the high pressures of liquid concrete. Subsequently, the assembled form clamps **104** are removed and the retracting and lock members are deactuated to withdraw the wedges and allow the form sides to be removed.

The sequence of assembly is important and should be noted in connection with the inventive concepts of the invention. By constructing the form structure **102** before affixing the assembled form clamps **104**, the form assembly can be assembled in any position and assembly is much easier. Thus, for example, if the assembled form clamps were used to hold the corner clamps and then the form sides were added, it would be very difficult to position the form sides in place in the corner clamps.

FIG. 12 shows a schematic representation of an end view of an alternate embodiment of the present invention. Included is a three-sided form assembly **102'**. Thus, only three form sides **12** are interconnected by two corner clamps. Subsequent to the assembly of the three-sided form assembly **102'**, assembled form clamp **106** is affixed to the three-sided form assembly **102'**. The assembled form clamp **106** includes three rectangular bars **106***a* similar to those described with reference to FIG. 11 with clamps **106***b* for interconnecting the members **106***a* at their points of intersection. The assembled form clamp **106** includes a tie bolt **106***c* for holding the open ends of the assembled form structure against outward movement. The structure of FIG. 13 is preferably laid horizontally with the open ends extending upward as seen in FIG. 12. Although not shown in FIG. 12, the

ends of the structure shown in FIG. 12 are generally positioned in abutment with forms or other means for containing the liquid concrete in between the U-shaped structure depicted in FIG. 12. The method of constructing the form of FIG. 12 would include the steps of first assembling the form sides and corner clamps to form the form structure **102'** in the manner described above and subsequently affixing the assembled form clamps **106** to rigidly hold the structure **102'** against deformation while pouring liquid concrete therein.

Thus, what has been depicted and described with reference to FIGS. 11 and 12 is a method for forming a multiple-sided, collapsible form structure in which the form assembly is first formed utilizing at least two form sides and at least one corner clamp of the general type depicted in FIG. 1. Subsequent to such assembly, assembled form clamps are affixed to the assembly to thereby rigidly hold the assembly in place without deformation during pouring of liquid concrete.

FIG. 13 is a schematic representation of a side view of a form depicting one way in which the corner clamps can be laid end to end to form a continuous form structure. Thus, one of the form sides **12** is depicted bridging the ends **14***a* of two corner clamps **14** laid end to end.

Consider now a method for constructing a cement pillar having chamfered corners in accordance with the present invention. The method involves the formation of a collapsible form utilizing the corner clamps and form sides shown in FIG. 1 forming the column form around embedded steel reinforcing rod structure **80** shown in FIG. 7. FIG. 7 depicts an embedded steel reinforcing structure **80** embedded in a floor and about which a collapsible form is to be constructed and cement is to be poured.

The method involves the use of a layout jig shown in FIG. 8. The layout jig includes a raised bed **72** which includes two spaced-apart, elongated members **72***a*. The members **72***a* have an upper surface lying in a common plane and the outer edges of members **72***a* are spaced apart a distance which is less than the width W (see FIG. 1) of one of the form sides **12**. The layout jig **70** also includes a lowered side bed **74** on each side of the raised bed **72** which includes a plurality of members **74***a* extending out from the sides of the members **72***a*. The upper surface of the members **74***a* lie in a common plane, that is, lower than the upper surface of the members **72***a* by an amount which is slightly greater than the thickness T (see FIG. 1) of one of the sides **18** of the outer locking member **16**.

The steps of the method according to the present invention are as follows:

(1) Cut or otherwise form a form side as shown at **12** in FIG. 1 to proper length and width. Although not essential to the present invention, preferably the form side **12** is formed of wood.

(2) Saw or otherwise form a groove **13** a prefixed distance away from the edge **12***a* of each of the form sides to match the edge **22***a* of the wedge **19** as described hereinabove.

(3) Lay a first form side on the raised bed **72** of the layout jig **70** allowing the edges **12***a* to overlap or extend beyond the outer edges of the raised bed **72**.

(4) Position first and second corner clamps, one on each side of the first form side with the sides **18** in between the first form side and the corresponding lowered bed **74**.

(5) Position the second and third form sides in between the wedges **19** and the remaining sides **18** of the first and second corner clamp **14**.

(6) Actuate the wedge **34** of the first and second form clamps to drive the wedges thereof into engagement with the groove **13** of the first, second and third form sides thereby rigidly locking the form sides between the wedges and sides **18** to form a three-sided form assembly as shown in FIG. 9.

