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OUTER RIGHT ANGLE CORNER FORMING UNIT FOR A CONCRETE WALL FORM

Filed May 17, 1955

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OUTER RIGHT ANGLE CORNER FORMING UNIT FOR A CONCRETE WALL FORM

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Application May 17, 1955, Serial No. 508,847

4 Claims. (Cl. 25—131)

The present invention relates generally to wall forms. More particularly, the invention relates to that type of wall form which is designed for use in the formation of a concrete wall and comprises: (1) a series of upstanding edge to edge rectangular panels which are formed of plywood or other suitable material and have oppositely disposed hole forming notches in the abutting side edges thereof; (2) a second series of similar upstanding rectangular panels which are disposed in oppositely but spaced apart relation with the panels of the first series; (3) horizontally positioned combined tie and spreader rods which extend between and at right angles to the two series of panels and have the ends thereof projecting through and beyond the notch-formed holes between the abutting side edges of the panels; and (4) removable clamping devices which are associated with the ends of the combined tie and spreader rods and serve when in place to hold the panels in fixed relation with the ends of the rods. In connection with use of a concrete wall form of the aforementioned type, it is necessary when the wall to be formed is to have a right angle bend to arrange certain of the panels of one series at right angles with respect to the other panels of the one series and correspondingly to arrange the panels of the other series. Herefore, difficulty has been experienced in positioning and connecting together the two panels that serve to form the outside corner of the right angle bend in the concrete wall that is formed by use of the form as a whole.

One object of this invention is to provide in connection with a concrete wall form of the type under consideration an outside right angle corner forming unit which involves a simple and novel construction, effectively and efficiently fulfills its intended purpose, and is so designed that it may be assembled and disassembled with facility. In general, the improved unit comprises: (1) a pair of vertically elongated rectangular upstanding panels which are positioned at right angles to one another and so that their inner side edges are in abutment with one another; (2) an upstanding angle bar which is the same in height as the two panels, fits in the space between the inner side edges of the panels, and is arranged so that its apex abuts against the aforementioned inside inner corners of the panels and the outer surfaces of its side flanges fit flatly against the inner side edges of the panels; and (3) releasable devices for holding the angle bar and the two panels in fixedly connected relation.

Another object of the invention is to provide an outside right angle corner forming unit of the aforementioned character in which the two panels are provided on their outer faces thereof with horizontally extending and aligned reinforcing boards which are arranged so that the inner end edges thereof are disposed adjacent to, but spaced a small distance inwards of, the inner side edges of the panels and have mounted on their outer surfaces longitudinally extending metallic strips the inner ends of which project beyond the inner end edges of the boards and are bent inwards at substantially right angles in order to form adjacent to the inner side edges of the panels and the free side edges of the side flanges of the angle bar vertically extending open ended sockets; in which the upstanding angle bar embodies adjacent to the inner ends of the metallic strips on the reinforcing boards a horizontally disposed C-shaped metallic strap the end parts of which are welded to, and project outwards from, the adjacent portions of the free side edges of the side flanges of the angle bar and form vertically extending open ended sockets in juxtaposition with the sockets that are formed by the inwardly bent inner ends of the aforementioned metallic strips; and in which the releasable devices for holding the angle bar and the two panels in fixedly connected relation consist of a pair of cast metal brackets which are associated with the panels respectively and embody pairs of spaced apart depending fingers certain of which are adapted to extend downwards through the sockets that are formed by the inwardly bent inner ends of the metallic strips and the others of which are adapted to extend downwards through the sockets that are formed by the end parts of the C-shaped strap on the angle bar.

A further object of the invention is to provide an outside right angle corner forming unit of the type and character under consideration in which the end parts of the C-shaped strap are in the form of right angle bends, and the inner side surfaces of the pairs of depending fingers on the cast metal brackets are downwardly divergent to the end that when the fingers are driven downwards through the sockets in connection with mounting of the brackets in place they operate automatically to draw the panels and angle bar towards one another into firmly clasped relation.

A still further object of the invention is to provide an outside right angle corner forming unit which is of generally new and improved construction and is characterized by such simplicity of design that it may be produced at a comparatively low cost.

