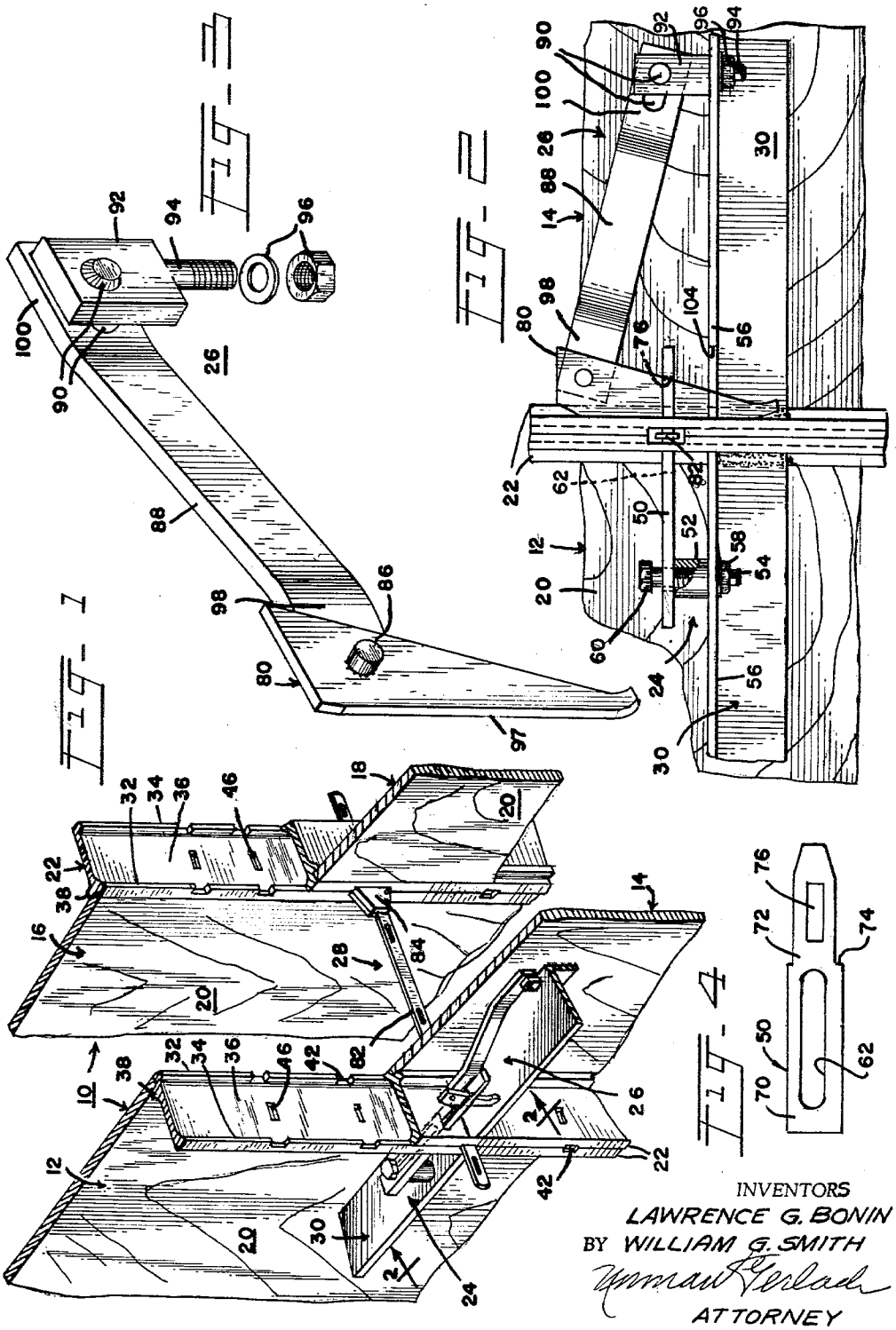
Feb. 16, 1965 L. G. BONIN ETAL 3,169,294

