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B. ELAM

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CONCRETE WALL FORM EXTENSION

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2 Sheets-Sheet 1

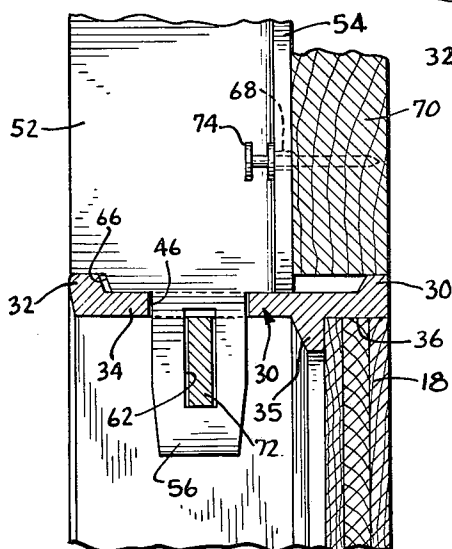
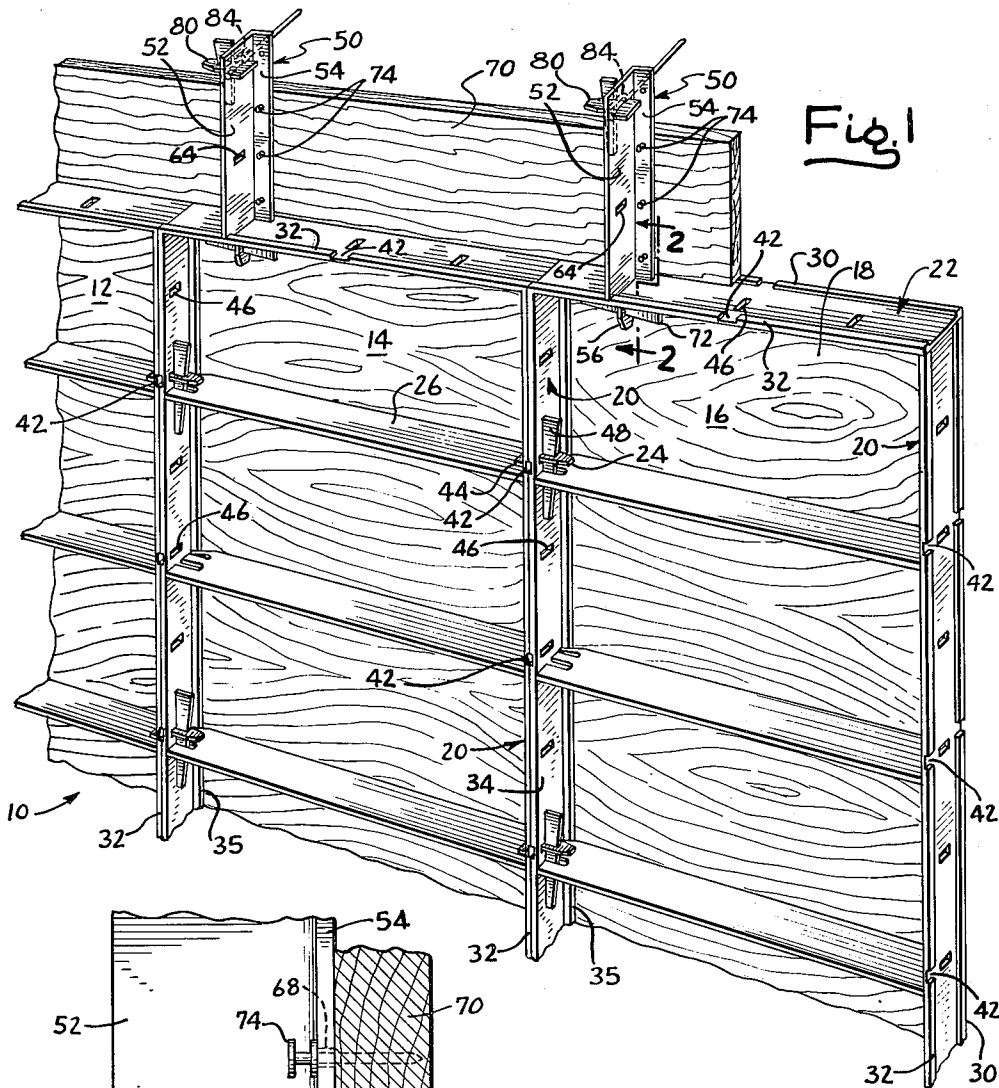


Fig. 2

INVENTOR
BERT ELAM

by: Norman H. Black

ATTY.