Other objects of the invention and the various advantages and characteristics of the present outside right angle corner forming unit will be apparent from the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by the 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 fragmentary perspective view showing an outside right angle corner forming unit embodying the invention with the various component parts thereof, i.e., the panels, the angle bar and the cast metal brackets, in assembled or operative relation;

Figure 2 is a similar perspective view except that it illustrates the finger-equipped cast metal brackets before they are driven downwards into their operative position wherein the pairs of spaced apart depending fingers thereof extend downwards through the aforementioned vertically extending open ended sockets;

Figure 3 is an enlarged horizontal section taken on the line 3—3 of Figure 1;

Figure 4 is a horizontal section illustrating the outside right angle corner forming unit in operative relation with an inside corner forming unit and additional panels so as to form a complete corner for use in the formation of a concrete wall having a right angle bend or corner;

Figure 5 is a fragmentary perspective of the angle bar of the unit, illustrating in detail the construction, arrangement and manner of mounting of the metallic C-shaped strap the end parts of which define or form vertically extending open ended sockets for receiving certain of the fingers on the cast metal brackets of the unit.
The outside right angle corner forming unit which is shown in the drawings constitutes the preferred form or embodiment of the invention. In general, the unit comprises a pair of upstanding vertically elongated rectangular frame members 6 and 9, an upstanding angle bar 7 and a pair of releasable devices 8 for holding the angle bar and the two panels in fixedly connected and clamped relation. When the unit is in its operative position the panels 6 extend at true right angles to one another. As shown in Figure 4 of the drawings, the unit together with a pair of panels 9, a pair of panels 10, 11, 12 and 13, combined tie and spreader rods 14 and releasable clamping devices 15 is adapted to form a form for use in the fabrication of concrete walls having a right angle bend in it. As hereinafter described in more detail, the unit in connection with use of the concrete wall form as a whole is adapted to form the outside corner of the right angle bend in the concrete wall that is formed by way of the form. The panels 9 and 13 are rectangular and extend vertically. They are positioned in edge to edge relation with the panels 6 of the outside right angle corner forming unit and form with the panels 6 an outside series of panels for the form as a whole. The four panels 6, 9, 10, 11, 12 and 13 are rectangular and extend vertically. They are arranged in edge to edge relation with the inside series of panels in opposed but spaced apart relation with the outer series of panels consisting of panels 6 and 9. The panels 11 and 12 extend at right angles to one another, are connected together at their inner side margins by a hinge connection 16, and form with the hinge connection an inside right angle corner forming unit for the form. Such inside corner forming unit is disclosed in, and forms the subject matter of, co-pending patent application Serial No. 505,570, filed by me on May 3, 1955. For a more detailed description of the construction, arrangement and mode of operation of the inside corner forming unit consisting of the panels 11 and 12 and the hinge connection 16 reference may be had to said application. The combined tie and spreader rods 14 and the releasable clamping devices 15 serve to hold the outer and inner series of panels in fixed spaced apart relation. It is contemplated that the two series of panels will be spaced apart a distance corresponding to the desired thickness of the concrete wall to be formed therebetween and also that after proper positioning of the two series of panels concrete in plastic or unset form will be poured between the two series of panels for wall forming purposes. After setting or hardening of the concrete, the form is dismantled and then the projecting ends of the combined tie and spreader rods are severed or broken at points adjacent to the sides of the concrete wall. The various panels including the panels 6 of the outside right angle corner forming unit are preferably formed of plywood and have oppositely disposed semi-circular notches 17 formed in their abutting side edges. Each oppositely disposed pair of notches forms a circular hole 18 for receiving one end of one of the combined tie and spreader rods 14. The plywood panels 6, 9, 10, 11, 12 and 13 are reinforced by horizontally extending boards 19 which extend across the outer faces of the panels and are fixedly secured in place in any suitable manner. The boards 19 are preferably positioned so that the imaginary longitudinal center lines of the two panels thereby