

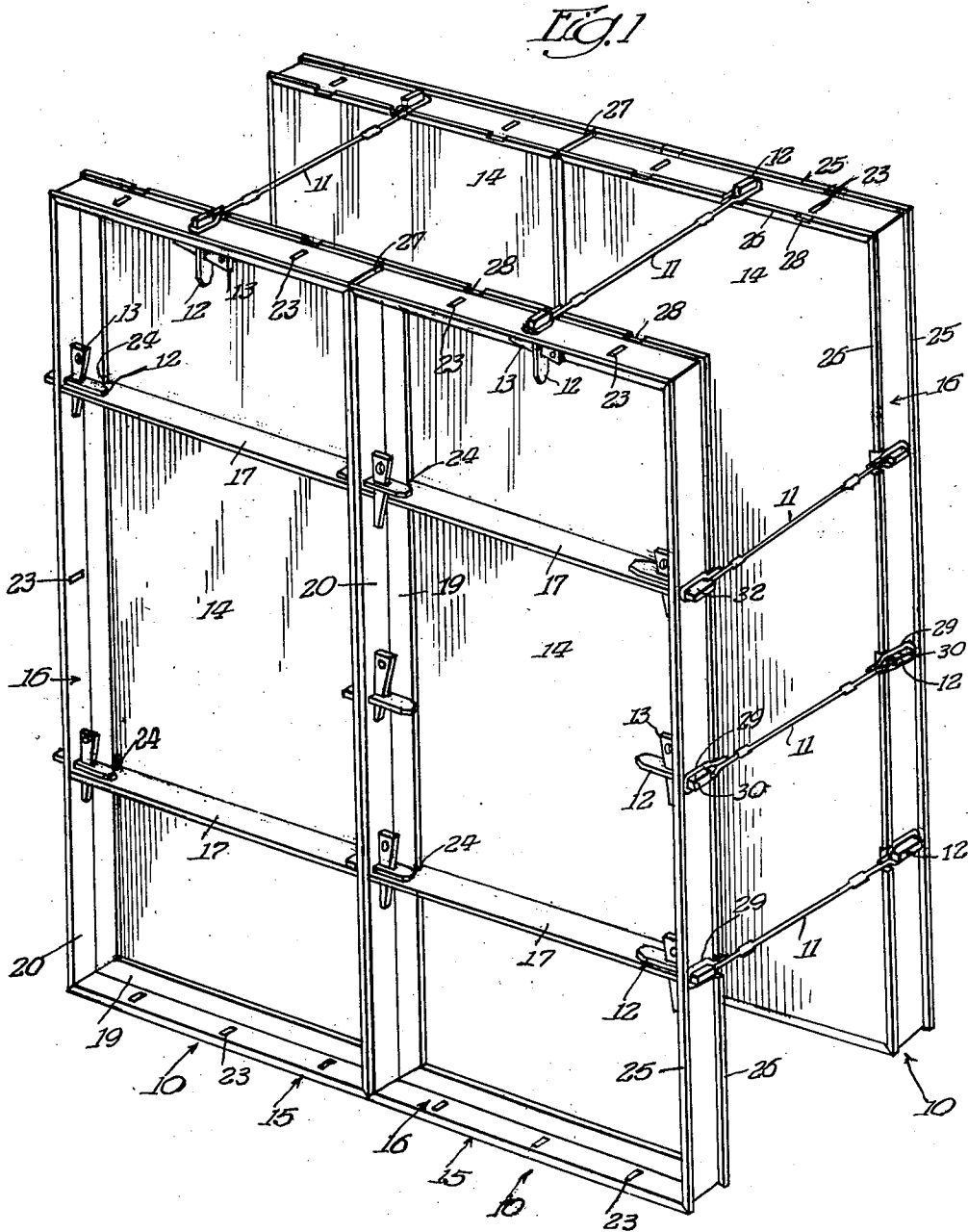
June 2, 1953

A. H. SYMONS
WALL FORM PANEL

2,640,249

Filed May 15, 1950

3 Sheets-Sheet 1



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