CONCRETE WALL FORM PANEL UNITS WITH ATTACHED CONNECTING MEANS THEREFOR

Filed Oct. 11, 1963 2 Sheets-Sheet 1



INVENTORS
LAWRENCE G. BONIN
BY WILLIAM G. SMITH
ATTORNEY

Feb. 16, 1965 L. G. BONIN ETAL 3,169,294

CONCRETE WALL FORM PANEL UNITS WITH ATTACHED CONNECTING MEANS THEREFOR

Filed Oct. 11, 1963 2 Sheets-Sheet 2

Fig. 5

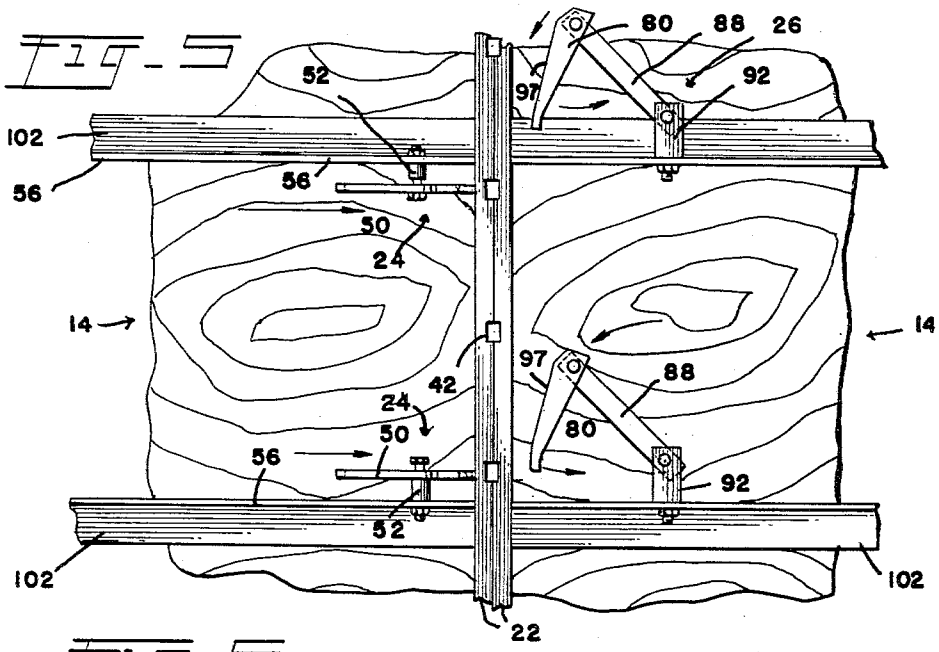
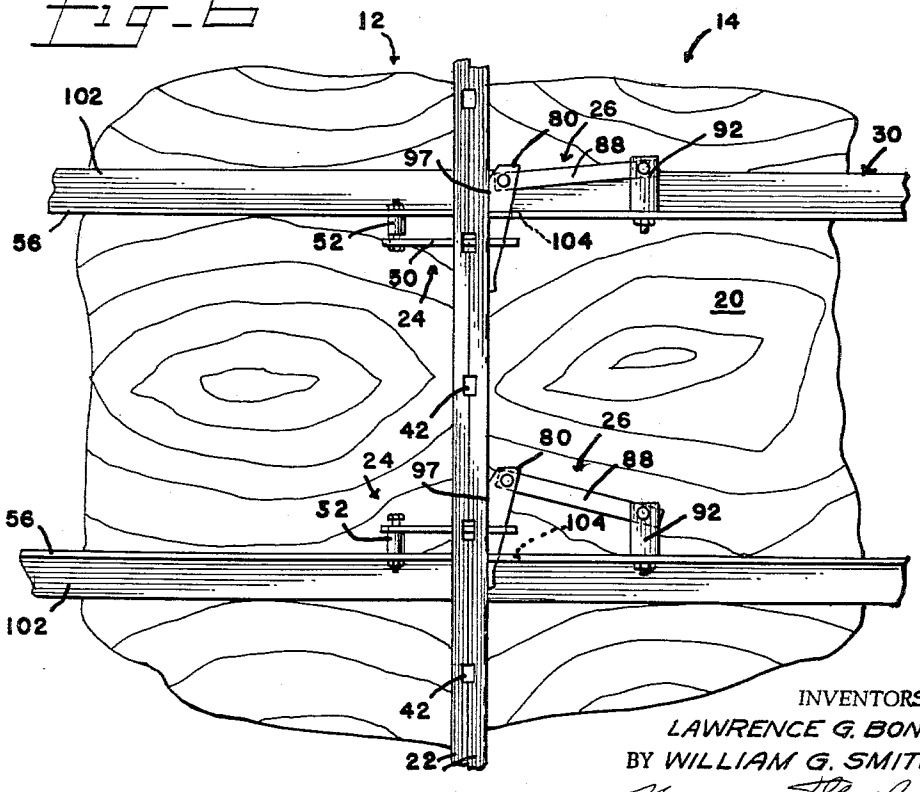


Fig. 6



INVENTORS
LAWRENCE G. BONIN
BY WILLIAM G. SMITH
Norman Perlack
ATTORNEY

United States Patent Office 3,169,294 Patented Feb. 16, 1965

3,169,294

CONCRETE WALL FORM PANEL UNITS WITH ATTACHED CONNECTING MEANS THEREFOR

Lawrence G. Bonin, Chicago, and William G. Smith, Streamwood, Elgin, Ill., assignors to Symons Mfg. Company, Des Plaines, Ill., a corporation of Delaware

