

E. B. WARD
CONCRETE WALL FORM

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Fig. 1

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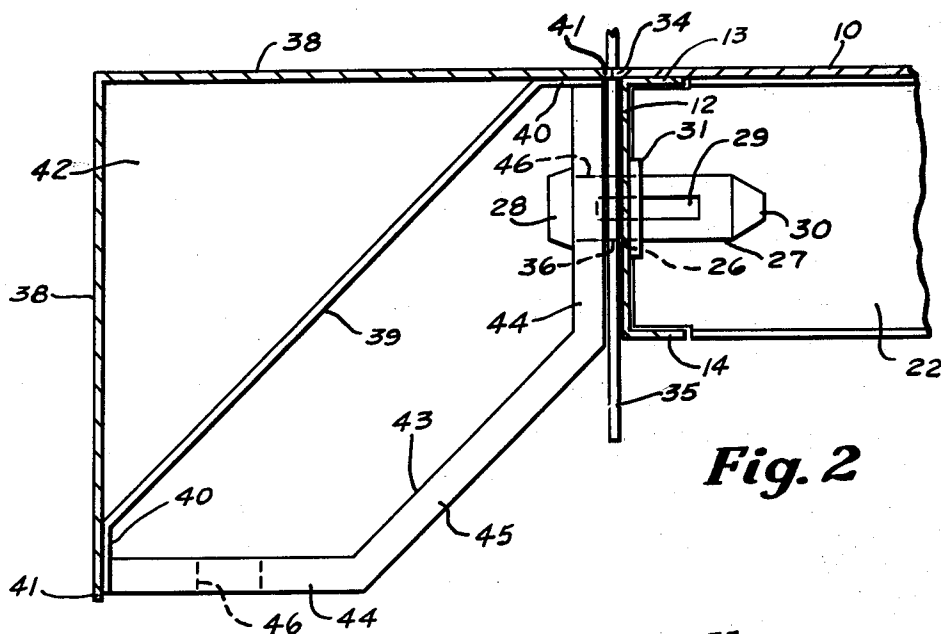
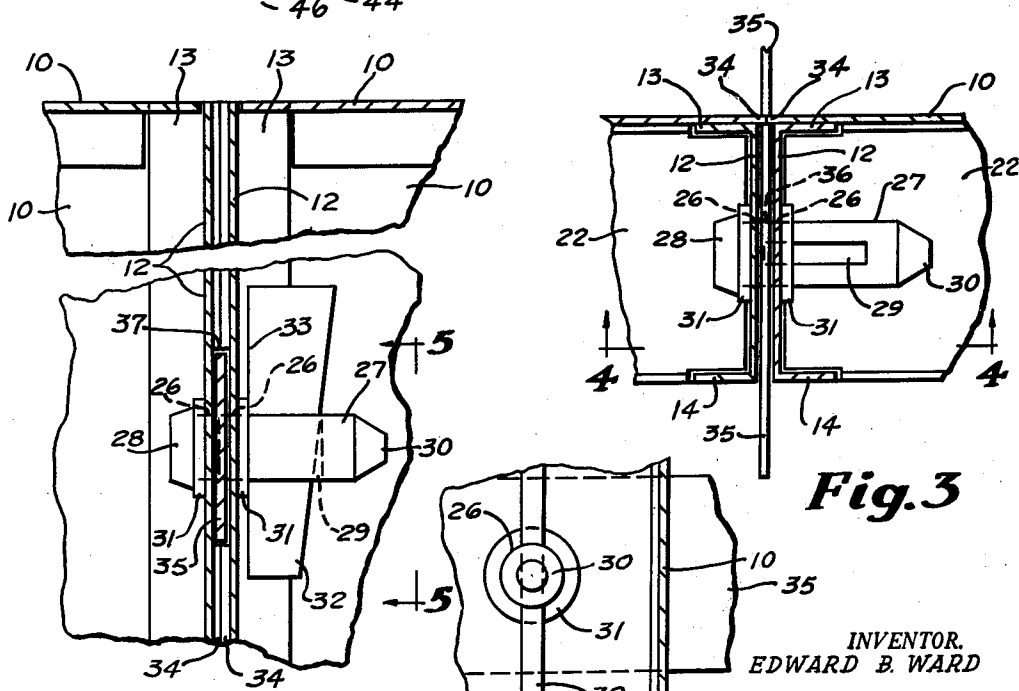
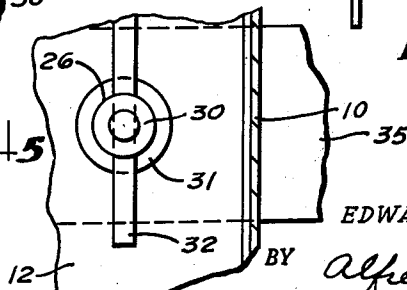
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2 Claims. (Cl. 25—131)