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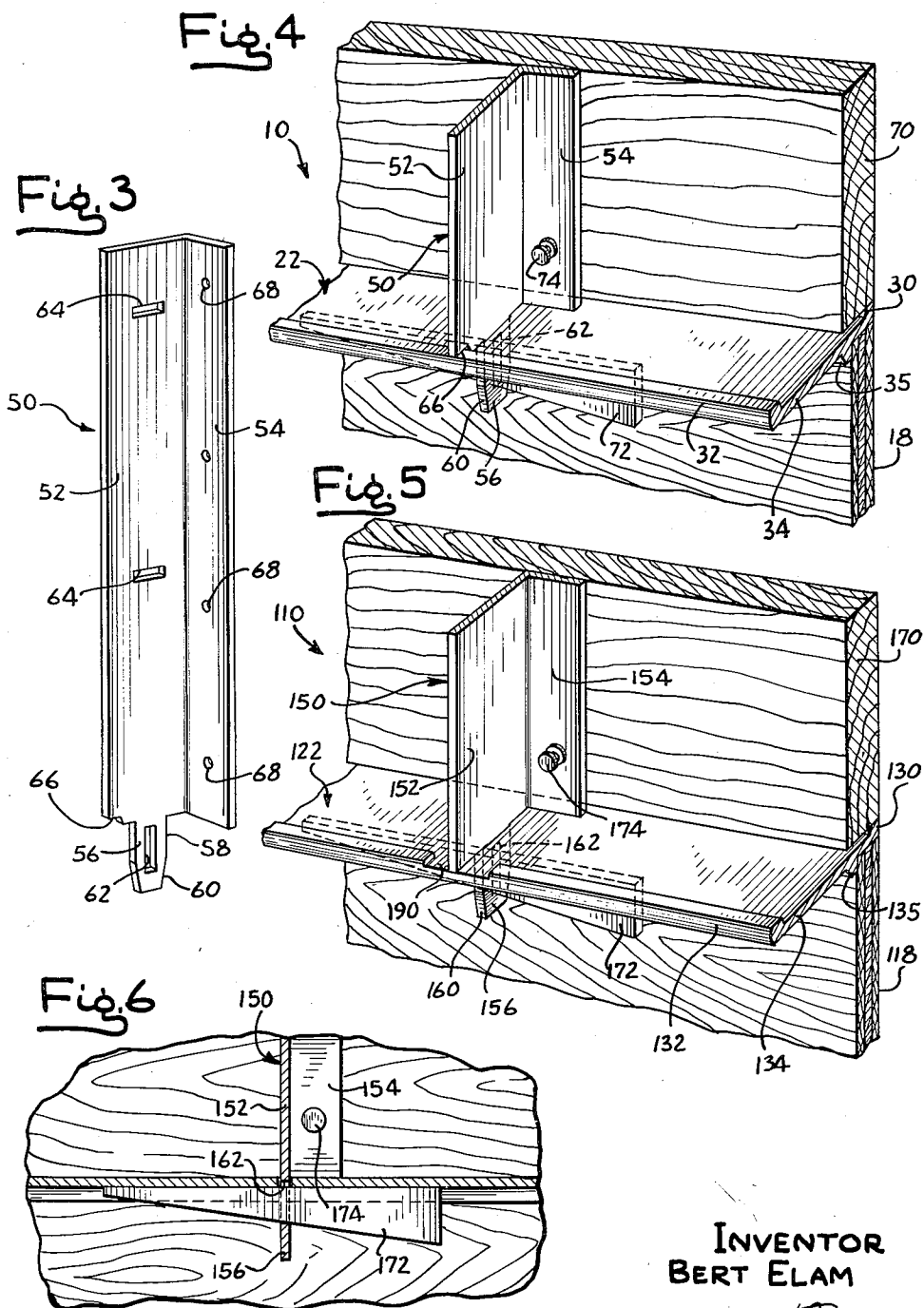
B. ELAM

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2 Sheets-Sheet 2



INVENTOR
BERT ELAM

by: *Harman H. Elam*
ATTY.