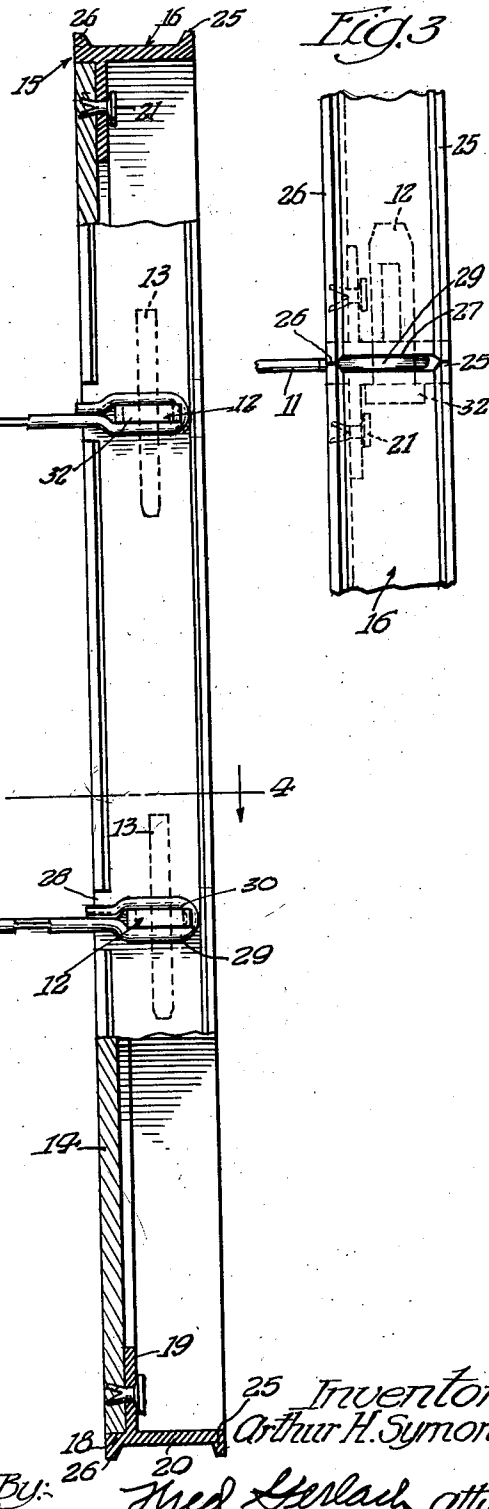
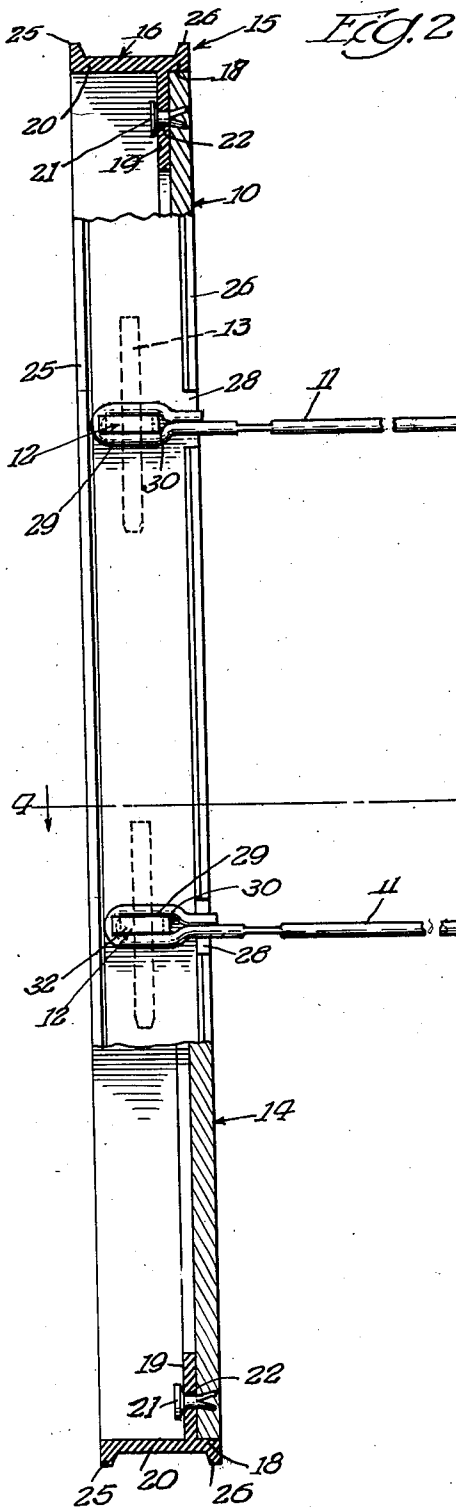
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3 Sheets-Sheet 2