(7) Remove the three-sided form assembly of FIG. 9 from the layout jig **70**.

(8) Position a fourth form side on the raised bed **72** of the layout jig with the edges **12***a* of the fourth form side **12** extending beyond the raised bed **72**.

(9) Position third and fourth corner clamp **14** on each side of the fourth form side with the sides **18** thereof in between the fourth form side and the corresponding lowered bed **74**.

(10) Place blocks, such as **80** and **82** shown in FIG. 10, in between the remaining side members **18** and the wedges **19** of the third and fourth corner clamp **14** in order to allow the tie wedge **34** to be actuated and wedge the fourth form side **12** in place.

(11) Actuate tie wedge **34** of the third and fourth form clamps to lock the blocks **80** and **82** and the fourth form side **12** rigidly together and thereby form a fourth form side assembly as shown in FIG. 10.

(12) The third and fourth form clamps are separately and securely affixed to the fourth form side **12** by wood screws **84** or the like as seen in FIG. 10.

(13) The tie wedges **34** are deactuated thereby releasing the corresponding wedges **19** of the fourth form side assembly and thereby releasing the blocks **80** and **82**. The blocks **80** and **82** are then removed, leaving an unused side **18** on both the third and fourth form clamps.

(14) The three-sided form assembly is positioned upright as seen in FIG. 9 around the implanted steel reinforcing rod structure **80** shown in FIG. 7.

(15) The single form side assembly shown in FIG. 10 is then positioned against the open ends of the three-sided form assembly with the edges of the second and third form sides in between the unused sides **18** and the wedges **19** of the third and fourth form clamps. It is this step that brings out the importance of the inclined members **66** and **68** shown in FIG. 6. If the three-sided form assembly has the form sides **12** diverging and the edges of the form sides extending beyond the free sides **18** of the form clamps in the single sided form assembly, the inclined surface **66***a* of the inclined member **66** will tend to force the diverging form sides **12** inwardly. Similarly, if the form sides **12** of the three-sided form assembly converge and the edges are inward of the free sides **18**, the inclined surface **68***a* of the inclined member **68** will tend to force the form sides **12** of the three-sided form assembly outwardly into proper relation with the free sides **18** of the single sided form assembly. Thus, preferably, a plurality of inclined members **68** are fixed along a line parallel with the free ends **12***a* and **12***b* of the three-sided form assembly shown in FIG. 9 and a plurality of inclined members **66** are positioned along the sides **18***c* and **18***d* of the corner clamps shown in FIG. 10. As the single-sided form assembly shown in FIG. 10 is positioned against the three-sided form assembly shown in FIG. 9, the inclined members **66** and **68** properly position the free ends **12***a* and **12***b* of the three-sided form assembly thereby allowing the structure to easily be assembled.

(16) The tie wedges **34** of the second and third form clamps are now actuated to drive the corresponding wedges **19** into engagement with the second, third and fourth form sides, thereby rigidly locking the form sides between the wedges and side members to form a four-sided column form assembly around the reinforcing steel.

(17) The liquid concrete is poured into the thus formed four-sided form assembly and allowed to set up and form the column form.

What is claimed is:

1. A method for constructing a cement pillar having a chamfered corner utilizing a collapsible form which includes form sides and corner clamps, each corner clamp having a pair of interconnected and diverging side members, a wedge and a retracting lock member for drawing the wedge toward said side members, a first and second corner tie being affixed along opposite edges of a first

form side to form a single form side assembly leaving free the side member on one side of the wedge of each corner tie, the steps comprising:

(a) positioning opposite first and second edges of a second form side in between the side members and the wedge, respectively, of third and fourth corner clamps;

(b) positioning third and fourth form sides, respectively, in between the wedges and the remaining side members of said third and fourth corner clamps;

(c) actuating the retracting and lock members of said third and fourth corner clamps to draw the wedges thereof into engagement with said second, third and fourth form sides thereby rigidly locking such from sides between the wedges and side members to form a three-sided form assembly;

(d) positioning said single form side assembly against the open ends of the three-sided form assembly with edges of the third and fourth form sides in between the free side members and the wedge of said first and second corner clamps, thereby forming a four-sided column form;

(e) actuating the retacting and locking members of said first and second corner ties to draw the wedges thereof into engagement with said first, third and fourth form sides, thereby rigidly locking such form sides between the wedges and side members to form a four-sided column form assembly; and

(f) positioning liquid concrete into said four-sided column form assembly.

