Sept. 19, 1950 C. M. MARTIN 2,523,131

FORM FOR MOLDING CONCRETE WALLS

Filed Dec. 1, 1947 2 Sheets-Sheet 1

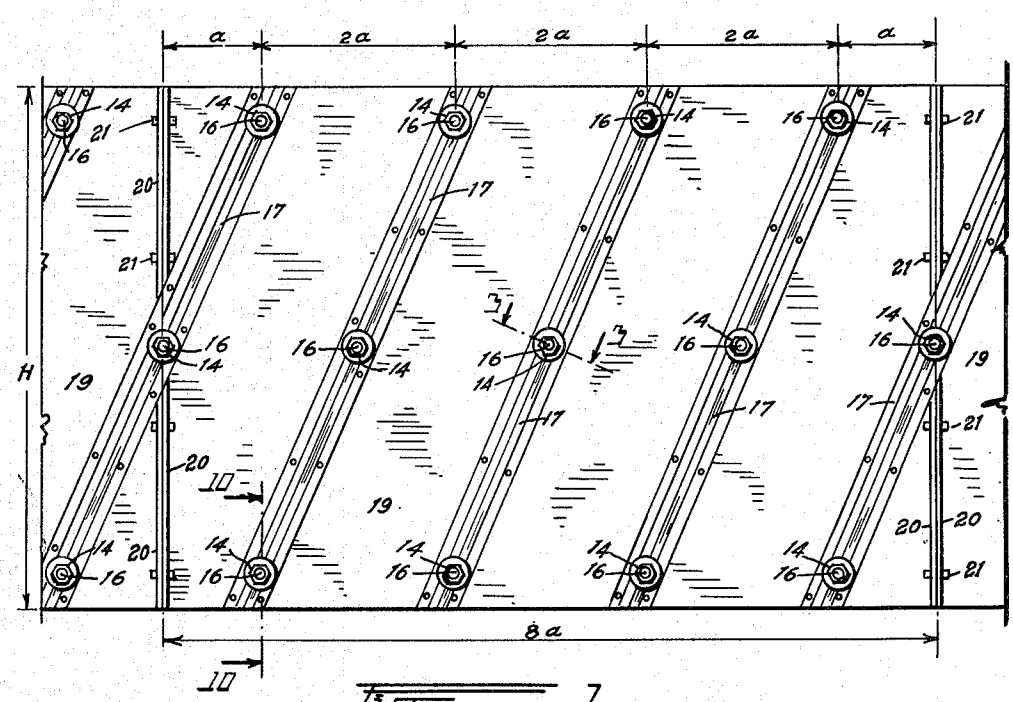


Fig. 1.

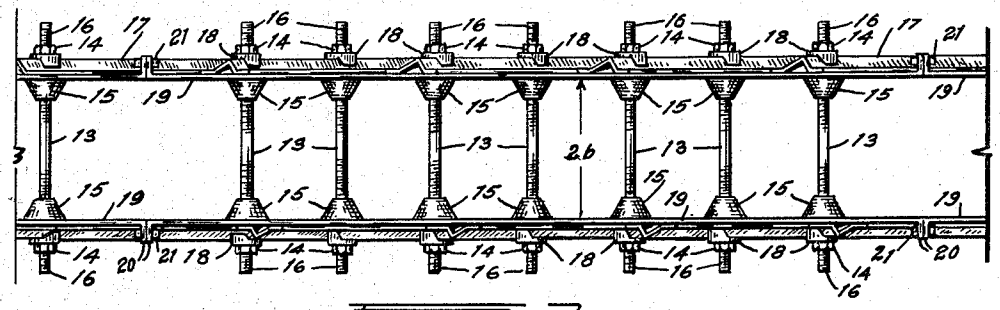


Fig. 2.

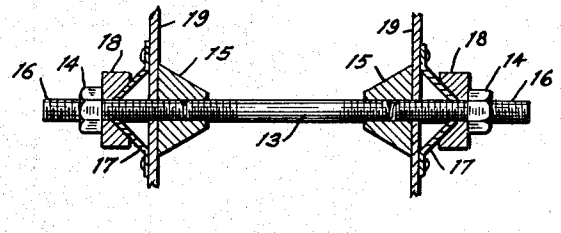


Fig. 3.