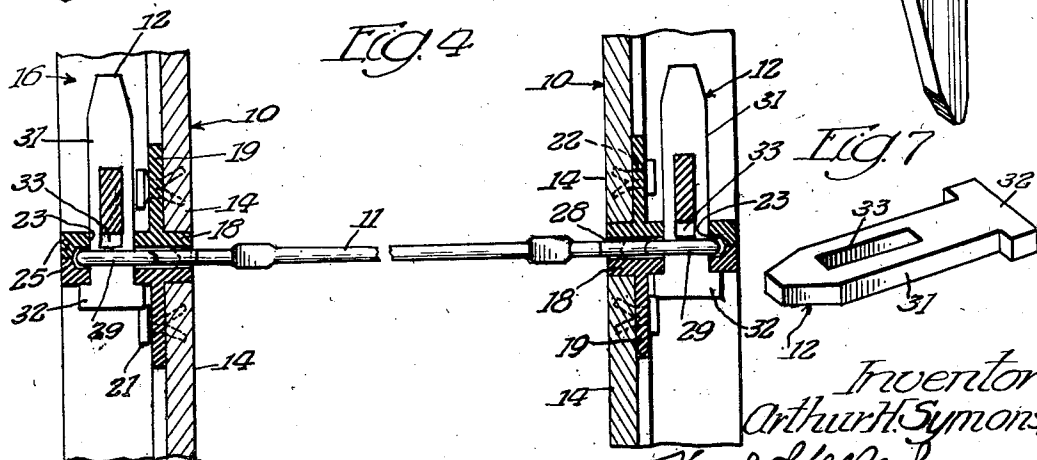
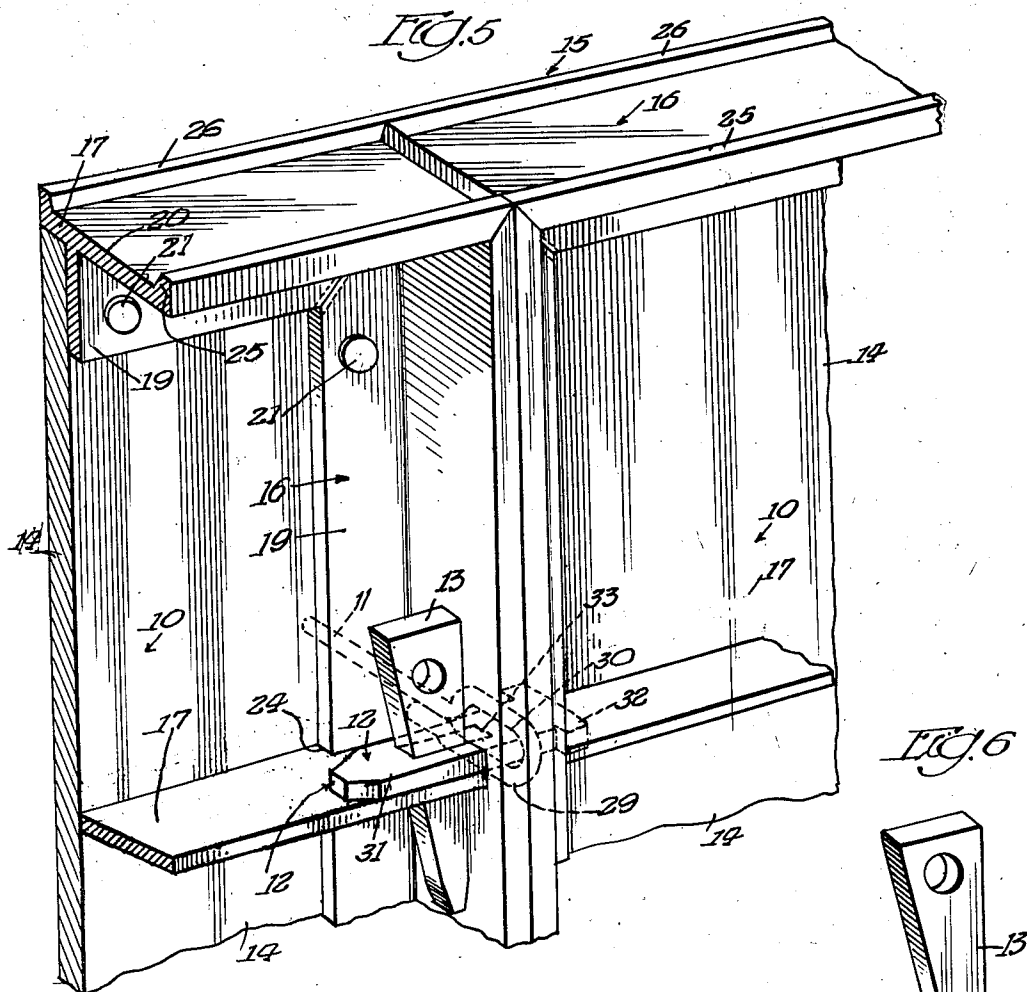