Filed Oct. 11, 1963, Ser. No. 315,466
6 Claims. (Cl. 25—131)

The present invention relates to concrete wall forms of the panel type and wherein opposed wall forms are each constructed or fabricated of a group of rectangular panel units in edge-to-edge relationship, with the wet concrete being poured into the space existing between the wall forms and with the two wall forms being connected together in spaced apart relationship by combined tie and spreader devices to prevent the forms from bulging outwardly under the thrust or weight of the wet concrete. The panel units commonly employed in this type of wall form consist of plywood facings against which the wet concrete abuts. Marginal stiffening and strengthening frames are applied to the outer sides of the facings and serve to reinforce the panel units, such frames consisting of marginal horizontal and vertical members and intermediate crossbars which may extend either horizontally or vertically and are connected at their ends to the horizontal or the vertical marginal frame members.

The present invention is particularly concerned with wall forms of this type, but which are known as prefabricated wall forms in that the individual panel units are assembled at the factory rather than in the field, and in that the plywood reinforcing frames, including the marginal vertical and horizontal members and any intermediate crossbars which may be employed, are in the form of lengths of steel channel or angle stock which may be rolled to special shape and perforated, notched, grooved and otherwise fashioned in order properly to receive therein the edges of the plywood facings, as well as to facilitate the use of suitable fastening devices or other concrete form hardware whereby the adjacent panel units may be fastened together.

There has long been upon the market a class of reusable prefabricated panel units which are known as "Steel-Ply" units and are manufactured and sold by Symons Mfg. Company of Des Plaines, Illinois (formerly Symons Clamp & Mfg. Co. of Chicago, Illinois). A "Steel-Ply" panel unit differs from conventional prefabricated panel units in that the marginal frame members thereof are of outwardly facing shallow channel configuration so that when like units are positioned in edge-to-edge relationship to build up a concrete wall form, the channel ribs of adjacent marginal members abut each other and maintain the channel webs slightly spaced apart. The channel ribs are notched at equally spaced intervals along the members and the notches enable the looped or apertured ends of combined tie and spreader devices to be inserted into the spaces existing between the channel webs. Holes which are formed in the webs of the marginal frame members at the level of the notches serve the purpose of receiving therethrough the slotted shank portions of T-bolts. The T-bolts are passed through the ends of the tie rods and the T-bolts are held in position by wedges which are driven through the slots in the shanks of the T-bolts. As the wedges are driven in place, they draw the abutting marginal frame members of adjacent panel units together due to extremely high tensional forces in the T-bolts. These T-bolts and wedges frequently constitute the sole means for effecting panel interconnection. Furthermore, these T-bolts and wedges are readily removable for concrete wall form dismantling operations, it being necessary merely to knock out the wedges and slide

the T-bolts from their holes, thus releasing the panel units. The present invention is specifically concerned with such concrete wall form panel units of the "Steel-Ply" type.

In the erection of any given wall form installation utilizing "Steel-Ply" panels units, due to the large quantity of hardware necessary to attach the various units together, it is customary for the workman performing the erection and operating upon the scaffolding to carry with them large buckets of T-bolts and wedges. During such operations, the loss of hardware is appreciable, especially in inclement weather when it is difficult to find the bolts or wedges in the mud. The cost of labor and materials are, therefore, increased accordingly.

Heretofore, and as disclosed in our co-pending United States patent application Serial No. 189,588, filed on April 23, 1962, and entitled "Concrete Wall Form Panel Units and Connecting Means Therefor," attempts have been made to "capture" such items of concrete wall form hardware as the T-bolts and wedges which are employed to secure the panel units together by fastening them permanently to the panel units while allowing for freedom of movement thereof on the panel units so that they may still perform their intended functions. To thus "capture" the T-bolts, such bolts are mounted for sliding movement on the crossbars in such a manner that they are constrained to move into and out of the slots in the marginal frame members in the same functional manner as conventional loose T-bolts. To "capture" the wedges, the latter are provided with integral swinging arms, much in the manner of the latch portion of a conventional hook and eye type of door latch, the arms being provided in such a manner that the wedges may be swung through arcs into and out of cooperating wedging engagement with the slots in the shanks of the T-bolts when the latter are projected through the holes in the webs of the marginal frame members. Thus, both the T-bolts and the wedges retain their intended functions and cooperate with each other in the usual manner of cooperation between loose wedges and T-bolts, even to the point of using an impact tool to drive the wedges in place and to dislodge them during wall form knock-down operations.