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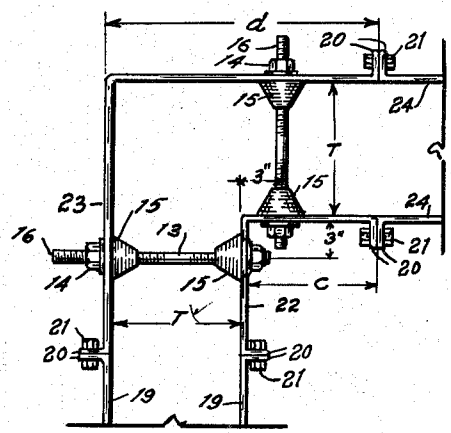


Fig. 5.

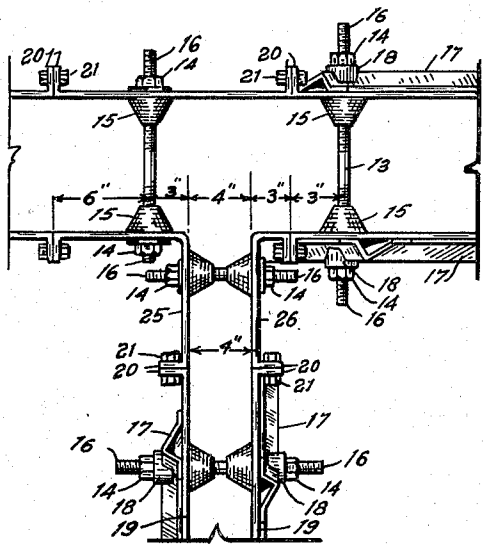


Fig. 6.

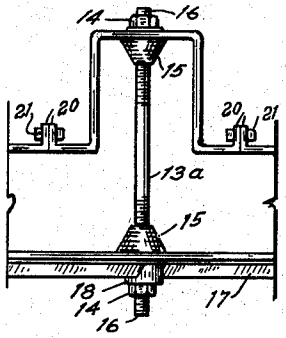


Fig. 7.

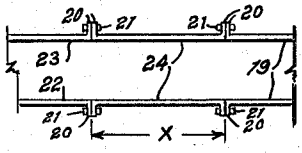


Fig. 4.

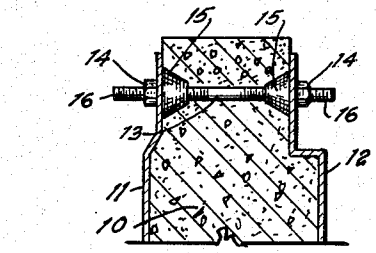


Fig. 8.

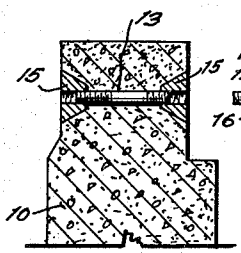


Fig. 9.

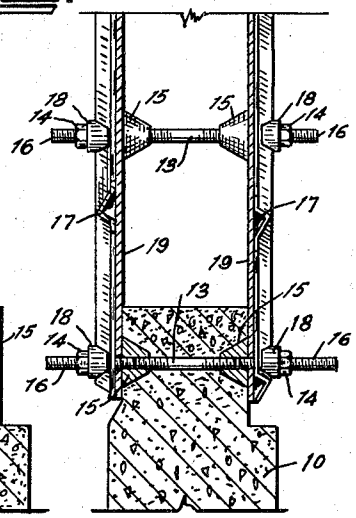


Fig. 10.

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FORM FOR MOLDING CONCRETE WALLS

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Application December 1, 1947, Serial No. 789,021

12 Claims. (Cl. 25—131)

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This invention relates to improvements in molds for making concrete walls for residences and the like.

Concrete is used very extensively in the construction of residences and larger buildings. Such buildings are either formed from concrete blocks that are then laid in the manner of stone or brick, or the walls may be poured, the latter being the method usually employed.

