

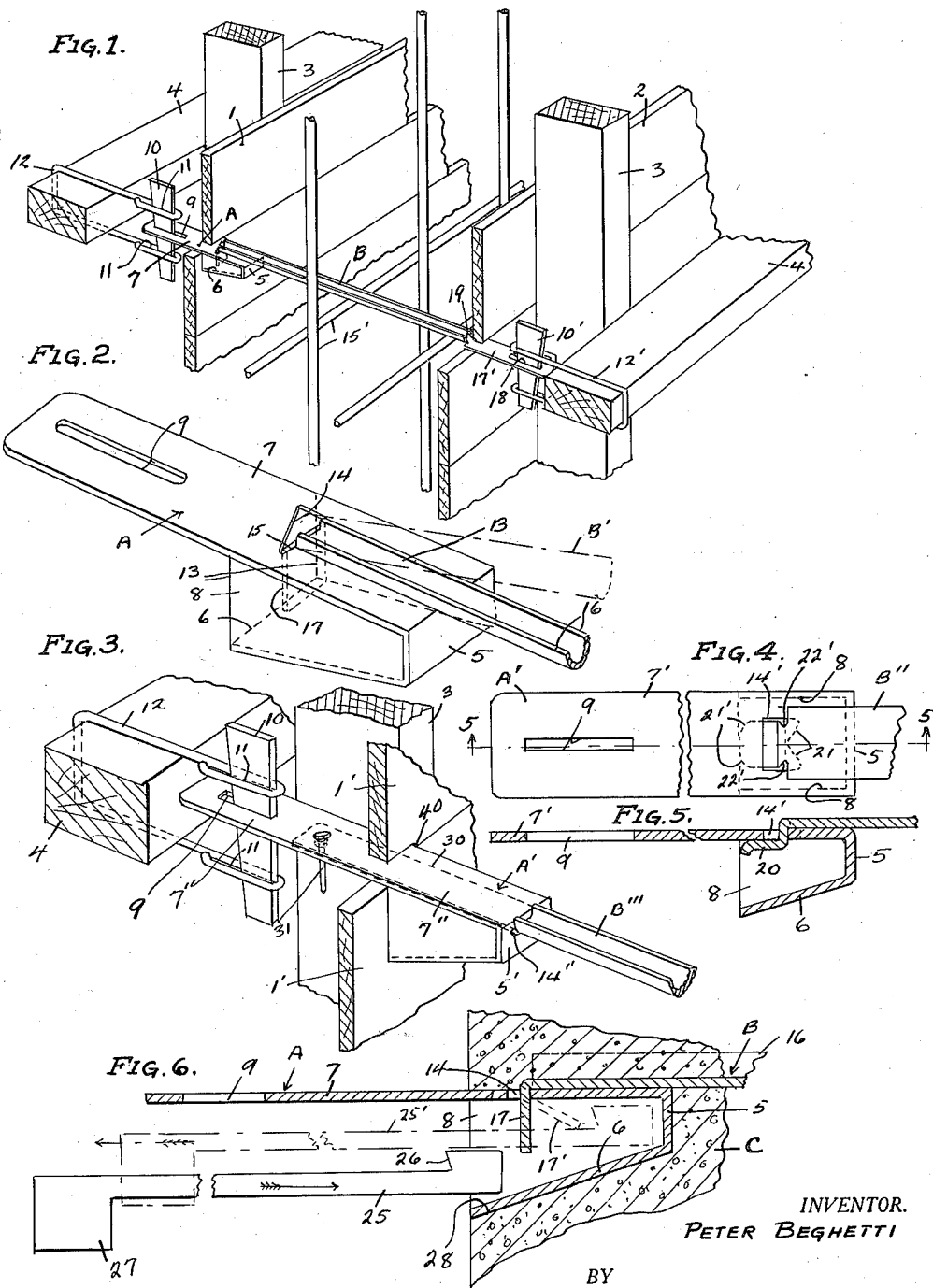
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TIE BAR AND SPACER

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TIE BAR AND SPACER

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This invention relates to tie bars and spacers for concrete wall forms and has for its objects an improved tie bar and spacer adapted to be quickly and easily installed either during the building of the ordinary form walls or after they are erected and in which a portion of the tie bar and spacer assembly remains embedded in the concrete wall with one end of said portion spaced inwardly from the outer side of the concrete wall while the remaining parts of the tie bar and spacer are readily removable therefrom, thus allowing a finishing of the outer surface of the wall with the one end of the embedded portion wholly concealed within the wall.