are in alignment with the semi-circular notches 17 in the side edges of the panels. As shown in the drawings the side edges of the reinforcing boards are disposed a small distance inwards of the side edges of the panels. Each of the reinforcing boards 19 is provided on its outer surface with a horizontally extending metallic strip 20. The strips 20 are located midway between the upper and lower side edges of the reinforcing boards and are fixedly secured in place by way of screws 21. The ends of the strips 20 which are adjacent to the semi-circular notches 17 project beyond the adjacent end edges of the reinforcing panels and are bent inwards at substantially right angles so as to form vertically elongated vertically extending open ended sockets 22. The combined tie and spreader rods 14 extend between and at right angles to the outer and inner series of plywood panels and are arranged so that the ends thereof project through, and an appreciable distance beyond, the angle bar and the two panels in fixedly connected and clamped relation. The portions of the combined tie and spreader rods that are disposed inwards of the inner faces of the panels are provided with flats 23 and weakness points 24 outwards of the flats. The extremities of the rods are provided with heads 25. The releasable clamping devices 15 are associated with the ends of the combined tie and spreader rods 14 respectively. They serve to clamp the panels of the form in edge to edge relation and also to hold the panels in fixed or rigid relation with the ends of the rods. As shown in Figures 1 and 2, the releasable clamping devices comprise cast metal brackets 26 and U-shaped locking bolts 27. The brackets 26 are horizontally elongated, extend normally outwards from and at right angles to the panels and embody at their inner ends pairs of spaced apart depending fingers 28 which are adapted to fit within and extend downwards through the aforementioned elongated vertically extending open ended sockets 22. The U-shaped locking bolts 27 of the releasable clamping devices 15 are adapted and formed so that the heads 25 of the brackets 26 and are adapted when driven in the direction of their open ends to be brought into straddled relation with the heads 25 on the extremities of the combined tie and spreader rods 14. For a more detailed description of the construction, arrangement and mode of operation of the combined tie and spreader rods 14 and the releasable clamping devices 15, reference may be had to my co-pending patent application Serial No. 500,107, filed on April 8, 1955 and entitled "Congress Wall Form." The vertically elongated upstanding panels 6 of the outside right angle corner forming unit are the same in height and width and have flat inner and outer faces. When in their operative or normal position the two panels 6 extend at right angles to one another and are arranged so that their inside inner corners are in abutment with one another. The inner side edges of the panels 6 are not provided with semi-circular notches 17 and are straight or flat throughout their entire length. The inner end edges of the reinforcing boards 19 on the outer faces of the panels 11 and 12 and the hinge connection 16 reference may be had to said application. The combined tie and spreader rods 14 and the reinforced devices 15 are to be bent inwards at right angles in order to form adjacent to the inner side edges of the panels 6 elongated vertically extending open ended sockets 29. The angle bar 7 of the outside right angle corner forming unit is the same in height as the panels 6. It is of one piece character and consists of a pair of side flanges 30. The latter are flat and extend at right angles to one another. The angle bar normally fits in the space between the inner side edges of the panels 6 and is arranged so that its apex abuts against the inside inner corners of said panels and the outer surfaces of its side flanges 30 fit flatly against the inner side edges of the panels 6. As shown in the drawings, the side flanges 30 of the angle bar 7 are the same in width as the inner side edges of the panels 6 only that there is shown in the drawings the side edges of the reinforcing boards are disposed a small distance inwards of the side edges of the panels. Each of the reinforcing boards 19 is provided on its outer surface with a horizontally extending metallic strip 20. The strips 20 are located midway between the upper and lower side edges of the reinforcing boards and are fixedly secured in place by way of screws 21. The ends of the strips 20 which are adjacent to the semi-circular notches 17 project beyond the adjacent end edges of the reinforcing panels and are bent inwards at substantially right angles so as to form ver-
parts 33 of the strap 31 together form or define vertically extending open ended sockets 37 in juxtaposition or side by side relation with the sockets 29 that are formed by the inwardly bent inner ends of the metallic strips 20 that are associated with the panels 6.