While such captured wedge and T-bolt combinations have completely eliminated the loss of concrete wall form hardware of this sort, and have materially reduced the labor costs attendant upon any given installation, such combinations are possessed of at least one serious limitation, this being the inability of the captured wedges to seat properly when encountering T-bolts at different elevations in the panel unit installation. By way of explanation, it is pointed out that the T-bolts are necessarily mounted for sliding movement at the level of the equally spaced slots in the vertical members of the rectangular reinforcing frames, while the wedges which cooperate with the T-bolts are invariably pivoted for swinging movement about fixed pivot points which, by reason of the peculiar and exact dimensional construction of certain sizes of "Steel-Ply" panel units, cannot all conveniently be positioned at the same levels as the T-bolts. The facilities for pivotally mounting the wedges are such that, where the larger size "Steel-Ply" panel units are concerned, some of the wedges may be pivoted at the approximate levels of their respective T-bolts, while the remaining wedges must necessarily be pivoted at levels which are appreciably above the levels of their respective T-bolts. It is obvious, therefore, that a wedge which has a rake angle which will suit it for proper wedging engagement with a T-bolt at approximately the level of its pivotal axis of swinging movement, will not have effective cooperation with a T-bolt which is at a different level. Just as in the case of a pivoted door latch, there is only one proper position

for its cooperating eye on the door jamb, so in the case of an integral one-piece pivoted wedge of the type under consideration, its cooperating T-bolt must assume an optimum elevation with respect thereto. The further out on the tangent to its arc of swinging movement that the T-bolt is positioned, the poorer will be the character of the wedging action which is attained when the wedge is driven home through the slot in the shank of the associated T-bolt.

The present invention is designed to overcome the above-noted limitation that is attendant upon the construction and use of captured T-bolts and wedges of the type disclosed in our above-mentioned co-pending patent application and, accordingly, the invention contemplates the provision of a novel wedge assembly which is capable of adjusting itself automatically to T-bolts which may be disposed at various elevations along the tangent to the arc of swinging movement of such wedge assembly. This being the principal object of the invention, it is another object to provide a wedge assembly, although designed primarily for use in connection with "Steel-Ply" panel units as original equipment, is capable of application to existing "Steel-Ply" panel units.

It is another object of the invention to provide in a concrete wall form panel unit of the type under consideration a captured wedge assembly in which the wedge proper is substantially identical in size and shape to a conventional loose wedge so that it retains all of the advantages thereof and obviates the disadvantage of possible loss of the wedge as previously outlined. By way of explanation of this object, it is pointed out that in connection with the wedge proper of the aforementioned co-pending patent application Serial No. 189,588, the outer edge of the wedge which makes contact with the adjacent marginal frame member is, of necessity, of curved or arcuate configuration in order that it may make tangential contact with the frame member and thus avoid binding against the frame member at the time it is driven to its home position. The wedge proper of the present invention, because it is pivoted on the associated swinging arm by means of which it is captured, may adjust itself to the slot in which it is driven and, because of this, it is possible to provide a linearly straight forward edge which will seat coextensively against the adjacent frame member of the panel unit and thus, exert a more effective wedging engagement with the associated frame member and T-bolt. A lost-motion connection between the swinging arm which captures the wedge proper and the crossbar to which the arm is secured allows the wedge proper all of the freedom of movement which is associated with a conventional loose wedge.

A further object of the invention is to provide a panel unit having associated therewith the necessary hardware whereby it may be joined to a like panel unit, and wherein the various elements of such hardware are at all times maintained within the transverse confines of the panel unit so that there are no laterally projecting parts which otherwise would interfere with stacking of like units for shipment or storage or would be likely to catch upon adjacent objects in handling of the panel unit.

With these and other objects in view, the invention consists in the novel construction, combination, and arrangement of parts shown in the accompanying two sheets of drawings forming a part of this specification.

In these drawings:

FIG. 1 is a fragmentary perspective view, partly in section, of a limited portion of a concrete wall form installation, showing a number of "Steel-Ply" panel units constructed according to the present invention operatively installed therein in edge-to-edge relationship;

FIG. 2 is an enlarged front elevational view taken substantially along the vertical plane indicated by the line 2—2 of FIG. 1 and in the direction indicated by the arrows;

FIG. 3 is an enlarged perspective view of a wedge assembly employed in connection with the present invention;

FIG. 4 is a plan view of a T-bolt employed in connection with the invention;

FIG. 5 is a fragmentary outside or front elevational view of a portion of a concrete wall form installation, showing the opposed abutting medial edge regions of a pair of juxtapositioned "Steel-Ply" panel units in the positions which they assume preparatory to movement of the cooperating T-bolt and wedge assemblies in their home positions; and

FIG. 6 is a fragmentary view similar to FIG. 5 but showing the T-bolt and wedge assemblies in their cooperating relationship.