Other objects and advantages will appear in the drawing and in the following specification.

In the drawing, Fig. 1 represents a perspective view of one form of my invention installed and with portions of the wall form broken away and shown in section.

Fig. 2 is an enlarged perspective view of a portion of the tie bar and spacer shown in Fig. 1.

Fig. 3 is a perspective view of a portion of another form of my invention with one side of the wall form shown broken away in section.

Fig. 4 is a plan view of a modified form of the device shown in Fig. 2.

Fig. 5 is a sectional view of Fig. 4 as seen from the line 4—4 of Fig. 4.

Fig. 6 is an enlarged sectional view of a portion of my invention in the concrete wall preparatory to removing certain portions of the spacer and tie bar, and also showing one means for use in accomplishing the removal of said portions.

Tie bars and spacers have been used for many years in the building of concrete wall forms, but heretofore considerable difficulty has been experienced in the use of bars and spacers where it is desirable to build reinforced concrete walls due to the fact that the tie bars and spacers have interfered with the placing of the reinforcing rods between the form walls preparatory to pouring the concrete, and in also providing tie bars and spacers that may be quickly dismantled when the wall forms are removed without leaving ends of the tie bars or spacers exposed on the outer side of the concrete wall. Attempts have been made to use threaded cones and the like at the ends of that portion of the tie bar extending between the wall forms, but in such instances considerable time is required to thread and to unthread the cones or other threaded parts and the threads are quickly corroded or injured, soon rendering the removed portions useless. Also the expense of threading the various parts is prohibitive inas-

much as the tie bar and spacer merely serve a temporary function at best.

To facilitate description, I will refer to my device as a whole as a "tie bar" although it functions as a spacer as well.

In my tie bar I am able to use plain flat bar stock in the manufacture thereof, or relatively heavy sheet metal and the placing of the portion of the tie bar that extends between the walls may be deferred during installation of the horizontal or vertical reinforcing rods for the concrete wall and later easily and quickly positioned between the walls of the form to secure them together and to space said walls. When the concrete wall is formed, the form walls are quickly taken down and projecting portions of the tie bar are quickly removed leaving pockets in the outer surface of the concrete wall for filling-in with plaster or cement to cover the ends of the tie bar remaining in the wall.

In the drawing (Fig. 1) the concrete form proper comprises an outer wall 1 and an inner wall 2, each wall being formed of superposed horizontal boards supported respectively against studding 3 and the walls arranged in opposed spaced relation. Horizontally extending beam members 4 extend across the outer sides of the studding, as indicated, so as to engage a plurality of the studding.

Generally the outer and inner wall of the concrete form are built up simultaneously and at desired height during the building of the outer wall I insert the rod-connecting members A between adjacent boards of the outer wall.

These members A (Figs. 1, 2, 6) comprise horizontal flat elongated strips of metal each bent downwardly and back at its inner end to provide an inner end wall 5 and a lower wall 6 extending divergently relative to the main upper strip 7 from the inner end wall 5 toward the outer end of strip 7. Ears 8 are provided on opposite side edges of the lower wall 6, which ears are bent upwardly to connect with the outer opposite edges of the main upper strip 7 at its inner end, thus forming a tapered box-like form at the inner end of strip 7 open at the end opposite the closed inner end 5. The outer end of strip 7 is provided with an elongated slot 9 adapted to receive a wedge member 10, which wedge member is also adapted to pass through vertical slots or openings 11 formed in the ends of a horizontally disposed U shaped member 12 adapted to embrace beam 4, the slots 11 respectively being substantially in vertical alignment above and below slot 9 in the strip 7 when the strip and U shaped members are in position.

The free rear edges 13 of the box-like end of strip 7 are adapted to engage the inner side of wall 1 when in position as above described, and the wedge member together with the U-shaped member 12 securely hold the strip 7 in the aforesaid position against wall 1.

The inner end of strip 7, and at about one inch from the inner side of the wall form 1, is provided with a triangular opening 14 having one side 15 thereof extending at right angles to the direction of strip 7. The extreme inner end 5 of the member A is spaced slightly further from wall 1 than the opening 14, from which it is seen that the box-like end of strip 7 will project only a few inches from the inner side of wall 1, leaving practically the entire space between walls 1 and 2 free for installing the reinforcing rods 15'.