The releasable devices 8 of the outside right angle corner forming unit are two in number. They are associated respectively with the panels 6 and are preferably the same in design and construction as the removable clamping devices 15 for holding the panels of the complete form in edge to edge relation and also in fixed or rigid relation with the ends of the combined tie and spreader rods 14. The reason for having the releasable devices 8 the same in construction as the removable clamping devices 15 is to standardize as much as possible the various parts or components of the form as a whole. As shown in the drawings, the two releasable devices 8 embody cast metal brackets 38. The latter are horizontally oriented, extend downwardly at right angles to the panels 6 and embody at the inner ends thereof two pairs of integral depending laterally spaced fingers 39. When the two releasable devices 8 are in their operative position as shown in Figures 1, 3 and 4, certain fingers of the pairs extend downwards through the vertically extending open ended sockets 29 and the other depending fingers of the pairs extend downwards through the vertically extending open ended sockets 37 which, as previously pointed out, are formed by the inner and outer portions of the end panels 33 of the C-shaped strap 32. In connection with mounting of the releasable devices 8, the brackets 38 are positioned so that the pairs of spaced apart depending fingers 39 overlie the pairs of adjoining sockets 29 and 37. Thereafter, hammer blows are imparted to the inner ends of the brackets 38 so as to drive the brackets downwards and these cause the fingers to slide downwards into and through the aforementioned sockets. When the brackets 38 are fully driven into place the pairs of depending fingers 39 serve to hold the angle bar 7 and the panels 6 in fixedly connected relation. The fingers 39 are preferably downwardly tapered in order that the inner side surfaces of each pair of depending fingers are downwardly divergent. As a result of this the fingers when driven downwards into and through the sockets 29 and 37 operate automatically to draw the panels 6 and the angle bar 7 towards one another into firmly clamped relation. When the devices 8 are in their operative position as shown in the drawings the pairs of depending fingers 39 are arranged in straddled relation with the outer portions 35 of the end panels 33 of the horizontally disposed strap.

The outside right angle corner forming unit is assembled by first placing the angle bar 7 in an upstanding or vertical position on a suitable foundation and then arranging the angle bar so that its apex extends in the proper direction. Thereafter, the panels 6 are arranged so that they are vertically and positioned at right angles to one another. After proper marquetry of the panels, the latter are slid in the direction of the angle bar 7 until their inner side edges are brought into abutting relation with the outer surfaces of the right angle side flanges of the angle bar. At the conclusion of the last mentioned operation, the two brackets 38 are positioned so that the pairs of depending fingers 39 overlie the sockets 29 and 37. After so positioning the brackets the latter are driven downwards so as to cause the fingers to fit within and extend through the aforementioned sockets. After the brackets are fully driven into place, the pairs of depending fingers 39 operate as heretofore pointed out to hold the angle bar 7 in firmly clamped and connected relation. Upon assembly of the outside right angle corner forming unit the other parts of the form are manipulated into place as shown in Figure 4 and as heretofore described. When the form as a whole is complete, concrete in plastic or unset form is poured between the two series of edge to edge panels. After hardening of the concrete the clamping devices 15 and the two releasable devices 8 are driven upwards so as to release the various panels including the panels 6 of the outside right angle corner forming unit. After release of the panels the latter are removed and the projecting ends of the combined tie and spreader rods 14 are bent at right angles and then twisted so as to break the rods at their weakness points 24. As soon as the releasable devices 8 are removed the angle bar 7 is released so that it may be removed from the wall by shifting it laterally away from the wall.

The herein described outside right angle corner forming unit due to its particular design or construction effectively and efficiently fulfills its intended purpose and is characterized by the fact that it may be installed and removed with facility and also produced or fabricated at a comparatively low cost.