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WALL FORM PANEL

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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WALL FORM PANEL

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2 Claims. (Cl. 25—131)

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The present invention relates generally to wall forms. More particularly the invention relates to that type of wall form which is adapted for use in the formation of a concrete wall and comprises: (1) a series of upstanding edge to edge panels of the rectangular facing and reinforcing frame variety; (2) a second series of similar upstanding panels in opposed and spaced apart relation with the panels of the first series; (3) horizontal combined tie and spreader members which extend between the two series of panels and have apertured ends between the frames of the panels; (4) head and shank variety bolts which extend through the apertured ends of the combined tie and spreader members and registering holes in adjacent portions of the frames of the panels and have longitudinal slots in the outer ends of their shanks; and (5) wedges which extend through the slots in the outer ends of the shanks of the bolts and when driven tightly into place coact with the bolts to connect the panels to the ends of the combined tie and spreader members and also to clamp the panels together in edge to edge relation.

As evidenced by United States patent application Serial No. 81,962, filed by me on March 17, 1949, it has heretofore been proposed in connection with the fabrication or manufacture of a wall form of the aforementioned type to form the facings of the panels of plywood and to form the reinforcing frames for the panels of steel angle bars consisting of coplanar flanges which abut against, and are suitably fixedly secured to, the rear faces of the margins of the plywood facings and rearwardly extending flanges which extend at right angles to, and are joined to the outer margins of, the coplanar flanges, embody holes therethrough for the shanks of the bolts and have welded to their outer faces flat, longitudinally extending, steel strips which are spaced apart adjacent the holes to form recesses for accommodating the apertured ends of the combined tie and spreader members and have the front margins thereof projecting beyond the front faces of the coplanar flanges in order to form with said coplanar flanges rectangular seats in which the marginal portions of the plywood facings fit snugly. In practice it has been found that a wall form, the panels of which are fabricated or constructed in the aforementioned manner is subject to certain objections. In the first place the panels, due to the fact that the angle bars and the flat separately formed longitudinally extending strips are formed of steel are heavy and unwieldy and hence may not be read-

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ily installed and removed. Secondly, the flat separately formed horizontally extending strips which are welded to the outer side faces of the rearwardly extending flanges of the angle bars constituting the facing-reinforcing frames sometimes become dislodged or disconnected and hence render useless the panels of the form.

The primary object of this invention is to provide a wall form which is an improvement upon, and eliminates the objections to, previously designed forms of the same general design and construction and is characterized by the fact that the facing-reinforcing frames are formed of light metal, such as magnesium, and the rearwardly extending flanges of the angle bars that constitute the frames of the panels, instead of being provided on the outer side faces thereof with flat separately formed longitudinally extending strips, embody at the front margins thereof coplanar integral extensions which lap the edges of the plywood facings and define with the coplanar flanges rectangular seats in which the marginal portions of the facings fit snugly. By forming the angle bars of the panel frames of light metal the panels as a whole are light in weight and hence may be manipulated into and out of place with facility; and by providing the rearwardly extending flanges with coplanar forwardly extending extensions instead of separately formed strips the panel frames are not likely to break and hence have an extremely long life.

Another object of the invention is to provide a wall form of the last mentioned character in which the rear side margins of the rearwardly extending flanges of the angle bars and the front side margins of the coplanar extensions have integral, outwardly and laterally extending, full length ribs which, when the panels are in assembled relation, form between the panel frames closed spaces for receiving and accommodating the apertured ends of the combined tie and spreader members.