After the horizontal reinforcing rods 15' are in place the remainder of the tie-bar may be connected in place if desired, or if the walls are well spaced for a relatively thick wall, a considerable height of the form walls may be first erected.

The remainder of the tie bar comprises a bar B of plain flat sheet metal with its edge margins turned upwardly as at 16 leaving the ends flattened, one end 17 of which is bent downwardly and is adapted to be inserted from above through opening 14 in strip 7 while the opposite flat end 17' remains straight and is adapted to be forced between adjacent boards of the wall 2.

In order to facilitate connecting the end 17 with strip 7 the opening 14 is made in its triangular shape, since the bent end 17 may be hooked into opening 14 at an angle as indicated at B' in Fig. 2, and then pivoted in the opening to insert the opposite flat end 17' of bar B between the adjacent boards of wall 2 and in this position the end 17 engages edge 15 of the opening 14. The flat end 17' is provided with an elongated slot 18 (Fig. 1) adapted to receive a wedge 10' similar to wedge 10 for connecting to a U shaped member 12' in the same manner as member 12 is installed. The shoulders 19 formed by turning up the margins of strip B are adapted to engage the inner side of wall 2 and thus the walls 1 and 2 are effectively supported in spaced relation when wedge 10' is in place. The bar B cannot move longitudinally at the end engaging in opening 14 since the triangular shape of the opening will permit a pivotal movement of the bar only, one end of the edge of the opening 14 opposite edge 15 preventing such longitudinal movement. Since the opening 14 is relatively small, it does not need to be closed after installation of the device, although it may be plugged up by any suitable means if desired.

The device of Figs. 4 and 5 is substantially the same as that of Figs. 1, 2 and 6 except that the bar B'' is flat and is formed at its end engaging in opening 14' with an offset portion 20 adapted to close the opening 14' when in position, to prevent longitudinal movement of the bar. Also the opening 14' on one side has divergently extending edges 21, permitting the bar B'' to pivot horizontally in opposite directions for insertion of the end 20 into the opening in either of the opposite angular positions relative to strip 7' which is the main upper strip of this form of the invention. The other parts of the connecting member bear the same numbers as in the description of Fig. 2. The outer end of portion 20 is, of course, cut off at its corners as indicated in Fig. 4 at 21' to permit the pivotal movement

above described. The end 20 cannot of course be removed from engagement in opening 14' when the opposite end of the bar B'' is inserted through wall 2. The bar B at points where the end 17 is turned down, may be notched slightly if desired, as best indicated at 22' in Fig. 4, since both forms of the device are adapted to be similarly notched, thus slightly weakening the bars respectively at these points, and when the wall 1 is removed (by removal of wedges 10) it will be seen that the open end of the box-like form on connecting member A (Figs. 1, 2, 6) or A' (Figs. 4, 5) opens outwardly of the concrete wall C (Fig. 6) and thus enables access to the end 17 (Fig. 2) and end 20 (Fig. 5) of bars or strips B, B'' respectively.

In Fig. 6, I show one manner of breaking the end 17 or 20 such as by a tool 25 having a hook 26 at one end, which tool may easily be driven into the open end of said box-like end to the position indicated in dotted line at 25' when end 17 is bent as at 17' by the end of the tool 25, and the tool can then be driven in the opposite direction by oppositely driving on the driving lug 27 at the opposite end of the tool. In practically every instance the end 17 or 20 will break off across the weakened portion with a single blow inwardly when the connecting member A or A' can readily be removed from the concrete wall, leaving pocket 28 (Fig. 6) for filling-in with concrete or plaster covering the end of bar B or B'', which end is spaced inwardly of the outer surface of the wall.

In Fig. 3, I show a form of invention in which a bar B''' has a straight end 30 adapted to pass through opening 14'' in the end wall 5' of a box-like form on the end of a connecting member A'' and which straight end is provided with an opening adapted to coincide with an opening in strip 7'' at a point outwardly of the outer form wall 1' for insertion of a pin or nail 31 through such openings and the bar B' is formed with upturned side edges the same as bar B or B'', the shoulder formed at the point where the flat end 30 commences being adapted to form a stop engaging the end 5 of member A' and at such point the bar B' is weakened by notches the same as those shown at 22' in Fig. 4 if desired, although the juncture at the connection between end 30 of bar B' and the turned up portion is ordinarily sufficient to make the desired weakness at this point, whereby the end 30 is easily broken at said point upon removal of the member A' or before removal thereof as desired. In this form of device the bar B'' is connected to strip 7' during process of erection of the wall opposite to wall 1' when said opposite wall reaches the height of strip 7'.