Referring now to the drawings in detail, and in particular to FIG. 1, a fragmentary portion of a composite concrete wall form of the metal-reinforced "Steel-Ply" panel unit type has been illustrated therein and designated in its entirety by the reference numeral 10. The wall form 10 is made up of a series of rectangular panel units, only four of which have been fragmentarily shown herein at 12, 14, 16, and 18, the panel units 12 and 14 being arranged in edge-to-edge relationship on one side of the form, and the panel units 16 and 18 being similarly arranged on the other side of the form 10.

Each panel unit is of the "Steel-Ply" type, which is to say that it is in the form of a generally rectangular plywood facing 20 having a steel marginal reinforcing frame applied to the outer edge portions thereof, such frame consisting of vertical and horizontal frame bars. Only the vertical frame bars 22 appear in the drawings since the horizontal frame bars at the upper and lower edges of each panel unit bear no direct relation to the present invention. For a full disclosure of one of the panel units 12, 14, 16 or 18, reference may be had to aforementioned co-pending patent application Serial No. 189,588, wherein the character of the horizontal marginal frame bars, as well as other panel adjuncts, have been fully illustrated and described.

The vertical frame bars 22 extend in contiguity at the juncture between adjacent panel units and are maintained in such position by means of cooperating bolt assemblies 24 and wedge assemblies 26 which constitute the essence of the present invention and the nature and function of which will be described in greater detail presently. The two sides of the wall form are maintained in their proper spaced relationship by means of conventional tie rod and spreader devices 28.

Intermediate horizontal crossbars 30 in the form of angle bars extend across each panel unit and such crossbars have their ends secured by welding to the vertical marginal frame bars 22.

Specifically, the vertical marginal frame bars 22 are of shallow channel shape in transverse cross section, and each bar includes inside and outside marginal ribs or flanges 32 and 34 and a connecting web portion 36. A lateral flange 38, which is spaced inwardly a slight distance from the inside edge portions of each frame bar, affords a right angle recess in which the adjacent vertical edge of the plywood facing 20 seats with its inside face extending flush with the inside edge portions of the frame bars 22.

During the erection of the concrete wall form 10, the two panel units 10 and 12 are brought into contiguity as shown in FIGS. 1 and 2 with adjacent vertical frame bars 22 abutting each other so that the respective ribs 32 and 34 are in edge-to-edge abutting relationship, while the web portions 36 remain slightly separated. At vertically spaced regions along the ribs 32 and 34, pairs of transversely registering notches 42 are provided, and these notches, when the frame bars 22 are in contiguity, define therebetween horizontal channel voids for receiving therethrough the tie rods proper of the tie rod and spreader devices 28. A rectangular hole 46 is formed in the web portion 36 at the horizontal level of each pair of notches 42 and is adapted to receive therethrough,

where a conventional "Steel-Ply" panel unit is concerned, the shank of the T-bolt of the usual bolt and wedge assembly whereby the frame bars may be drawn together. In the present instance, however, and as will be described in detail presently, the rectangular holes 46 are adapted to receive therethrough the shank portions of the bolts of the specially constructed T-bolt assemblies 24. The shank portions of the bolts are designed for cooperation with the wedges of the specially constructed wedge assemblies 26, and the latter assemblies, to a large extent, constitute the principal feature of the present invention. The horizontal frame bars are substantially identical in their construction to the vertical frame bars 22, but since they bear no direct relation to the present invention, they have not been illustrated herein.

The arrangement of parts thus far described, with the exception of the brief reference to the T-bolt assemblies 24 and the wedge assemblies 26, is more or less conventional and no claim is made herein to any novelty associated with the same. Concrete wall forms of this type may vary widely in their details of construction and it will be understood that the wall form illustrated herein is purely exemplary of one embodiment of a concrete wall form embodying panel units employing the novel wedge assemblies 26. Such wall forms may include numerous other articles of concrete hardware, such as waler-supporting brackets, panel-aligning devices, and the like, only such portions of a wall form as bear a relation to the present invention being illustrated herein.

As previously stated, the T-bolt assemblies 24 and the wedge assemblies 26 of the present invention do not deviate appreciably in function from conventional T-bolt and wedge assemblies in that they are designed to draw the adjacent edges of the panel units hard together for panel aligning and erection purposes, as well as to constitute anchor points for the adjacent ends of the tie rod and spreader devices 28. A conventional T-bolt, tie rod and wedge assembly is shown and described in United States Patent No. 2,948,045, granted on August 9, 1960, and entitled "Tie Rod Assembly for Concrete Wall Forms and Cone Therefor." The T-bolt assemblies 24 and the wedge assemblies 26 of the present invention differ structurally from a conventional T-bolt and wedge assembly in that the component parts thereof are permanently attached to the panel units with which they are associated in a novel manner for immediate cooperation when adjacent like panel units are brought into operative edge-to-edge relationship for wall form erecting purposes, as will now be more fully described in detail.