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CONCRETE WALL FORM EXTENSION

Bert Elam, Hazelwood, Mo., assignor to Symons Clamp & Mfg. Co., Chicago, Ill., a corporation of Delaware

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The present invention relates to concrete wall forms of the panel type wherein the opposed wall forms are each constructed of a group of rectangular panels assembled in edge-to-edge relationship, with the wet concrete being poured into the space existing between the walls, and with the two walls being connected by combined tie and spreader devices to prevent the walls from bulging or separating under the outward thrust of the wet concrete. The panels commonly employed in this type of concrete form consist of a facing of plywood against which the wet concrete lies, and a stiffening and strengthening frame which is applied to the outer side of the facing, such frame including marginal horizontal and vertical members and intermediate crossbars which may extend either vertically or horizontally and which are connected at their ends to either the horizontal or the vertical marginal frame members. The present invention has particular reference to concrete wall forms of this type but which are known as prefabricated wall forms in that the individual panels are assembled at the factory rather than in the field and in that the plywood panel-reinforcing members, including the vertical and horizontal marginal members, and any intermediate cross members 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 or otherwise fashioned in order properly to receive therein the plywood panel edges, 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.

In the erection of certain concrete structure, situations frequently arise where the vertical height of a given installation, for example a wall installation, is not an exact multiple, in units of length, of the vertical extent of the available prefabricated form panels at the scene of installation. In other words, no combination of available panels (which invariably are manufactured in standard sizes) can be selected to build up a wall form structure exactly equal to the desired concrete wall height. Additionally, occasions sometimes arise in the field where it is necessary to provide upward extensions on a given wall installation, either at the time the concrete is initially poured, or after the initially poured concrete has hardened so that the second pouring will bring the level of the concrete above the top level of the first concrete pouring. In instances where prefabricated wall forms are employed, it is inconvenient to add to the wall form by the use of additional full height panel sections to accommodate a few inches increase in the form height and, accordingly, the present invention provides a relatively simple and inexpensive wall form extension whereby the original wall form, consisting of full height prefabricated panel units, may be extended upwardly to the desired degree without necessitating the use of additional prefabricated panel units and utilizing a minimum of concrete form hardware.

The provision of a concrete wall form extension as briefly outlined above being among the principal objects

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of the invention, it is a further object to provide a novel form of extension bracket, capable of ready attachment to the upper horizontal marginal frame member of the uppermost form panel unit, such bracket having means associated therewith whereby a wooden plank or board of the necessary height to effect the form extension may be conveniently attached to the bracket in accurate edge-to-edge relationship with the panel unit and with the inside face of the board lying accurately on the plane of the inside face of the panel unit.

It is another object of the invention, in a concrete installation of this character, to provide an extension bracket of this sort and having additional means associated therewith whereby opposed brackets on opposite sides of the form structure may be tied together by conventional tie rod structures.

Yet another object of the invention is to provide a concrete wall form extension bracket of this sort having still further means associated therewith whereby one or more walers may be applied to the bracket so that the waler or walers, in combination with other similar form extension brackets in the installation, may be accurately aligned with one another in the usual manner of waler installation.

A further object of the invention is to provide a concrete wall form extension which may be applied to a panel unit, utilizing only conventional concrete wall form hardware so that, outside the fabrication of the bracket itself, no special manufacturing operations are required.