It is thought manifest that applicant may use members similar to A, A' at either or both ends of the bars B, B' if desired, although there is generally no need to cover the end of the spacer bar that is at the inner side of the wall.

The feature of making bars B, B' or B'' with upturned opposite side edges strengthens the bars against bending and permits the concrete to readily flow around to the underside of the bars and the construction of such bars is easily accomplished.

It is also manifest that the edge of one of the adjacent boards of the form wall may be notched as at 40 (Fig. 3) to pass member 7, 7', or 7'' where a very tight wall is desired and a similar notch may be provided in wall 2 for end 17' of bar B or the other bars B'' and B'''.

Having described my invention, I claim:

1. A tie bar and spacer for the opposed walls of a concrete wall form comprising a metal piece formed at one end with a hollow tapered member opening outwardly in the direction of the opposite end of said piece, said piece being adapted to extend transversely of said form with the open end of the tapered member engaging the inside of one of the walls of the form, said tapered member being provided with an opening in a side thereof spaced from the open end of said member, a bar, means on said bar adapted to removably engage in said opening against rotation of the bar relative to said member and to extend toward the opposite wall of the form for securement to said opposite wall for holding the walls of the form in spaced relation.

2. In a construction as defined in claim 1, said means on said bar comprising an extension of the bar adapted to slidably pass through said opening, a stop formed on the bar adapted to engage the outer side of the tapered member at said opening, said bar being slightly weakened at a point adjacent the stop whereby the end of the bar may be broken at said point for removal of the portion adapted to extend within the tapered member.

3. A tie bar and spacer for the two opposed walls of a concrete wall form comprising an elongated, horizontally extending flat strip of metal formed at one end with a hollow tapered member opening outwardly at its larger end in the direction of the opposite end of said strip, one of the sides of said tapered member being provided with an opening at a point spaced from the open end and a bar having a flattened end adapted to slidably extend through said opening into said tapered member for removably engaging said flat strip, said flat strip of metal being adapted to extend transversely across the outer wall of the form to beyond the outer side of the wall at the outer end and to be supported by said wall independently of the opposite wall of the form with the tapered member projecting from the inner side of said outer wall and the bar extending from the tapered member to said opposite wall, means associated with the opposite wall adapted to removably engage the end of said bar opposite said flattened end.

4. In a construction as defined in claim 3, said flattened end of the bar being bent substantially at right angles to the remainder of the bar and said opening being provided in the upper side of said tapered member whereby the flattened end is adapted to hook into said opening for engagement with the tapered member.

5. In a construction as defined in claim 3, means adapted to be positioned outwardly of the outer wall of the form arranged and adapted to detachably engage an end of said flattened strip for drawing said tapered member tightly against the inner side of said wall.

6. In a construction as defined in claim 3, a U shaped member adapted to embrace a portion of the wall form outwardly of the outer wall of the form positioned with its arms on opposite sides of the outer end of the strip, said arms and outer end of said strip being provided with aligned openings adapted to removably receive a retaining member for securing the U shaped member to said strip of metal in assembled relation.

7. In a construction as defined in claim 3, the flattened end of said bar being adapted to extend transversely across said outer wall to the outer side thereof and means positioned outwardly of said wall form removably securing said flattened end of the bar to said strip, a stop formed on said bar adapted to engage the tapered member at a point remote from the open end thereof for insuring against longitudinal movement of the bar in the direction of the tapered member when the flattened end of the bar is inserted into said tapered member.

8. A tie bar and spacer for two opposed walls of a concrete wall form comprising an elongated horizontally extending flat strip of metal formed at one end with a flat-sided tapered box-like member opening outwardly at its larger end in the direction of the opposite end of said strip, one of the flat sides of said tapered member being provided with an opening at a point remote from the open end of the member, a bar adapted to slidably extend at one end through said opening to within said member, a stop formed on the bar adapted to engage the side of said member at said opening for limiting the movement of the end of the bar into said member, said strip adapted to extend transversely across the outer wall of said form with the tapered member engaging the inner side of said wall and the opposite outer end of the strip projecting outwardly of the outer side of the wall, means adapted to be positioned outwardly of the form removably engaging the outer end of said strip and the opposite end of said bar being adapted to extend transversely across the opposite wall form to the outer side thereof, means adapted to removably engage the opposite end of said bar outwardly of the outer side of said opposite wall.

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