The T-bolt assemblies 24 and the wedge assemblies 26 are counterparts, and inasmuch as they exist on different panel units, their cooperation can be effected only when adjacent panel units containing these counterpart assemblies are assembled upon each other in edge-to-edge relationship as shown in FIGS. 1 and 2. Each counterpart assembly is comprised of one T-bolt assembly 24 and one wedge assembly 26, the bolt assembly 24 of FIG. 3 being disposed upon the panel unit 12, and the wedge assembly 26 being disposed upon the panel unit 14.

Each T-bolt assembly 24 is substantially identical with the bolt assembly that is disclosed in aforementioned copending patent application Serial No. 189,588 and involves, in its general organization, a T-bolt proper 50 (hereinafter termed simply as the T-bolt) and an anchor post assembly therefor whereby the bolt assembly may be permanently affixed to one of the intermediate horizontal crossbars 30 which constitutes a support therefor. The anchor post assembly of each T-bolt assembly is in the form of a cylindrical cup member 52 (see FIG. 2) having a threaded shank 54 which projects downwardly through the horizontal flange 56 of the crossbar 30 and is secured in position on the crossbar by means of a nut 58. A threaded stud bolt 60 is received in the cup member 52, and when fully threaded therein, has its head portion elevated above the rim of the cup member 52 so as

to leave a portion of its shank exposed. Before threaded reception of the stud bolt 60 in the cup member 52, its shank portion is passed through an elongated longitudinally extending slot 62 (see FIG. 4) in the T-bolt 50 so that the bolt is permanently captured by the stud bolt 60 and is loosely retained thereon at all times.

The T-bolt 50 of each assembly 24 is in the form of a length of flat steel bar stock having a wide rear section 70 (see FIG. 4) and a reduced forward section 72. It is loosely slidable on the associated stud bolt 60 between a retracted position wherein its extreme forward end just enters the adjacent hole 46 in the panel unit 12, and an advanced or projected position wherein the reduced section 72 is projected through both of the adjacent registering holes 46 in the web portions 36 of the frame bars 22 of the panel units 12 and 14. It is to be noted at this point that the anchor post assembly of each bolt assembly 24 is so disposed on the horizontal flange 56 and the length of the slot 62 is such that, when the T-bolt 50 is in its retracted position, the forward end of the T-bolt just enters the adjacent hole 46. Thus, the T-bolt may not be completely withdrawn from the adjacent hole 46 and, therefore, the T-bolt is constrained to slide endwise along the intermediate crossbar 30 and is prevented from angular turning movement in a horizontal plane by reason of its close proximities to the panel facing 20. In its advanced projected position, the shoulders 74 which exist at the juncture region between the sections 70 and 72 abut against the adjacent vertical frame member 22 of the panel unit 12, while an appreciable portion of the T-bolt section 72 projects outwardly beyond the vertical frame member 22 of the panel unit 14 and into the confines of the panel unit 14. This reduced section 72 of the T-bolt is provided with an elongated longitudinally extending slot 76 which is designed for reception of a wedge proper 80, the latter being associated with and forming a part of each wedge assembly 26, as will be described in detail presently.

As best shown in FIG. 2, when the T-bolt 50 of each assembly 24 is moved to its advanced position so that the reduced section 72 thereof is projected through the adjacent rectangular holes 46, this reduced section is adapted to extend through a slot in the adjacent end of the tie rod 82 of the tie rod and spreader device 28. Said adjacent end of the tie rod enters the void which exists between the adjacent web portions 36 and passes through a pair of the registering notches 42. The purpose of the T-bolt 50 of each bolt assembly 24 is thus two-fold in that it serves to maintain the edges of adjacent panel units in contiguity, and also serves as an anchor point for the adjacent end of the tie rod 82. The particular tie rod illustrated herein forms no part of the present invention. For descriptive purposes herein, it is sufficient to state that the tie rod 82 and similar tie rods extend between the two opposed wall forms and serve to maintain them in their proper spaced relationship. Each tie rod 82 has associated therewith shoulder-forming elements 84 which are commonly referred to as spacer cones and serve to prevent inward movement of the panel units with respect to the tie rods.