With these and other objects in view, which will become more readily apparent as the following description ensues, 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 one side of a concrete wall form, showing a pair of extension brackets constructed in accordance with the principles of the present invention operatively applied thereto;

Fig. 2 is an enlarged sectional view taken substantially on the vertical plane indicated by the line 2—2 of Fig. 1 in the direction indicated by the arrows;

Fig. 3 is an enlarged perspective view of one of the extension brackets employed in connection with the structure of Fig. 1;

Fig. 4 is an enlarged fragmentary perspective view, partly in section, of a portion of the installation shown in Fig. 1, the fragment being taken in the vicinity of the juncture between an extension bracket and one of the wall form panels;

Fig. 5 is a perspective view similar to Fig. 4 showing a slightly modified form of extension bracket; and

Fig. 6 is a fragmentary side elevational view of a portion of the structure shown in Fig. 5.

Referring now to the drawings in detail and in particular to Fig. 1, a fragmentary portion of a composite wall form of the prefabricated metal-reinforced panel type has been illustrated herein and designated in its entirety at 10. The wall form 10 is made up of a series of rectangular panel units or assemblies, three of which have been fragmentarily shown herein at 12, 14 and 16 with the panel units being arranged in edge-to-edge relationship. Each panel unit is in the form of a generally rectangular plywood facing 18 having a steel marginal reinforcing frame applied to the outer face of the panel unit and consisting of vertical and horizontal marginal frame bars 20 and 22 respectively, only the upper frame bar of each panel unit being shown herein. The bars 20 extend in contiguity at the various regions where the panel units meet in edge-to-edge relationship. It will be understood that the wall form

side 10 is arranged in spaced opposition to a similar form side wall (not shown) and is maintained in spaced relationship from such wall form side by means of conventional tie rod and spreader devices, fragments of which have been illustrated herein and designated in their entirety at 24. Intermediate horizontal frame members 26 extend across each panel unit and such members have their ends secured by welding to the opposed faces of the two vertical marginal frame members 20.

The vertical frame bars 18 are of shallow channel shape cross section and each bar includes inside and outside marginal ribs or flanges 30 and 32 respectively, and a connecting web portion 34 (see also Fig. 2). A lateral flange 35 spaced inwardly a slight distance from the inside edge of each frame bar affords a right angle recess 36 in which the adjacent vertical edge of the plywood facing or panel proper 18 seats with its inside face extending flush with the inside edge of the frame bars 20 and 22.

In erecting the concrete wall form 10, two of the panel units are brought into contiguity with adjacent vertical frame bars 20 abutting each other so that the respective flanges 30 and 32 are in edge-to-edge abutting relationship while the web portions 34 remain slightly separated to create a void therebetween. At vertically spaced regions along the marginal flanges 30 and 32, pairs of transversely registering notches 42 are provided and these notches, when the frame bars are in contiguity, define therethrough the tie rods proper of the tie rod and spreader assemblies 24. A rectangular hole 46 is formed in the web portion 34 at the horizontal level of each pair of notches 42 and is adapted to receive therethrough the usual T-bolt and wedge assembly devices 48 whereby the frame bars 20 may be drawn tightly together. The horizontal frame bars 22 are substantially identical in their construction to the vertical frame bars 20 and, to avoid needless repetition of description, similar reference characters have been applied to the corresponding parts of both frame bars.

The arrangement of parts thus far described is purely conventional in its design and construction 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 wall form to which the wall form extension of the present invention may be applied. Only such portions of the wall form 10 as are operatively associated with, or bear a relation to, the present wall form extension have been illustrated herein.

Panel units of the type set forth above are generally made in standard sizes and, occasionally, a situation will arise where the height of a particular concrete wall structure to be erected exceeds by a matter of inches, say from four to twelve inches, the height of a wall form which can be built up by the use of standard height panel units. While it would be possible to utilize an additional pair, or pairs, of panel units of minimum standard height in opposed relationship on opposite sides of the form, the use of such units would not only entail the cost of the units and their attendant hardware for fastening them in place and for spacing them across the form, but it would also preclude the use of screed devices at the top of the form.