A further object of the invention is to provide a wall form of the type and character under consideration in which the outwardly and laterally extending ribs on the front side margins of the coplanar extensions have notches which are in horizontal alignment with the bolt receiving holes in the rearwardly extending flanges of the angle bars and serve to accommodate the portions of the combined tie and spreader members that are directly inwards of the apertured bolt receiving ends.

A still further object of the invention is to

provide a concrete wall form which is generally of new and improved construction, may be fabricated or manufactured at a comparatively low cost, effectively and efficiently fulfills its intended purpose and, due to the particular design and construction of the panels thereof, possesses extremely long life.

Other objects of the invention and the various advantages and characteristics of the present wall form will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by claims at the conclusion hereof.

In the drawings which accompany and form a part of this specification or disclosure and in which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a perspective view of a concrete wall form embodying the invention;

Figure 2 is an enlarged view, partly in end elevation and partly in vertical transverse section, illustrating in detail the manner in which the combined tie and spreader members together with the bolts and wedges serve to hold the panels of the two series in spaced apart and connected relation;

Figure 3 is an enlarged top plan view showing the manner in which the outwardly and laterally extending full length ribs on the rear side margins of the rearwardly extending flanges of the angle bars and the front side margins of the coplanar extensions of the rearwardly extending flanges serve to form closed spaces for the apertured ends of the combined tie and spreader members;

Figure 4 is a horizontal section on the line 4—4 of Figure 2;

Figure 5 is an enlarged fragmentary perspective view of certain adjacent corner portions of two of the panels of the wall form;

Figure 6 is a perspective view of one of the wedges; and

Figure 7 is a perspective view of one of the head and shank variety bolts.

The wall form which is shown in the drawings constitutes the preferred form or embodiment of the invention. It is adapted for use in the formation of a concrete wall (not shown) and comprises two similar series of upstanding edge to edge panels 10, combined tie and spreader members 11 for holding the two series of panels against relative lateral displacement, and bolts 12 and wedges 13 for connecting the panels to the ends of the combined tie and spreader members and also holding the panels in edge to edge relation. The two series of panels are spaced apart a distance corresponding to the desired thickness of the concrete wall to be formed therebetween and are adapted to have concrete poured between them for wall forming purposes. After setting or hardening of the concrete the panels 10 are removed from the sides of the wall and the projecting ends of the combined tie and spreader members 11 are severed or broken off as well understood in the art.

The panels 10 are all the same in size, design and construction and each consists of a rectangular facing 14 and a rectangular frame 15.

The facings 14 of the panels 10 are preferably formed of plywood, although if desired, plain or regular wood may be employed. They are of uniform thickness throughout their entire areas and have flat front faces. By reason of the fact that the front faces of the panel facings are flat

the sides of the concrete wall that is formed between the two series of panels are uniform and likewise flat.

The frames 15 serve to reenforce or strengthen the plywood facings 14 and are for the most part located rearwards of the facings. They are formed of light metal, such as magnesium, and comprise one-piece angle bars 16, flat crosspieces 17, and extensions 18. The angle bars 16 consist of inwardly extending coplanar flanges 19 and rearwardly extending right angle flanges 20. Certain of the angle bars 16 extend vertically and are laterally spaced and the other angle bars are positioned horizontally and extend between the ends of the vertically extending angle bars. The ends of the vertically and horizontally extending angle bars are mitered and are rigidly connected together by welding. Ordinarily the panels 10 are positioned so that they are vertically elongated although it is to be understood that, if desired, the panels may be arranged so that they are horizontally elongated. The inwardly extending coplanar flanges 19 of the angle bars 16 fit flatly against the rear faces of the marginal portions of the facings 14 and are secured to said facings by rivets 21. The latter are of the split shank variety and extend through holes 22 in the coplanar flanges 19. Preferably the rivets are of such length that the inner ends thereof do not extend through the front faces of the plywood facings 14. The rearwardly extending flanges 20 of the angle bars 16 extend at right angles to, and are formed integrally with, the outer margins of the coplanar flanges 19 and have inwards of their ends transversely elongated holes 23. As best shown in Figure 4 the inner side faces of the rearwardly extending flanges 20 lie in the same planes as the edges of the plywood facings 14. Preferably each of the rearwardly extending flanges has a plurality of holes 23 and such holes are spaced equidistantly apart. The flat crosspieces 17 extend horizontally and are disposed inwards of, and in parallel relation with, the horizontally extending angle bars. They extend between the vertically extending angle bars and have the ends thereof welded to the inner side faces of the rearwardly extending flanges of the vertically extending angle bars at points directly beneath certain of the holes 23 in such angle bars. The inner corners of the crosspieces 17 have notches 24 in order to accommodate the coplanar flanges of the vertically extending angle bars. The inner edges of the crosspieces abut against the rear faces of the plywood facings in order that the crosspieces serve to reenforce the facings against rearward deflection or bending. Preferably there are two crosspieces for each rectangular frame 15, as shown in Figure 1, although it is to be understood that additional crosspieces may be employed if the frame is vertically elongated to an appreciable extent. The extensions 18 are formed integrally with, and project forwards from, the front side margins of the rearwardly extending flanges 20 and are in coplanar relation with the latter. They lap or fit flatly against the edges of the plywood facings and define with the coplanar flanges 19 rectangular seats in which the marginal portions of the facings fit snugly. As shown in the drawings the front side edges of the extensions 18 are flush with the front faces of the facings. The forwardly extending extensions 18 protect the edges of the plywood facings 14 against chipping or splitting. The rear side margins of the rearwardly extending flanges 20 are provided with outwardly and laterally extending full length in-