Each wedge assembly 26 is best illustrated in FIGS. 2 and 3 and includes a wedge proper 80 (hereinafter referred to simply as the wedge). This wedge is generally of triangular shape and is pivoted by means of a rivet 86 to the distal end of a vertically swinging arm 88. The rivet 86 extends through a transverse hole in the distal end of the arm and is welded in place. The proximal end of the arm is connected by a pin and slot connection 90 to an anchor post assembly. The latter includes a post proper 92 having a depending threaded shank 94 which projects through the horizontal flange 56 of the crossbar 30 of the panel unit 14 and is secured thereto by a nut and washer assembly 96, the latter being welded in position. The wedge 80 of each wedge assembly 26 has a linear forward edge 97 which makes line contact with

the adjacent vertical frame bar 22 when the wedge is in its operative position in the concrete wall assembly as shown in FIG. 6.

The anchor post proper 92 of each anchor post assembly is pivoted on the flange 56 of the crossbar 30 at a point close to the plywood facing 20, and to align the wedge 80 with the associated T-bolt 50, the outer end region 98 of the arm 88 is laterally offset outwardly from the inner or proximal end region 100 thereof. By such an arrangement, each wedge assembly 26 as a whole is maintained in an out-of-the-way position well within the rectangular confines of the associated panel unit.

Although in the drawings there is no disclosure of a complete "Steel-Ply" panel unit, the adjacent regions of the various fragmentarily illustrated panel units will disclose the fact that such T-bolt assemblies 24 as may be applied to the panel units are positioned on the crossbars 30 adjacent to the right-hand edges of the panel units, while the wedge assemblies 26 are positioned on the crossbars adjacent to the left-hand edges of the units, this fact being particularly apparent in FIGS. 5 and 6. It will be understood that each of the panels 12, 14, 16 and 18 is provided with the same number and arrangement of T-bolt assemblies 24 and wedge assemblies 26.

It is explained that in connection with standard "Steel-Ply" panel units, for convenience of hardware manipulation in connection with large-sized panel units, the crossbars 30 at one end region of a given panel unit are positioned differently from the crossbars at the other end region of the unit. The representations of FIGS. 5 and 6 are of the medial regions of the panel units 12 and 14, and it will be observed that the upper crossbar 30 of each of these two views is positioned with its vertical flange 102 projecting upwardly, while the lower crossbar 30 is positioned with its vertical flange 102 projecting downwardly. Because it is desirable at all times that the wedges 80 of the wedge assemblies 26 be applied to the T-bolts 50 so that they may be driven downwardly by a hammer or other impact tool, and because of the uniform spacing of the various holes 46 and notches 42, it is necessary to position the anchor posts 92 on the upper sides of the horizontal flanges 56 of the crossbars 30. On the other hand, however, the anchor posts 52 of the bolt assemblies 24 must be reversed under certain circumstances in order to bring the T-bolts 50 associated therewith into horizontal register with the adjacent holes 46 and notches 42. Thus, as shown in FIGS. 5 and 6, on the upper crossbars 30, the anchor posts 92 depend from the horizontal flanges 56, whereas on the lower crossbars 30 these anchor posts are upright. In the case of the upright anchor posts, registering holes 46 and notches 42 are disposed above the level of the crossbars 30, while in the case of the depending anchor posts 92, the holes 46 and notches 42 are disposed below the level of the crossbars. In the former case, the wedges 80 first pass through the slots 76 in the T-bolts 50 and, thereafter, pass through clearance slots 104 in the horizontal flanges 56. In the latter case, the wedges 80 first pass through the clearance slots 104 and, thereafter, pass through the slots 76 in the T-bolts 50.

In the operation of the T-bolt assemblies 24 and the wedge assemblies 26 of the present invention, in the erection of a given form installation such as that shown in FIG. 1, adjacent panel units such as the panel units 12 and 14, or the panel units 16 and 18, are brought into edge-to-edge contiguity in the usual manner of erection, and when properly aligned, the holes 46 in the adjacent vertical frame members 22 will move into registry. It is then necessary merely to project the T-bolts 50 of the bolt assemblies 24 from the retracted position in which they are shown in FIG. 5 to the advanced position in which they are shown in FIG. 6 to the end that the reduced sections 72 thereof are projected completely through the adjacent registering holes 46 and so that the slots 76 are exposed for wedge-receiving purposes. Thereafter, the arms 88 of the wedge assemblies 26 are swung from their retracted position in which they are shown in FIG. 5 to the advanced position in which they are shown in FIG. 6 so that the wedges 80 enter the slots 76, adjust themselves to the vertical frame bars 22, and draw the T-bolts 50 forwardly to cause the shoulders 74 thereof to bear hard against the adjacent frame bar of the panel unit 12, while at the same time the straight forward edges 97 of the wedges 80 bear hard against the adjacent vertical frame bar of the panel unit 14, thus forcing the two panel units 12 and 14 together and locking the same in position. Prior to projection of the T-bolts 50 through the registering holes 46, the adjacent ends of the tie rods 82 are caused to enter the space existing between the slightly spaced web portions 36 of the adjacent vertical frame members 22 so that the T-bolts will pass through the slots in the said adjacent ends of such tie rods. The final home position of the wedges 80 is attained by striking the upper edges of the wedges with an impact tool in order to drive the wedges downwardly into slots 76. To facilitate proper application of the impact blow, these upper edges of the wedges are disposed slightly above the level of the arms 88 as shown in FIGS. 2 and 3, thus providing an elongated impact head at the upper ends of the wedges.

