United States Patent [19]

Argust

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[54] **CORNER CLAMP**

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[52] **U.S. Cl.** ..... **249/219 R**, 249/194, 269/117

[51] **Int. Cl.** **E04g 13/02**

[58] **Field of Search** ... 249/17, 23, 25, 48, 192, 194, 249/195, 196, 219 R, 219 W, 45, 46, 169, 205, 193, 167; 269/112, 126, 41, 201, 115–125, 228–230; 248/222; 24/68 A, 68 D, 68 R, 68 FP, 126 A, 68 CD, 268; 292/283, 282

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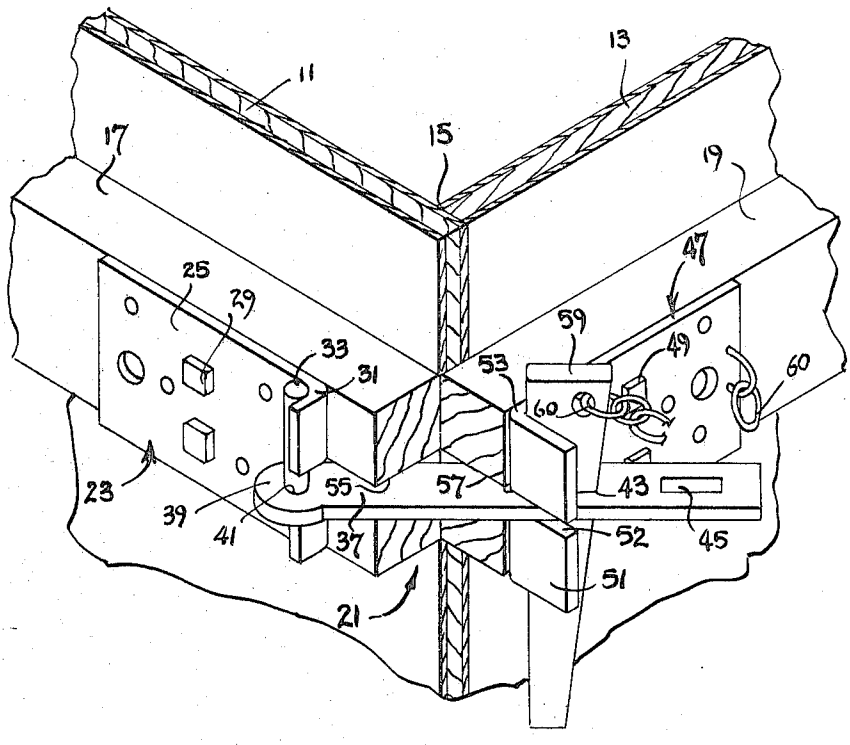
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Assistant Examiner—John S. Brown
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[57] **ABSTRACT**

A corner clamp or tie for joining together the free ends of a pair of walers at the corner of a form which comprises a first plate means for attachment to one of the walers. A rotatable bar is pivotally connected at one end thereof to the first plate. A second plate means is adapted to be affixed to the other adjoining waler. The second plate means has a portion thereof extending generally normal to the form member, the perpendicular member having a notch therein which is coalignable and receives the end of said bar opposite from the pivot end connected to the first plate member, and a wedge insertable in an aperture in the end of said rotatable bar adjoining said second plate member.