The present invention obviates the use of additional panel units in this manner and, toward this end, it contemplates the provision of a plurality of form extension brackets which have been designated in their entirety at 50, two such brackets appearing in Fig. 1. Each extension bracket 50 is in the form of an L-shaped angle bar or iron having a relatively wide flange 52 and a relatively narrow flange 54. When the bracket 50 extends vertically as shown in Fig. 3, the lower edge of the flange 52 is provided with a downwardly projecting attachment tongue or finger 56 having parallel side edges 58 in the base regions thereof and the distal region of which taper as at

60. An elongated vertical slot 62 is formed centrally in the tongue for attachment purposes as will be described presently. A plurality of elongated horizontally extending spaced slots 64 are formed in the medial regions of the flange 52 and may be employed selectively for waler attachment or tie rod attachment purposes as likewise will be made clear subsequently. The lower outside corner of the flange 52 is notched as at 66 for clearance purposes as also will appear presently. The flange 54 is formed with a plurality of spaced nail holes 68 therethrough.

The extension brackets 50 are employed for maintaining one or more upper form extension boards 70 in position at the top of the form on each side thereof and, accordingly, the brackets are installed on the upper frame bars 22 of the various panel units by inserting the tongues 56 through selected holes 46 as shown in Fig. 1 and driving conventional wedge members 72 horizontally through the slots 62 below the frame bars 22 to draw the lower edges of the flanges 52 and 54 firmly into contact with the upper face of the frame bars. With the brackets 50 thus secured to the frame bars 22, the notches 66 at the outside corners of the flanges 52 will register with the outside ribs 32 as best seen in Figs. 2 and 4 so that the notches afford clearance spaces for the ribs and permit the brackets 50 to seat squarely on the upper faces of the frame bars 22.

It is to be noted that with the brackets 50 thus anchored on the upper frame bars 22, the distance between the flange 54 of each bracket and the inside edge of its respective frame bar 22 is precisely equal to the thickness of the extension boards 70 so that these boards may be brought flush against the inside faces of the flanges 54 and the flanges nailed to the board, utilizing dual head nails 74 which are passed through the nail holes 68 as best seen in Fig. 2, such nails facilitating removal thereof when the form is to be knocked down.

With the brackets 50 in position on the upper frame bars 22, the extension boards 70 are brought squarely against the inside faces of the flanges 54 and the flanges are nailed to the board, utilizing dual head nails 74 which are passed through the nail holes 68 as best seen in Fig. 2. It is to be noted that the distance between the flange 54 of each bracket 50 and the inside edge of its respective frame bar 22 is precisely equal to the thickness of the extension boards so that these boards will, when nailed to the flanges 54, lie flush with the various panels proper 18 and present uniform, unbroken extensions of the plywood facings, the intervening inside edges of the frame bars 22 serving to preserve the facing continuity.

The various slots 64 in the flanges 52 may be employed for tie rod attachment purposes or, alternately, they may be employed for waler anchoring purposes. One convenient method of tying the form extensions together on opposite sides of the concrete form installation has been shown in Fig. 1 wherein the brackets 50 extend a short distance above the level of the uppermost frame bar 22 to present the uppermost slot 64 above such level. The tie rod assemblies 24 may then be anchored in the opposed slots of the inside and outside form assemblies respectively, utilizing conventional short connecting bolts 80 which are passed through the slots 64 and wedges 82 which are driven through slots in the connecting bolts to, in turn, drive the tie rod loops 84 hard against the sides of the flanges 52 of the extension brackets 50.

Where walers are to be applied to the extension brackets 50, any suitable waler clamping assembly having associated therewith suitable means for attachment to the extension brackets may be employed for holding the walers in place. For example, in United States Patent No. 2,879,576, granted on March 31, 1959 and entitled "Waler Clamping Assembly For Concrete Wall Forms," there is shown and described a waler clamping means including a waler bracket, tie rod, connecting bolt and a pair of wedge members, one for the tie rod and the other for the connecting bolt. Such an assembly obviously is

applicable to the installation of walers on the extension brackets 50 of the present invention and reference may be had to such patent for a full understanding of the manner in which the installation may be made. It is deemed sufficient for purposes of disclosure herein to state that the connecting bolts may be passed through the slots 64 and tie rod loops, secured in position by means of wedges which drive the loops hard against the flanges 52 in a manner similar to that described above in connection with the installation of the form spacing tie rod assemblies 24.