My invention relates to concrete forms, and more particularly to a metal concrete form.

It is a purpose of my invention to provide a concrete form that is made up of separate form members, that are detachably connected together in setting up the form, which is so constructed and arranged that the form can be set up much more quickly than has been previously possible and which comprises form members that fit together accurately and produce a smooth wall.

One of the purposes of my invention is to provide a form member, used in setting up such a form, that is provided with a flat sheet metal body portion, to one face of which are secured reinforcing or bracing members, the same being preferably secured by spot welding, which bracing members are so positioned and relatively arranged that the face of the one member that is directed inwardly or that will be engaged by the concrete as it is poured, will not buckle, dent or sag.

More specifically it is a purpose of my invention to provide a vertically elongated concrete form member that has a flat sheet metal body portion with reinforcing members secured to one face thereof as above referred to, which includes marginal reinforcing members along the top, bottom and side margins of the sheet metal body portion, and vertically and horizontally extending interposed bracing members, there being a plurality of the horizontally extending interposed bracing members between the top and bottom marginal reinforcing members and the interposed vertically extending bracing or reinforcing members are provided between certain of said horizontally extending members, including the upper and lower marginal members, so as to provide stiffened zones or areas at a plurality of points between the ends of the form members and adjacent the ends thereof, the vertically extending interposed reinforcing or bracing members being preferably staggered in adjacent areas of the form members. Furthermore the horizontally extending reinforcing members are preferably so spaced vertically from each other as to provide alternating wide and narrow zones or areas of the form member extending transversely of the form member with the wider zones braced by means of the interposed vertically extending bracing or reinforcing members extending between adjacent horizontally extending bracing members.

It is another purpose of my invention to provide such form members with flat sheet metal body portions that have the vertical marginal edges thereof projecting slightly beyond the vertical marginal bracing members, which makes it possible to have a close fit between said marginal edges of said body portions by providing openings in said projecting portions for receiving the tie members. A further advantage to having said marginal edge portions projecting beyond said bracing members is that cleaning of only the edge portions of the sheet metal body portions is necessary in the use of the form members to get the proper close fit between the adjacent sections of the form.

It is a further purpose of my invention to provide means for detachably securing a plurality of such form members as above referred to, to each other, so that the same will be firmly clamped together, the arrangement and character of said fastening and clamping means being such that the adjoining form members can be quickly set up and accurately aligned without any possibility of error being made therein.

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More specifically my invention includes form members that are provided with vertically extending marginal side reinforcing members, that are preferably in the form of channel members, with openings in the web portions thereof, that align in the adjoining form members or sections of the form, so that a headed fastening element in the form of a pin, that is provided with a shank portion having a longitudinally extending slot, can be passed through the aligning openings and a wedge driven into the slot in the pin to clamp the sections through which the pin has passed to each other along their longitudinal or vertical side edges.