7 Claims, 9 Drawing Figures



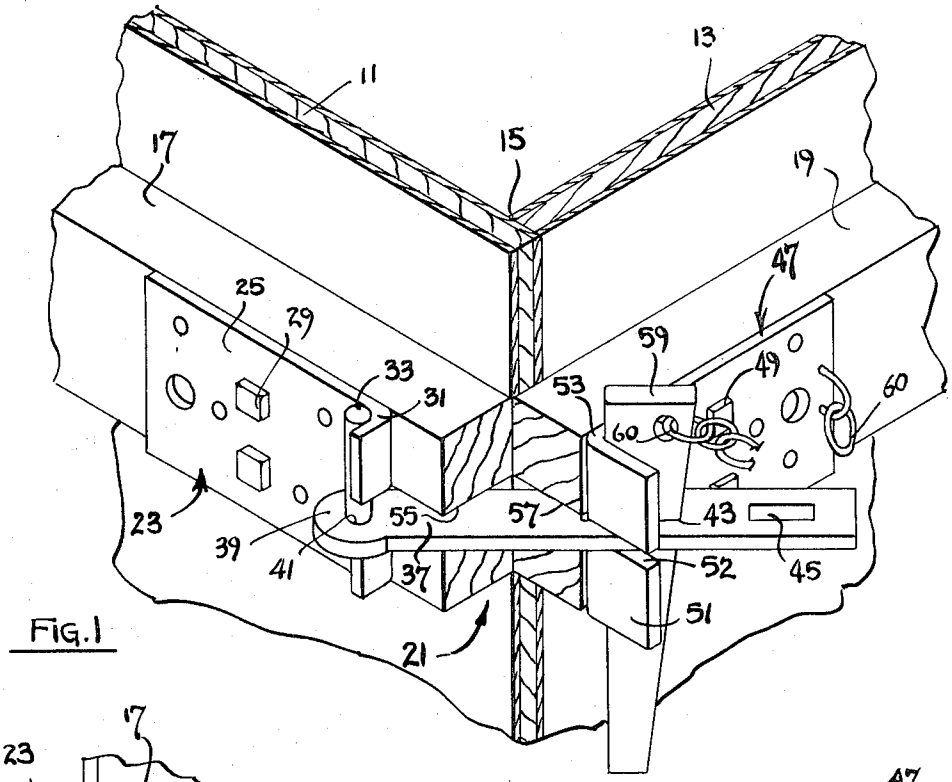


FIG. 1

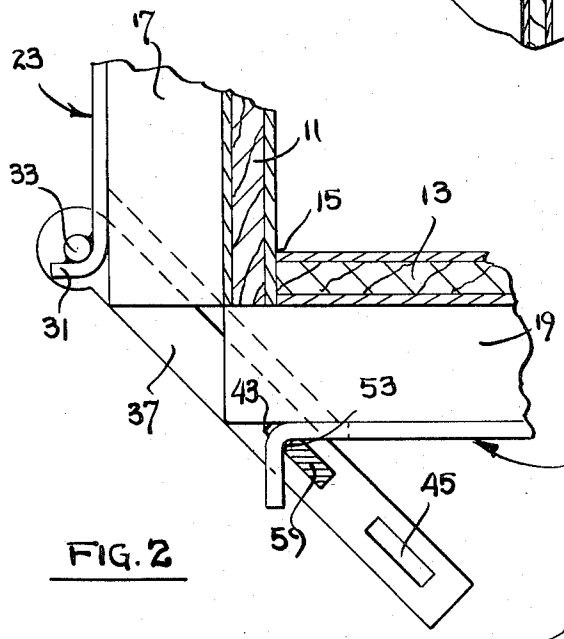


FIG. 2