The invention is not to be limited to the exact arrangement of parts shown in the accompanying drawings or described in this specification as various changes in the details of construction may be resorted to without departing from the spirit or scope of the invention. Therefore, only insofar as the invention has particularly been pointed out in the accompanying claims is the same to be limited.

Having this described the invention what we claim as new and desire to secure by Letters Patent is:

1. In a concrete wall form structure, in combination, a pair of aligned contiguous prefabricated similar panel units disposed in edge-to-edge upstanding relationship, each panel unit embodying a pair of opposed marginal frame members, a panel facing bridging the distance between said frame members and secured at its ends to the latter, and a horizontal crossbar also bridging the distance between the frame members and secured at its ends to the latter, each panel unit having one of its marginal frame members abutting the adjacent marginal frame member of the other panel unit throughout the length thereof, there being a hole in each of the abutting frame members at substantially the same height in the wall form structure and a small distance away from the associated crossbar whereby the two holes are in registry, an elongated bolt positioned adjacent to and in parallel relation with the crossbar of one panel unit, slidable lengthwise in a path which is in alignment with the registering holes, and movable bodily between a retracted rear position wherein the bolt is moved within the confines of said one panel unit and an advanced position wherein one end portion of the bolt is projected through both of the registering holes and extends into the confines of the other panel unit, said bolt being provided with a first elongated slot in the rear end portion thereof, a first anchor post mounted on the crossbar of said one panel unit and projecting through said slot for guiding the rear end portion of the bolt in said path, the forward end portion of the bolt being guided in the hole in said one panel unit, a shoulder on the bolt engageable with the marginal frame member of said one panel unit for establishing the forward position of the bolt, there being a second elongated slot in the forward end portion of the bolt, a second anchor post mounted on the crossbar of the other panel unit, a wedge-supporting arm, means including a lost-motion connection pivotally connecting the proximate end of said arm to said anchor post, a flat tapered wedge pivotally mounted on the distal end of the arm, said arm being movable between a retracted position wherein the wedge is remote from said projected one end portion of the bolt and an

advanced position wherein the wedge is projected into the slot in binding engagement with the adjacent frame member and with one end of the second slot for drawing the panel units hard against each other.

2. A concrete wall form structure as set forth in claim 1 and wherein said wedge is generally triangular in shape and is provided with a substantially linearly straight side designed for coextensive line engagement with the adjacent frame member when the wedge is projected into said slot.

3. A concrete wall form structure as set forth in claim 1 and wherein said anchor post is positioned on the crossbar of said other panel unit in close proximity to the panel facing of such unit, and the extreme distal end region of the arm which carries the wedge is offset laterally outwardly of the panel unit.

4. A concrete wall form structure as set forth in claim 1 and wherein the wedge is generally triangular in shape and is provided with a substantially linearly straight side designed for coextensive line engagement with the adjacent frame member when the wedge is projected into said slot, the anchor post on the crossbar of said other panel unit is positioned in close proximity to the panel facing of such unit, and the extreme distal region of the arm which carries the wedge is offset laterally outwardly of the panel unit.

5. A concrete wall form structure as set forth in claim 1 and wherein the wedge is generally triangular in configuration and is provided with a substantially linearly straight side designed for coextensive line contact with the adjacent frame member when the wedge is projected into said slot, and with an upper edge portion which overhangs the distal end of the arm, thus providing an impact head on the wedge for cooperation with an impact tool in driving the wedge into said slot.

6. A concrete wall form structure as set forth in claim 1 and wherein said second anchor post is positioned on the crossbar of said other panel unit in close proximity to the panel facing of such unit, and wherein the extreme distal end region of the arm which carries the wedge is offset laterally outwardly of the panel unit.

References Cited by the Examiner

UNITED STATES PATENTS

346,366	7/86	Faulder	292—101
1,369,713	2/21	Smith	292—101
1,443,177	1/23	Hart	292—109
1,473,324	11/23	Schmitt	70—98
2,997,769	8/61	Bowden	25—131

FOREIGN PATENTS

555,733	3/23	France.
672,281	9/29	France.
872,590	7/61	Great Britain.

MICHAEL V. BRINDISI, *Primary Examiner.*

ROBERT F. WHITE, *Examiner.*