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tegral ribs 25 and the front side margins of the extensions 18 are provided with outwardly and laterally extending full length integral ribs 26. When the panels 10 are arranged in edge to edge relation as shown in Figure 1, the ribs 25 abut against one another and also the ribs 26 abut against one another. The ribs 25 and 26 are the same in width and form substantially closed spaces 27 between the frames of the panels. The outwardly and laterally extending ribs 26 on the front side margins of the extensions 18 have formed therein notches 28 and these are horizontally aligned with the transversely elongated holes 23 in the rearwardly extending flanges 20 of the angle bars 16.

The combined tie and spreader members 11 extend horizontally between the two opposed spaced apart series of panels 10. They are preferably formed of steel rods and have at the ends thereof closed loops 29 which define apertures 30. In connection with assembly of the wall form the ends of the combined tie and spreader members 11 are inserted through the notches 28 into the closed spaces between the ribs 25 and 26 and are manipulated so as to arrange the apertures 30 in registry with the transversely extending holes 23 in the rearwardly extending flanges 20 of the angle bars 16. As shown in the drawings the notches 28 are slightly longer than the loops 29 are wide in order that the loops may be inserted through the notches into the closed spaces 27.

The bolts 12 embody flat tapered shanks 31 and heads 32 at the large ends of the shanks. The shanks of the bolts are adapted to extend through the apertures 30 in the ends of the combined tie and spreader members and also the holes 23 in the rearwardly extending flanges 20 of the angle bars 16. In assembling the wall form the panels are positioned in edge to edge relation and then the combined tie and spreader members are manipulated so as to dispose the apertured ends thereof in the closed spaces 27 between the ribs 25 and 26. Thereafter the bolts are shifted into their operative position by inserting the shanks 31 thereof through the apertures 30 and the transversely elongated holes 23 and then driving the bolts in the direction of the small ends of the shanks until the heads 32 are brought into abutment with the inner side faces of the adjacent rearwardly extending flanges 20. The small ends of the shanks of the bolts 30 are provided with longitudinally extending slots 33.

The wedges 13 are preferably formed of comparatively heavy stamped metal and are adapted to fit within, and extend through, the slots 33 in the small ends of the shanks of the bolts 12. When driven into place the wedges 13 bear against the inner side faces of the adjacent rearwardly extending flanges of the angle bars and serve to hold the bolts against longitudinal displacement. The wedges and bolts coact to connect the panels to the ends of the combined tie and spreader members 11 and also to clamp the panels together in edgewise relation. As shown in Figure 1 of the drawings the ends of the flat crosspieces 17 of the panel frames 15 have slots 34 for accommodating the wedges that coact with those bolts that extend through the rearwardly extending flanges of the vertically extending angle bars of the frames.