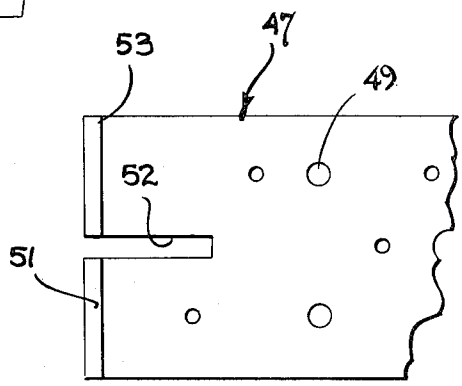


FIG. 3

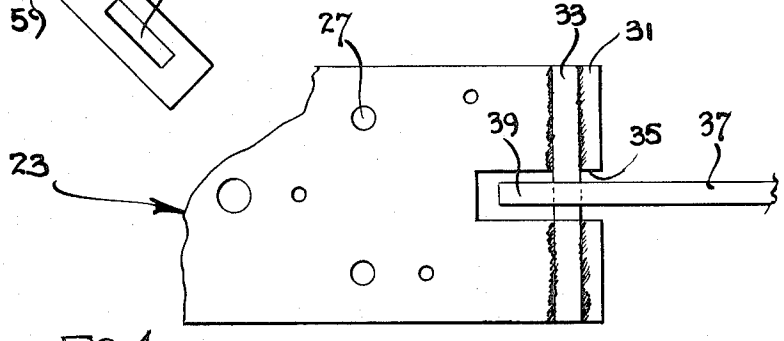


FIG. 4

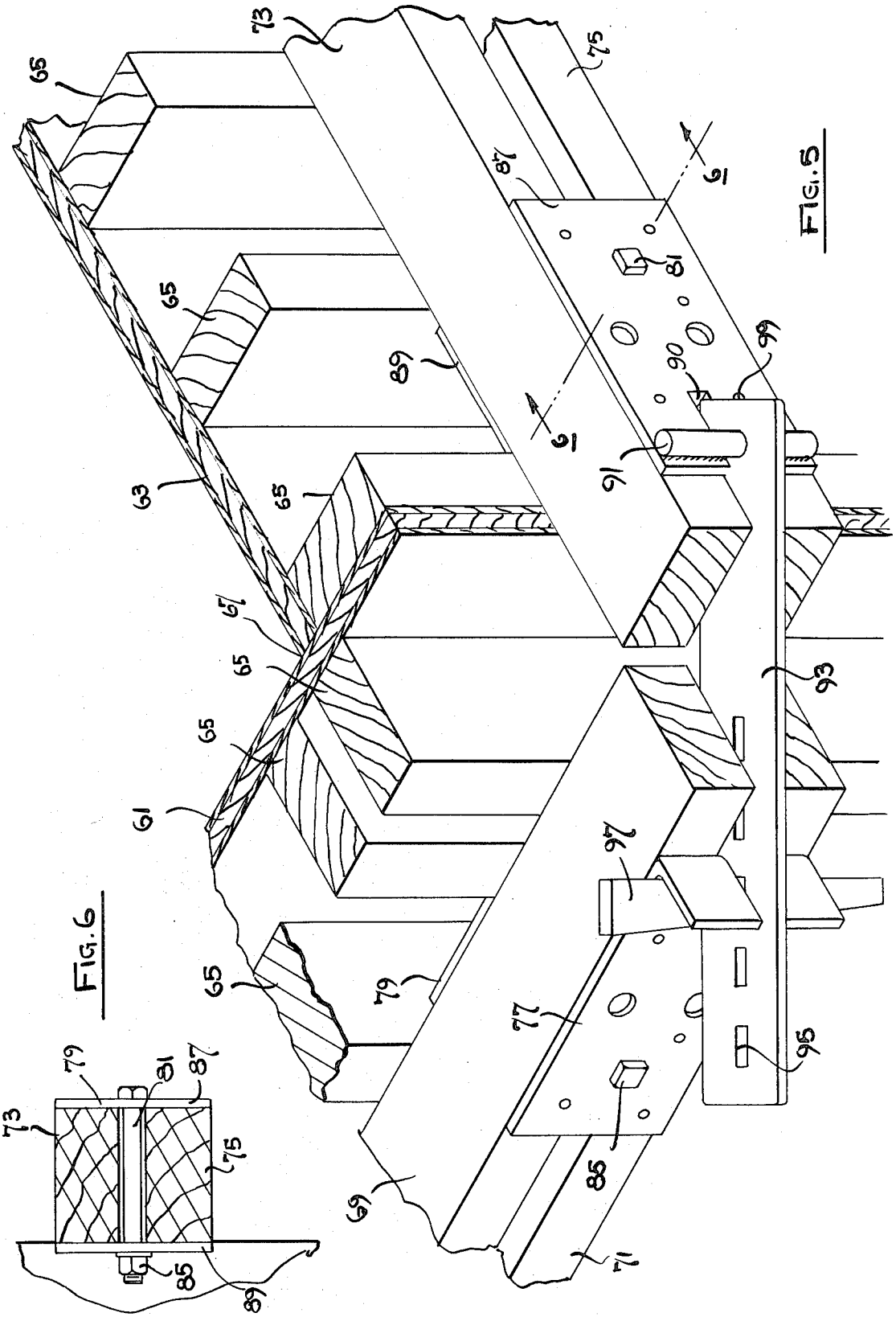