It is a particular purpose of my invention to provide in a clamping structure of the above referred to character, means whereby the wedges can be easily removed by a mere blow from a hammer on the end or nose of the pin or headed fastening element. In order that this can be accomplished I provide a pin of the above referred to character that is made of hardened steel and provide a spacing member in the form of a ring surrounding the opening through which the pin is passed and concentrically arranged relative to said opening. This prevents the binding of the side edge of the wedge against the web portion of the reinforcing member extending along the marginal side edge of the form member and permits the simple procedure for releasing the wedge above referred to. Due to the light weight of the form members or panels, they can be easily slid into place by one man, this being due to the fact that the sheet metal body portions thereof are reinforced in the manner above referred to.

It is also a purpose of my invention to provide a corner form member to be used in conjunction with said wall form members, that is strong and which provides for ready access to openings provided therein for insertion of fastening elements that connect the corner members with a pair of wall form members or panels that are adjacent thereto and extend at right angles to each other, said corner member being so constructed and arranged that concrete can not accidentally enter the same and interfere with the release of the fastening elements between it and the wall forming panels, which would interfere with the separation of the sections or portions of the form.

It is a further purpose of my invention to provide a corner form member that can also be used for forming an offset or a pilaster without using special length tie members, as the corner member can not be turned inside out by the pressure of the concrete thereon.

My improved concrete form is constructed and arranged to provide a minimum of weight for the form members and ample strength to withstand the abuse to which said form members are subjected in the handling thereof and in the pouring of the concrete. This is accomplished by the use of full hard high strength steel sheets for the body portions of the form members and the arrangement of bracing members provided thereon.

Other objects and advantages of my invention will appear as the description of the drawings proceeds. I desire to have it understood, however, that I do not intend to limit myself to the particular details shown or described except as defined by the claims.

In the drawings:

FIG. 1 is an outside face view of a portion of a concrete form made in accordance with my invention, partly broken away.

FIG. 2 is a section taken on the line 2—2 of FIG. 1 on an enlarged scale, the wedge being omitted.

FIG. 3 is a fragmentary horizontal sectional view on an enlarged scale, taken on the line 3—3 of FIG. 1, the wedge being omitted.

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FIG. 4 is a section taken on the line 4—4 of FIG. 3, but showing the wedge in position, and

FIG. 5 is a view partly in section and partly in elevation, taken on the line 5—5 of FIG. 4.

Referring in detail to the drawings, my improved concrete form comprises a plurality of wall forming form members, each having a rectangular sheet metal body portion 10, to the outer face of which along the vertical side margins thereof are secured by spot welding, the marginal reinforcing members 11. Said marginal reinforcing members are made in the form of channels, which have web portions 12 and inner flanges 13 and outer flanges 14. The inner flanges 13 of said marginal reinforcing members 11 are spot welded to the outer face of the sheet metal body portion 10. At the bottom marginal edge of the sheet metal body portion 10, a bottom horizontal marginal reinforcing member 15 is provided, and at the upper margin of the body portion 10 an upper marginal reinforcing member 16 is provided. Said members 15 and 16 are shown as being channel members of the same cross section as the marginal reinforcing members 11. While a top and bottom marginal reinforcing member is referred to herein, it will be understood that the entire form can be reversed so that the bottom reinforcing member 15 can be placed at the top, and vice versa, as the structure is symmetrical with respect to the top and bottom edges of the form member which has the sheet metal body portion 10.

Extending between the marginal side edge reinforcing members 11 and spaced from the top and bottom marginal edges of the body portion 10 are the interposed horizontal reinforcing members 17, 18, 19, 20, 21 and 22, said interposed horizontal reinforcing members being spot welded at predetermined spaced intervals along their length to the body portion 10. It will be noted that the transverse horizontal bracing members 17 and 22 are spaced a greater distance from the marginal reinforcing members 15 and 16 than the transverse interposed reinforcing members 21 and 22, 17 and 18, and 19 and 20 are spaced from each other, and that the interposed transverse members 20 and 21, and 18 and 19 are spaced the same distance from each other as the transverse interposed reinforcing member 17 is spaced from the marginal reinforcing member 15 and as the transverse reinforcing member 22 is spaced from the marginal reinforcing member 16. Accordingly there are provided lengthwise or vertically of the form member, alternating wide and narrow areas or sections, there being a pair of said wider areas adjacent opposite ends of the form member and a pair thereof near the mid-portion of the member.