In Fig. 5 a slightly modified form of extension bracket 150 has been illustrated and shown in a concrete wall form environment substantially identical with the environment for the bracket 50 illustrated in Fig. 4. To avoid needless repetition of description, similar reference characters but of a higher order have been applied to such parts in Fig. 5 as correspond to similar parts in Fig. 4.

Whereas in Fig. 4, the outside rib 32 of the upper horizontal frame bar 22 is continuous at its region of intersection with the bracket 50, thus necessitating the provision of the notches 66 at the outside lower corners of the various extension brackets 150 in Fig. 5, the flange 132 is relieved as at 190 so that the notches 66 may be omitted and the lower edges of the flange 152 may be linear throughout. Otherwise the extension brackets 150 are identical with the extension brackets 50 and their mode of application to the concrete wall form 110 is identical.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to two illustrative embodiments of the invention, it will be understood that various omissions and substitutions and changes in the forms and details of herein described concrete wall form extension may be made by those skilled in the art without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

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

1. In a concrete wall form structure, in combination, laterally spaced form walls each including rectangular panel units disposed in edge-to-edge relation, each of said panel units comprising a facing and inside and outside marginal vertical and horizontal frame bars extending along the vertical and horizontal edges respectively of the panel unit facing, the horizontal frame bars in the upper region of the wall form structure being disposed in longitudinal alignment, each of said uppermost horizontal frame bars being generally channel shape in cross section and presenting upstanding inner and outer marginal ribs respectively and a connecting flat web, there being a hole in said web intermediate said ribs, the various holes in the webs of said uppermost frame bars extending in longitudinal alignment in the wall form structure, an extension bracket for each hole, said extension bracket comprising an elongated vertically disposed angle bar including diverging side flanges extending at a right angle to each other, the lower end of said angle bar being seated upon the upper face of the frame bar web with one flange extending transversely and the other flange extending longitudinally of the frame bar, an attachment finger on the lower edge of one of said flanges and projecting down-

wardly through said hole, clamping means cooperating with said finger on the underneath side of the frame bar for clamping the lower edge of the extension bracket hard against the frame bar, there being a series of nail holes in the longitudinally extending flange of the extension bracket, a form extension board bridging the distance between adjacent brackets, said board having an inside face flush with the adjacent panel unit facings, and a series of attachment nails extending through said nail holes and secured in said board.

2. In a concrete wall form structure, in combination, laterally spaced form walls each including rectangular panel units disposed in edge-to-edge relation, each of said panel units comprising a facing and inside and outside marginal vertical and horizontal frame bars extending along the vertical and horizontal edges respectively of the panel unit facing, the horizontal frame bars in the upper region of the wall form structure being disposed in longitudinal alignment, each of said uppermost horizontal frame bars being generally channel shape in cross section and presenting a pair of marginal upstanding inner and outer marginal ribs and a connecting flat web, there being a hole in said web intermediate said ribs, the various holes in the webs of said uppermost frame bars extending in longitudinal alignment in the wall form structure, there being a notch formed in said outer rib in transverse register with said hole, an extension bracket for each hole, said extension bracket comprising an elongated vertically disposed angle bar including diverging side flanges extending at a right angle to each other, the lower end of said angle bar being seated upon the upper face of the frame bar web with one flange extending transversely and the other flange extending longitudinally of the frame bar, an attachment finger on the lower edge of one of said flanges and projecting downwardly through said hole, clamping means cooperating with said finger on the underneath side of the frame bar for clamping the lower edge of the extension bracket hard against the frame bar, the lower edge of said transversely extending flange of the extension bracket projecting into said notch in the outer rib, there being a series of nail holes in the longitudinally extending flange of the extension bracket, a form extension board bridging the distance between adjacent brackets, said board having an inside face flush with the adjacent panel unit facings, and a series of attachment nails extending through said nail holes and secured in said board.

3. In a concrete wall form structure, the combination set forth in claim 1 wherein the lower outside corner of said transversely extending flange is recessed to clear said outer marginal rib of the frame bar.

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