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FIG. 5

FIG. 6

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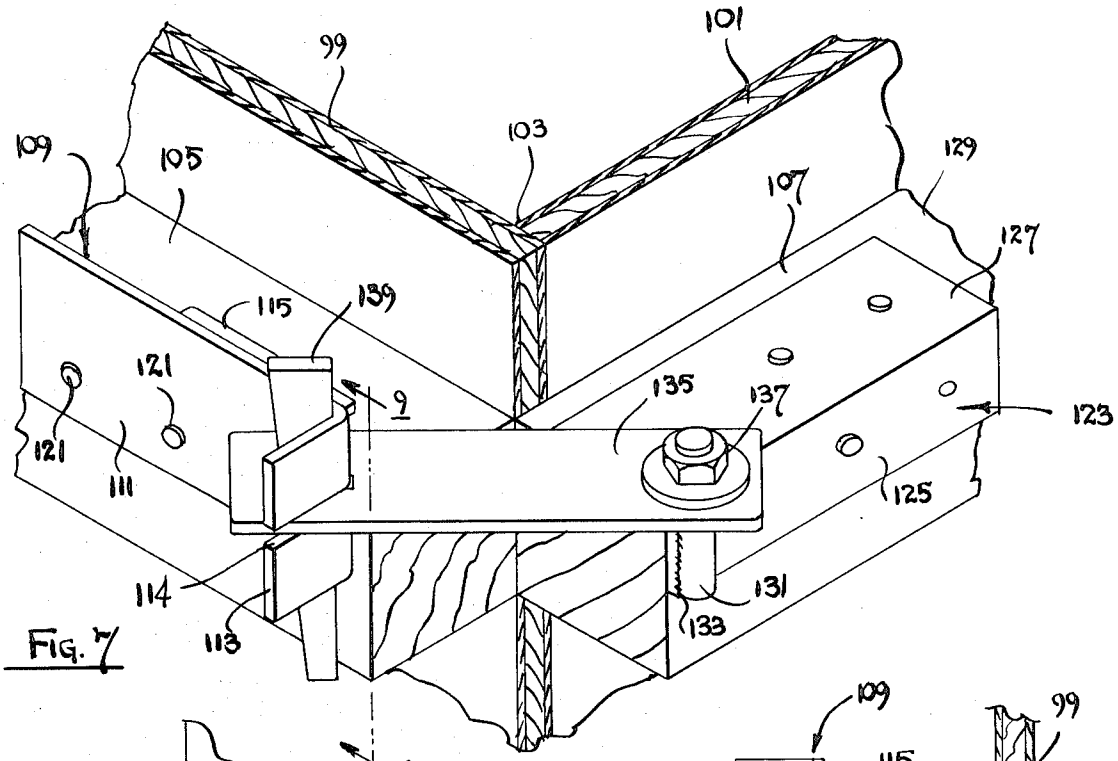