Vertical reinforcing members 23 are provided between the end reinforcing members 15 and 16 and the interposed horizontal reinforcing members 17 and 22, being spot welded at predetermined intervals to the outer face of the body portion 10. Preferably the vertically extending interposed reinforcing members 23 are arranged so that one is located at the mid-portion of the area adjacent each end of the form member and one of said members 23 is located at a distance half way between the middle of said area and the side marginal member 11. This provides the necessary stiffness at the end portions of the body portion 10 to prevent any distortion thereof out of its flat condition.

In order to prevent any bulging, denting or warping of the mid-portion of the wall form, the body portion 10 is provided with vertically extending reinforcing members 24, that are interposed between the side marginal members 11 and extend between the horizontal members 18 and 19, and 20 and 21, respectively. Also, if it is further desirable to stiffen the mid-portion of the wall panel or form member additionally, a central vertically extending reinforcing member 25 can be provided between the horizontal reinforcing members 19 and 20. It is to be understood that, preferably, all of the reinforcing members 17, 18, 19, 20, 21, 22, 23, 24 and

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25 are of channel shaped cross section, as shown for the side reinforcing members 11 in FIG. 2.

The web portions 12 of the marginal reinforcing members 11 are provided with openings 26 that are so arranged that the openings will be in alignment with each other whether the marginal end that has the reinforcing means 16 is at the top or the marginal edge that has the reinforcement 15 is at the top of the panel or form member. As shown, there are four such openings in each of said vertical marginal edge reinforcements of the wall panel.

In erecting the form, the sections are moved into edgewise adjacency, that is, with the vertical marginal edges in adjacency to each other and the openings 26 in alignment. With said openings in such alignment, the pins 27 having the heads 28 and being provided with longitudinal slots 29 and tapered ends or nose portions 30, are passed through the said openings, the tapered ends 30 aiding in aligning the openings and in the passage of the pins through the same. Surrounding the opening 26 is a spacing ring 31, which is of an annular character, and is made of hardened steel, said ring-like member 31 being arranged concentrically to the opening 26 and being welded to the web portion 12. Preferably one of said ring-like members 31 is provided on each of the web portions surrounding the opening 26 therein so that the panels or form members are completely interchangeable end for end, avoiding any possibility of there being a pair of form members so arranged that there is no ring-like member 31 projecting from either of the web portions 12 of the reinforcing members 11 where the wall panels of the form adjoin.

The hardened steel ring 31 serves as a spacing member so that when the wedge 32 is driven into the slot 29 the edge 33 of the wedge will engage with the hardened spacing member 31 and not with the web portion 12, this preventing damage to the web portion and at the same time preventing freezing of the wedge to the web portion, which would make it extremely difficult to remove the wedge and the pin when the form is to be dismantled. By providing the hardened spacing ring 31 the release of the wedges, when it is desired to dismantle the form, is very quickly accomplished by a downward blow of a hammer on the outer tapered end 30 of the slotted pin, which causes the release of the wedge 32, which can then be easily pulled out.

It will be noted that the vertical marginal reinforcing members 11 have the web portions 12 thereof inset from the vertical marginal edges of the body portions 10 to provide narrow lip portions 34 along said vertical marginal edges of said flat wall sections projecting beyond said reinforcing members. This provides a space between the web portions 12 of said reinforcing members 11 for the tie members 35 that have openings 36 through which the headed fastening elements 27 are passed. Said lip portions 34 are provided with rectangular notches 37 to receive the ties 35.