Whereas the angle bar 7 of the unit has been described as having but a single horizontally disposed C-shaped strap 31, it is to be understood that it may have a vertical series of spaced apart straps depending upon its length. In the event that the angle bar 7 is provided with more than one strap, each of the panels 6 is provided with a corresponding number of reinforcing boards 19 and metallic strips 30. It is also to be understood that the invention is not limited to the embodiment thus described since they 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, an outside right angle corner forming unit adapted to form a part of a form for use in the formation of a concrete wall with a right angle bend therein, and comprising a pair of side by side upstanding rectangular panels positioned at right angles to one another and so that their inside inner corners are directly adjacent to one another, and embodying on their outer faces means forming a pair of oppositely disposed vertically extending sockets adjacent to the inner side edges of the panels, an upstanding angle bar of substantially the same height as the panels, consisting of right angle side flanges, positioned in the space between the inner side edges of the panels, arranged so that its apex abuts against said inside inner corners of the panels and the outer surfaces of its side flanges fit flatly against the inner side edges of the panels, and embodying adjacent to the socket-forming means a horizontally disposed C-shaped strap the end parts of which are connected to, and project outwards from, the adjacent portions of the free side edges of said side flanges and form vertically extending sockets in juxtaposition with the first mentioned sockets, and a pair of releasable brackets associated with, and disposed outwards of, the panels respectively, operative to hold the angle bar and the panels in fixedly connected relation, and each embodying a pair of depending laterally spaced, downwardly tapered fingers one of which extends slidable through one of the first mentioned sockets and the other of which extends slidable through the adjoining one of the second mentioned sockets, said fingers serving to draw said rectangular panels toward each other and consequently to draw said inner side edges of the panels against the side flanges of said upstanding angle bar.

2. As a new article of manufacture, an outside right angle corner forming unit adapted to form a part of a form for use in the formation of a concrete wall with a right angle bend therein, and comprising a pair of side by side upstanding rectangular panels positioned at right angles to one another and so that their inside inner corners are directly adjacent to one another, and embodying adjacent to the socket-forming means a horizontally disposed C-shaped strap the end parts of which are connected to, and project outwards from, the adjacent portions of the free side edges of said side flanges and form vertically extending sockets in juxtaposition with the first mentioned sockets, and a pair of releasable brackets associated with, and disposed outwards of, the panels respectively, operative to hold the angle bar and the panels in fixedly connected relation, and each embodying a pair of depending laterally spaced, downwardly tapered fingers one of which extends slidable through one of the first mentioned sockets and the other of which extends slidable through the adjoining one of the second mentioned sockets, said fingers serving to draw said rectangular panels toward each other and consequently to draw said inner side edges of the panels against the side flanges of said upstanding angle bar.
distance inwards of the inner side edges of the panels, a pair of metallic strips extending lengthwise of, and connected to, the outer faces of the boards respectively and having the inner ends thereof projecting beyond the inner end edges of the boards and bent inwards to form vertically extending sockets, an upstanding angle bar of substantially the same height as the panels, consisting of right angle side flanges, positioned in the space between the inner side edges of the panels, arranged so that its apex abuts against said inside inner corners of the panels and the outer surfaces of its side flanges fit flatly against the inner sides of the panels, and embodying adjacent to the inner ends of the metallic strips a horizontally disposed C-shaped strap the end parts of which are connected to, and project outwards from, the adjacent portions of the free side edges of said side flanges and form vertically extending sockets in juxtaposition with the first mentioned sockets, and a pair of releasable brackets associated with, and disposed outwards of, the panels respectively, operative to hold the angle bar and the panels in fixedly connected relation, and each embodying a pair of depending laterally spaced fingers one of which extends downwards and slidably through one of the first mentioned sockets and the other of which extends downwards and slidably through the adjoining one of the second mentioned sockets.

3. An outside right angle corner forming unit according to claim 2 and in which the angle bar and the strap are formed of metal and the end parts of the strap are in the form of right angle bends and are welded to the adjacent portions of the free side edges of the side flanges of the angle bar.

4. An inside right angle corner forming unit according to claim 2 and wherein the pairs of depending laterally spaced fingers on the releasable brackets are downwardly tapered and so coact with the sockets that when slid downwards into place they draw the panels and angle bar together into firmly clamped relation.

References Cited in the file of this patent

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Patent Number</th>
<th>Inventor</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,052,419</td>
<td>Morrill</td>
<td>July 16, 1912</td>
</tr>
<tr>
<td>1,599,035</td>
<td>Baumberger</td>
<td>Sept. 7, 1926</td>
</tr>
<tr>
<td>1,621,563</td>
<td>Stevens</td>
<td>Mar. 22, 1927</td>
</tr>
</tbody>
</table>

FOREIGN PATENTS

<table>
<thead>
<tr>
<th>Patent Number</th>
<th>Country</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>681,219</td>
<td>Great Britain</td>
<td>Oct. 22, 1952</td>
</tr>
</tbody>
</table>