Fig. 7

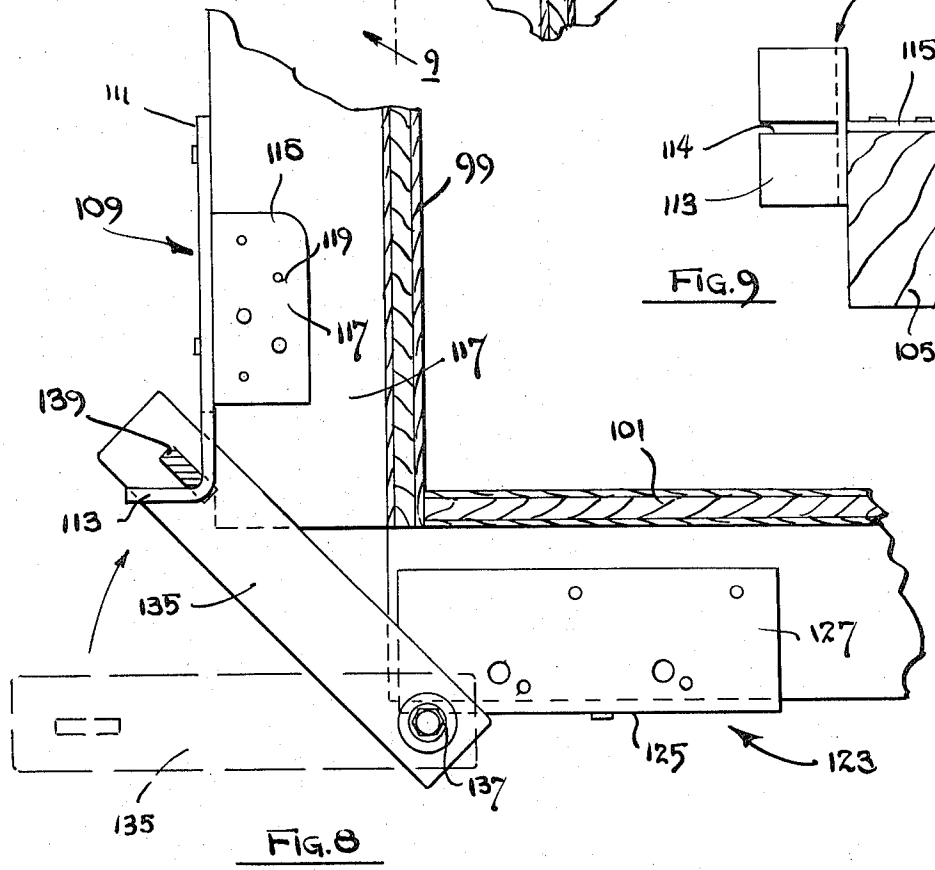


Fig. 8

Fig. 9

CORNER CLAMP

To date there have been many corner tie members which are useful for securing forms for concrete walls and the like. The forms normally comprise flat panel members which can be of plywood or other suitable composition. Disposed and horizontally affixed on the outer surface of the flat panels are spaced-apart generally parallel walers which can be of differing sizes such as 2×4, 2×6, 4×4, 4×6, and the like, depending upon the distance to be spanned, the strength of the corner tie, and the like. In many instances, the walers are directly affixed to the panel members. In other instances where it is desirable to increase the vertical distance between the walers and use higher strength ties, the walers are mounted on a plurality of vertical frame members known as studs. In this instance, the vertical stud members serve to add rigidity to the panels to prevent bending of the panels between the walers. Since not all walers are of the same dimension or size, as indicated above, in the past there has generally been a particular corner clamp or tie for each particular size of waler and for each differing type of application. The corner clamps which were designed for more universal application generally required considerable effort in assembly and disassembly thereof. These corner clamps often involved threaded bolt members which were tightened with a suitable nut. The time required to tighten and untighten these members was considerable. To simplify the corner clamps, others attempted to utilize wedge members which were driven into a slot in the corner clamp pulling the two adjoining walers together at the corner. These type of corner clamps, however, generally suffered from being specifically designed for a single size of waler and thus the fabricator had a considerable expense in buying stock in differing size corner clamps for differing size walers. In some instances, the corner tie can be used only where the walers are on edge against the panels. In many other corner tie designs, the corner tie must be entirely or at least partially removed from the respective joined walers at a corner when the form is disassembled. Thus, when the form is reused, the entire process of attaching the tie to the same walers must be repeated. This, of course, involves a considerable expenditure of labor effort to disassemble and re-assemble the corner ties each time the form is reused.