At corners where the wall panels extend at right angles to each other, a corner member such as shown in FIGS. 1 and 2 is provided, which may also be used to form an offset or pilaster. Said corner member has a sheet metal body portion that has the legs 38 that extend at right angles to each other and the obliquely or diagonally extending wall portions 39, which are interrupted to provide pockets in said corner members, as will be explained below. The obliquely extending walls 39 have vertical marginal flanges 40 that extend in flat face to face engagement with the walls 38 and are welded thereto. Said flanges 40 terminate short of the vertical marginal edges of the legs 38 to provide marginal narrow lips 41 on the corner members, notched in the same manner as the lips 34 to accommodate the ties 35. Thus a substantially triangular cross section provided for the major portion of the corner member, which provides a structure which is quite rigid. Top and bottom walls 42 extend between

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the legs 38, and the obliquely extending walls 39 and are welded thereto, to provide closed spaces between the walls 38, 39 and 42 of the corner member, and pockets 47 in the corner member between the closed portions. In order to provide for maximum strength in the corner member structure where the same is joined to the flat wall panels adjacent the same, a bracing member 43 is provided across each pocket 47 between the walls 38, having legs 44 extending perpendicularly to the walls 38 and welded at their ends thereto, said bracing members having diagonally extending portions 45 connecting the legs 44 and the legs 44 are provided with openings 46 therein, which are so located as to align with the openings 26 in the web portions 12 of the marginal reinforcements 11 of the adjoining form members, the pins 27 being adapted to be passed through the aligning openings 46 and 26 and wedges 32 being adapted to be applied in the same manner as for connecting two of the wall panels or wall form members. It will be noted that the reinforcing members 43 are provided on the corner member substantially midway between the top and bottom of the pockets 47 in the corner member so that the hand can be passed into said pocket 47 to put the fastening elements 27 in position in the openings 46 and 26 in the assembly of the corner members and the wall panels.

What I claim is:

1. In a concrete form, a pair of adjacent concrete form members each having a panel wall with an edge member extending therefrom along adjacent marginal edges thereof, said edge members having flat opposed inner and outer faces and adapted to be positioned with the flat outer faces in face to face relation, said edge members having a plurality of aligned openings therein, a hardened steel ring rigidly fixed to one of said edge members in surrounding relation to each of said openings therein and in projecting relation to said inner face thereof, said hardened steel rings each terminating in a flat face spaced from the inner face of said one edge member, said hardened steel rings each having an opening therein axially aligned with the respective opening in said one edge member and substantially corresponding in shape and not greater in size, a headed fastening element having a shank with the head at one end engaging the other edge member and the shank extending through said aligned opening with a portion extending beyond the flat face of said ring, said shank and ring being engaged to retain the form members against shifting transversely of the axis of the aligned openings, said extending portion of the shank having a transverse slot extending longitudinally

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thereof from within the hardened steel ring and terminating in outwardly spaced relation thereto, and a steel wedge member removably mounted in said slot with an intermediate portion engaged with the flat face of the hardened steel ring and spaced end of said slot to draw the edge members into tight face to face relation in response to driving of the wedge into said slot, said wedge member being of a length substantially greater than the transverse dimension of the hardened steel ring and having a straight longitudinal edge engaging said flat face of said ring and spaced from the inner face of the respective edge member, said connector being characterized by said wedge being released from fastening engagement with the shank and hardened steel ring by striking the end of the shank adjacent said wedge member with a hammer blow transversely to the axis of said shank.

2. A structure as set forth in claim 1 wherein a hardened steel ring is rigidly fixed to each of said edge members in axial alignment with each of the aligned openings therein and in projecting relation to the inner faces of the respective edge members, and the headed fastening element has the shank thereof extending through said aligned opening with the head engaging one hardened steel ring and the wedge engaging the other.

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