2. A method according to claim **1** comprising the additional step of positioning said three-sided form assembly about an implanted steel reinforcing structure prior to the step of positioning said single form side assembly.

3. A method according to claim **1** wherein a jig is used having a central bed and a lowered bed on each side of said central bed comprising the additional steps of:

(a) positioning said second form side on said central bed with sides extending beyond said central bed;

(b) positioning said third and fourth corner clamps, one on each side of said second form side, with the side members thereof in between said first form side and the corresponding lowered bed; and

(c) positioning third and fourth form sides in between the wedge and the remaining side member of said third and fourth corner clamps, respectively, and then going to the step of actuating the retracting and lock members of said third and fourth corner clamps.

4. A method according to claim **1** comprising the additional steps of:

(a) positioning opposite edges of said first form side in between one side member and the wedge of each of said first and second corner ties, leaving one side member of each corner tie free; and

(b) separately affixing said first and second corner clamps to said first form side, thereby forming said first form side assembly.

5. A method for constructing a cement pillar having a chamfered corner utilizing a jig having a central bed and a lowered bed on each side of said central bed and a collapsible form which includes form sides and corner clamps, each corner clamp having a pair of interconnected and diverging side members, a wedge member and a retracting lock member for drawing the wedge toward said side members, the steps comprising:

(a) positioning a first form side on said central bed with sides extending beyond said central bed;

(b) positioning first and second corner clamps one on each side of said first form side with side members in between said first form side and the corresponding lowered bed;

(c) positioning second and third form sides in between the wedges and the remaining side members of said first and second corner clamps, respectively;

(d) actuating the retracting and lock members of said first and second corner clamps to draw the wedges thereof into engagement with said first, second and third form sides, thereby rigidly locking such form sides between the wedges and side members to form a three-sided form assembly;

(e) positioning a fourth form side on said central bed on said jig with sides extending beyond said central bed;

(f) positioning third and fourth corner clamps on each side of said fourth form side with the side member in between said fourth form side and the corresponding lowered bed;

(g) positioning blocks in between the remaining side members and wedges of said third and fourth corner clamps;

(h) actuating the retracting and locking member to lock the blocks and fourth form side into the third and fourth corner clamps, thereby providing a fourth form side assembly;

(i) separately affixing the third and fourth corner clamps to said fourth form side;

(j) deactuating the retracting and locking members of said third and fourth corner clamps thereby releasing the wedge members thereof and removing the blocks to leave unused side members;

(k) positioning said three-sided form assembly about an implanted steel reinforcing structure;

(l) positioning said fourth form side assembly against the open ends of the three-sided form assembly with the edges of the second and third form sides in between the unused side members and the wedge of said third and fourth corner clamps;

(m) actuating the retracting and locking members of said second and third corner ties to draw the wedges thereof into engagement with said second, third and fourth form sides, thereby rigidly locking such form sides between the wedges and side members to form a four-sided column form assembly around the reinforcing steel; and

(n) positioning liquid concrete into said column form assembly.

6. A method for constructing a concrete structure having a chamfered corner utilizing a collapsible form which includes form sides and corner clamps, and assembled form clamps, each corner clamp having a pair of interconnected and diverging side members, a wedge and a retracting lock member for drawing the wedge toward said side members, the steps comprising:

(a) interconnecting multiple form sides and at least one corner clamp forming a portion of a form assembly for containing liquid concrete, comprising the steps of:

(1) positioning the edges of at least two of such form sides in between the side members and the wedge of said at least one corner clamp;

(2) actuating the retracting and lock member of said at least one corner clamp to draw the wedge thereof into engagement with said form sides thereby rigidly locking such form sides between the wedges and side members to form a multi-sided form assembly;

(b) subsequently affixing the assembled form clamps to said form assembly and thereby rigidly hold the form assembly in place while pouring liquid concrete therein; and

(c) positioning liquid concrete into said form assembly.

7. A method according to claim **6** wherein at least a multi-sided form assembly is formed using at least three of said form sides and at least two of said corner clamps comprising the step of positioning one of said form sides between the side member and wedge of said at least two corner clamps and positioning a separate one of the re-

maining two form sides in between the remaining side members and wedge of the at least two corner clamps prior to actuation of the retract and locking members and prior to the affixing of the assembled form clamps.

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