Briefly, the herein corner clamp comprises a first plate member which can be nailed to one waler or to two vertically spaced apart waler members, depending upon the application. A second plate member is provided which can be nailed or secured by other means to the adjoining waler or walers. The second plate member has a generally flat portion for nailing or securing to the waler and an angle portion disposed normal to the base portion and extending outwardly from the base portion when secured to the waler. The angle portion has a notch located therein. A rotatable bar member is pivotally connected at one end thereof to the first plate member. The end of the bar member opposite to the pivot end has at least one aperture therein. The two plate members are secured to adjoining walers at a corner of a form in such a manner that the pivotal bar will extend from the first plate member to the second plate member passing through the slot formed in the outwardly extending portion of the second plate member in such a manner that the slot in the bar is disposed in the portion of the bar that has passed through the slot in the extension. A wedge member is provided which is then driven into the aperture in the bar member in order to maintain the adjoining walers in a tight clamped relationship by providing at least two apertures in the rotatable bar member. The clamp assembly can be used for applications of varying dimensions. Further, it can be appreciated that the clamping member can be utilized on walers of different dimensions. In some applications, it might be necessary to saw a notch in the walers at their adjoining ends to provide room for the bar member passing therebetween from one plate to the other In another embodiment of the invention, the bar member will pass over one of the horizontal surfaces of a waler, the bar being attached at its pivot end to a plate in the form of an angle iron, the plate thus being secured to both an outer vertical surface and a top horizontal surface of an adjoining waler member. One of the main advantages of the herein corner clamp is that a form having the clamp of this invention can be rapidly disassembled without removing the elements of the clamp. Thus, the form can be reused in another location without reassembly or reattaching the corner clamp. It is believed the invention will be further understood from the following detailed description and drawings in which:

FIG. 1 is a perspective representation of one embodiment of a corner clamp of this invention mounted on a form.

FIG. 2 is a top plan view of a portion of a corner clamp of FIG. 1.

FIG. 3 is an enlarged view of one of the plates of the corner clamp of FIG. 1.

FIG. 4 is a plan view of another plate of the corner clamp of FIG. 1.

FIG. 5 is a perspective view of a second embodiment of a corner clamp arrangement of this invention.

FIG. 6 is a cross sectional view taken along line 6—6 of FIG. 5.

FIG. 7 is a perspective view of a third embodiment of a clamp of this invention.

FIG. 8 is a top view of the clamp of FIG. 7.

FIG. 9 is a partially sectioned view taken along line 9—9 of FIG. 7.

Turning now to FIGS. 1–4 there is seen a first embodiment of a corner clamp of this invention. As seen in FIG. 1, two plywood panels 11 and 13 provide a corner 15. The first waler 17 is affixed to panel 11 and a second waler 19 is correspondingly affixed to panel 13. The walers, for example, can be 2×4's with the elongated 4 inch side of the board being attached to the panels by nails on the like. A corner clamp 21 of the invention is shown affixed to the walers securing the corner 15 of the form. The corner clamp 21 is comprised of a first plate 23 which is seen in further detail in FIG. 4. The plate 23 can be nailed to the waler 17 and is provided with a plurality of apertures 25 through which nails can pass. Further, to assure attachment, the plate 23 has two enlarged openings 27 through which lag bolts 29 can be driven. One end 31 of the plate 23 disposed toward the corner 15 is curved outwardly and is generally normal to the surface of the plate affixed to the waler. In this portion there is secured a rod or axle 33 by welding or the like so that the rod 33 is permanently affixed to the plate 23. By so providing portion 31, the axle 33 can be welded over a wider surface area onto the plate member 23.