In assembling the form the panels are positioned in two opposed spaced apart series, as heretofore pointed out. Thereafter the ends of the combined tie and spreader members 11 are inserted through the notches 28 into the closed spaces 27 between the ribs 25 and 26. After

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proper manipulation of the combined tie and spreader members the bolts 12 are inserted into place and then the wedges 13 are driven through the slots 33 in the shanks of the bolts. As soon as the form is assembled concrete is poured into the space between the two series of panels. Upon hardening or solidifying of the concrete the panels are dismantled by removing the wedges 13 from the bolts and then sliding the bolts lengthwise in the direction of their heads 32. As soon as the wedges and bolts are removed the panels are free and hence may be removed by shifting them away from the sides of the wall. After removal of the panels the projecting loop equipped ends of the combined tie and spreader members 11 are severed or broken off adjacent the sides of the wall as heretofore described.

The herein described wall form effectively and efficiently fulfills its intended purpose and is capable of being assembled and dismantled with facility. It has extremely long life so far as the panels 10 are concerned and this is directly attributable to the fact that the reinforcing frames 15 for the plywood facings 14 include the integral extensions 13 which are in coplanar relation with the rearwardly extending flanges 20 and form with the coplanar flanges 19 rectangular seats in which the marginal portions of the plywood facings fit snugly. By reason of the fact that the reinforcing frames 15 are formed of magnesium the panels of the form are light in weight and hence may be readily assembled and dismantled.

The invention is not to be understood as restricted to the details set forth since these may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

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

1. As a new article of manufacture, a panel adapted to be placed in edge to edge relation with like panels for purposes of forming a wall form and comprising a rectangular facing and a unitary facing-reinforcing frame in the form of four angle bars arranged in rectangular relationship around the facing and consisting of rigid inwardly extending coplanar flanges fitting against and secured to the rear face of the marginal portion of the facing, rigid rearwardly extending right angle flanges connected to the outer margins of the coplanar flanges, embodying spaced apart transverse bolt-receiving holes therein, and having on the rear side margins thereof outwardly and laterally extending integral ribs, and rigid extensions formed integrally with, and projecting forwards from, the front side margins of the rearwardly extending flanges, disposed in truly coplanar relation with said rearwardly extending flanges and in lapped relation with the edges of the facing, forming with the coplanar flanges a rectangular seat in which the marginal portion of the facing fits snugly, having the front edges thereof flush with the front face of the facing, and having on their front side margins outwardly and laterally extending integral full length ribs, the last mentioned ribs being of the same thickness as the first mentioned ribs, forming with said first mentioned ribs spaces for receiving certain apertured ends of combined tie and spreader members and having formed therein spaced apart notches in alignment with the bolt-receiving holes in the rear-

modate the portions of the combined tie and spreader members that are adjacent said certain apertured ends and to locate and hold said certain apertured ends of the combined tie and spreader members in registry with said holes.

2. As a new article of manufacture, a panel adapted to be placed in edge to edge relation with like panels for purposes of forming a wall form and comprising a rectangular plywood facing and a facing-reinforcing frame in the form of four separately formed one-piece angle bars formed of light weight metal, arranged in rectangular relationship around the facing, having mitered welded together ends, and consisting of rigid inwardly extending coplanar flanges fitting directly against and secured to the rear face of the marginal portion of the facing, rigid rearwardly extending right angle flanges connected to, and formed integrally with, the outer margins of the coplanar flanges, embodying spaced-apart transverse bolt-receiving holes therein, having their inner side faces lying in the same planes as the edges of the facing, and having on the rear side margins thereof outwardly and laterally extending integral full length continuous ribs, and rigid extensions formed integrally with, and projecting forwards from, the front side margins of the rearwardly extending flanges, disposed in truly coplanar relation with said rearwardly extending flanges and in lapped relation with the edges of the facing, forming with the coplanar flanges a rectangular seat in which the marginal

portion of the facing fits snugly, having the front edges thereof flush with the front face of the facing, and having on their front side margins outwardly and laterally extending integral full length ribs, the last mentioned ribs being of the same thickness as the first mentioned ribs, forming with said first mentioned ribs spaces for receiving certain apertured ends of combined tie and spreader members and having formed therein spaced apart notches corresponding in number to and in alignment with the bolt-receiving holes in the rearwardly extending flanges and adapted to accommodate the portions of the combined tie and spreader members that are adjacent said certain apertured ends and to locate and hold said certain apertured ends of the combined tie and spreader members in registry with said holes.

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