The plate 23 additionally has a slot 35 formed therein at the end thereof adjacent the portion 31, the notch extending partially from the end into the plate. A rotatable arm or bar 37 has one end 39 thereof secured to plate 23. The arm 37 has an aperture 41 in end 39 through which the rod or axle 33 passes. The arm or bar 37 is thus assembled onto the axle and placed in position on the plate 23 before the rod 33 is welded thereto. The arm 37 thus freely rotates on axle 33. The end 39 of arm 37 is preferably curved over a relatively small radius in order to minimize the length that the slot 35 has to extend into the plate member 23. In other words, by having end 39 so curved, the arm can easily rotate relative to the axle within a small slot 35. In the embodiment shown, two slots 43 and 45 are provided in the arm 37 toward the end opposite the end 39.

Mounted on waler 19 is a second plate 47 of the corner clamp of the invention. Plate 47 is generally of similar construction to plate 23, and is secured to the waler by nails and lag bolts 49. The plate 47 has a portion 51 that extends outwardly therefrom and normal to the waler 19, forming a corner 53 where the portion 51 joins the main body of the plate.

In order to use the corner clamp, each of the two plates 23 and 47 are first secured to their respective walers 17 and 19. The walers are then notched adjacent the corner 15 of the form at 55 and 57 respectively. The notches 55 and 57 are generally medially disposed in the walers and are coalignable with the notched aperture 35 in plate 23 andthe corresponding notched aperture 52 in plate 47. This allows the arm 37 to extend from plate 23 through the aperture 52 in plate 47 so that it can be secured relative thereto. Depending upon the size of walers and the placement of the plates of the clamp, at least one of the openings 43 or 45 will extend beyond the portion 51 on plate 47. As shown in FIG. 2, particularly, the opening 43 partially extends through the corner 53. A wedge 59 is then driven through the opening 43 as shown in FIG. 1 to effectively clamp the panels 11 and 13 together. The wedge can be permanently affixed to plate 47 by a chain 60. Thus, as it can be seen, once the plates are mounted on the walers, it is an extremely simple procedure to effect the clamping by only driving the wedge through one of the openings 43 and 45. More importantly, the wedge can be simply removed after the form is used and the arm 37 rotated away from plate 47 out of engagement with the aperture 52 therein, allowing the panels 11 and 13 to be separated. This is obviously a very simple and expeditious step which still allows the respective members of the clamp to be retained onto the respective panels 11 and 13 for future reuse thereof. In other words, the breakdown of the form is extremely simplified, utilizing the clamp of the herein invention, while allowing the clamp to be readily retained for subsequent use when the form is again set up.

FIGS. 5 and 6 shown an embodiment of the clamp of this invention which can be used where stud members are affixed to the panels. Thus, as seen in FIG. 5, two panels 61 and 63 have a plurality of stud members 65 affixed thereto. The panels 61 and 63 are joined at a corner 67. Affixed to the studs 65 are a first pair of walers 69 and 71 slightly spaced apart and mounted on end. In other words, if the walers 69 and 71 were 2x4's the shorter 2 inch side of the board is affixed to the studs. Likewise, a second pair of walers 73 and 75 are affixed to the stud 65 mounted on panel 63. Mounted on walers 69 and 71 is a plate 77 which is identical to plate 47 in FIG. 1. In this particular embodiment, the plate 77 can be secured to the walers by nails, as well as utilizing an additional backing plate 79 which is spaced on the opposite edge of the walers from plate 77. Plate 79, which serves as a backing plate, is secured relative to main plate 77 by an elongated bolt 85 which is seated in an enlarged aperture provided in plate 77, and affixed relative thereto by a nut (not shown).

Mounted on walers 73 and 75 respectively, is a second plate 87 which is secured thereto by nails and a backing plate member 89 which is secured to main plate 87 by means of bolt 81 and nut 85, in the same manner as backing plate 79 is secured to plate 77. Plate 87 is a flat plate having an aperture 90 at one end thereof with a rod or axle 91 being welded to the plate and extending across the aperture 90. A flat bar or arm 93 is rotatably secured on the axle 91. The arm 93 has a plurality of openings 95 therein in which the wedge member 97 can be seated. In this embodiment it is to be noted that an end 99 of the bar 93 adjacent the rod 91 is not rounded as shown in the embodiment in FIG. 1. Thus, the aperture 90 must extend further into the plate 87 to allow for the bar to fully swing or rotate relative to the plate 87.

Turning now to FIGS. 7–9 there is seen a third embodiment of the invention which is particularly useful where it is desirable to eliminate the need for cutting a notch in the walers at the corners or where there is no opening provided adjacent parallel walers as seen in FIG. 5. As shown in FIG. 7, two panels 99 and 101 respectively form a corner 103. A first waler 105 is mounted on panel 99 and a second waler 107 is mounted on panel 101. A first plate member 109 is mounted on waler 105. Plate member 109 has a generally flat base portion 111 and a portion 113 adjacent one end thereof that extends normal to the surface 111. Portion 113 has a notched aperture 114 extending therethrough and into the portion 111. Extending from the base portion 111 of the plate 109 is an additional plate 115. Plate 115 rests on a top surface 117 of waler 105 and is secured thereto by nails 119 passing through corresponding apertures in the plate 115. The portion 111 is additionally secured to the waler by nails 121. The plate 115 is positioned below the aperture 114 so that the aperture or slot is above the surface 105 of the waler. The second plate element 123 is secured to waler 107. Plate 123 is similar an angle iron having surfaces 125 and 127 normal to each other and mounted on respective adjoining faces of the waler. Top surface 127 of the plate 123 is thus correspondingly affixed to a top surface 129 of the waler 107. A rod or axle 131 is affixed to an end 133 of the plate 123 on surface 125 thereof. An arm 135 is rotatably mounted on the axle 131 resting on surface 127 of the plate 123. The rotatable arm 135 can be secured relative to the axle 131 by a nut 137 which engages a threaded end of the axle 131. Thus, the arm 135 swings over the top of the respective walers 105 and 107 and is secured in the slotted opening 114 of the first plate 109 by a wedge 139 in a manner similar to that shown in the previous embodiments.

As can be seen from the three embodiments shown, the herin invention comprises the utilization of two plates which are secured to two respective adjoining walers adjacent a corner of a from. One plate has a rotatable arm affixed thereto, while the second plate has

a slotted opening therein for receiving an opposite end of the arm which extends across the corner of the form between the walers. The end of the rotatable arm which is seated in the slotted opening in the second plate, is secured relative thereto by a wedge element. To disassemble a form, the wedge is merely withdrawn and the arm swung away to the plate to which it is rotatably affixed. The forms are then ready for reuse and the corners can be readily and rapidly resecured.

I claim:

1. A corner clamp for joining together the free ends of a pair of walers at the corner of a form comprising:

a first plate having means for attachment to one of the walers,

an arm rotatably connected at one end thereof to said first plate, and having at least one opening therethrough adjacent the other end, and

a second plate having means for attachment to the other of the pair of walers, said second plate having a portion thereof with a slot formed therein to receive the end portion of said arm having the opening therethrough, the slotted portion of the second plate extending generally perpendicular to the attachment means thereof.

2. The clamp of claim 1 wherein said arm is a generally flat member lying in a plane normal to the plate members.

3. The clamp of claim 2 further comprising:

a wedge member capable of engaging the opening through said arm.

4. The clamp of claim 1 wherein the means for attachment of said plates to the waler comprises:

a plurality of small apertures thereto through said plate whereby the plate can be nailed to the walers.

5. The clamp of claim 4 further comprising:

at least two enlarged openings provided through each plate for additionally securing the plate by lag bolts to said walers.

6. The clamp of claim 1 further comprising:

an associated backing plate for disposition on the opposite surface of a waler from said first and second plates when said clamp is to be mounted on a pair of spaced-apart parallel walers,

and bolt means for securing said backing plates to said first and second plates.

7. The clamp of claim 6 wherein:

each backing plate has an additional portion thereon extending therefrom for resting on and capable of being affixed to an upper surface of a waler.

* * * * *