Ordinary concrete used for building construction is formed from a mixture of gravel, sand and Portland cement. Such materials when properly mixed, form a very substantial and lasting wall structure. Such structures, however, are fairly good conductors of heat and it is therefore necessary to lath and plaster such walls, leaving an air space along the inner surface.

In some parts of our country there is a large supply of volcanic ash which is sometimes referred to as pumice and other times as scoria, such material can be used in the manufacture of concrete and when so used in the construction of residences, it is found that it requires less heat to keep them warm in cold weather due to the fact that such concrete is a poorer conductor of heat than the ordinary concrete employing sand and gravel.

It is the object of this invention to produce a mold by means of which buildings, more especially residences, can be readily constructed from any kind of concrete, but which are especially well adapted for concrete made from pumice or other volcanic ash.

Another object of the invention is to produce a form comprising a small number of different structural elements including plates, so constructed and arranged that they may be quickly assembled to form molds for walls and which shall be so designed that partition walls can readily be formed at the same time that the outer walls are made.

A still further object of the invention is to produce a form of the class described which shall be composed principally of metal plates suitably reinforced, which are so designed that they may be shifted from one level to another, as the building of the wall progresses.

Another object is to produce a compound spacer and tension element by means of which the molded plates may be held firmly in properly spaced relation and which shall be of such construction that they may be readily removed after they have served their function, in order that

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they may be employed in other places, as the building construction progresses.

The above and any other objects that may become apparent as this description proceeds are attained by means of a construction and an arrangement of parts that will now be described in detail and for this purpose reference will be had to the accompanying drawing in which the invention has been illustrated in its present preferred form, and in which:

Figure 1 is a side elevation of one of the form plates;

Figure 2 is a top plan view of the form shown in Figure 1;

Figure 3 is a section taken on line 3—3, Figure 1 showing the construction of the combined spacer and tension element;

Figure 4 is a fragmentary top plan view of a wall showing insert for length adjustment;

Figure 5 is a top plan view of a form showing the corner construction;

Figure 6 is a view similar to that shown in Figure 5, but shows a partition construction;

Figure 7 is a top plan view showing how a pilaster can be molded.

Figure 8 shows a section through the upper end of a foundation wall, showing the upper ends of the forms;

Figure 9 is a section similar to that shown in Figure 8, but with the plates removed; and

Figure 10 is a section taken on line 10—10, Figure 1.

Referring now to the drawing, reference numeral 10 designates the foundation wall which is formed by pouring a suitable concrete mixture into the space provided for its reception by plates 11 and 12. These plates are secured against separation by means of a bolt 13 and nuts 14 and are held against accidental inward movement by means of conical nuts 15. Bolts 13 are threaded inwardly from their ends for a considerable distance and may be threaded throughout their entire lengths, if desired. The conical nuts 15 are threaded onto the ends of bolt 13 and serve as abutments limiting the inward movement of the mold plates. Bolts 16 have their inner ends threaded in nuts 15 and extend through the plates and through the strengthening ribs 17, as shown in Figure 3. They also pass through ferrules 18 that have one end grooved for the reception of the strengthening ribs. The plates that are used to form the straight sections of the walls have been designated by numeral 19, are rectangular and are provided along opposite verti-

cal edges with flanges 20 bent outwardly at right angles. Instead of flanges bent from the plates themselves, angle irons may be used in a manner quite obvious. Flanges 20 are provided with a plurality of openings that are so positioned that they will register and through which clamping bolts 21 may pass to hold the plates in position.

Referring now more particularly to Figure 1, it will be observed that the horizontal distance between strengthening ribs 17 is $2a$ and that the distance between the holes through which the spacers extend is also $2a$. The distance from the holes nearest the ends of the plate to the outside of the angular flanges 20 is one-half the distance between the spacer holes or a. In the drawing each strengthening rib 17 has been provided with three holes, one at each end and one directly in the middle. These holes are so situated that the end holes are in vertical alignment.

In the drawing the thickness of the wall or the distance between the inner surfaces of the mold or form will be considered as T. At the corners special form parts are provided and have been illustrated in Figure 5. The form part that is at the inside of the wall at each corner has been designated by reference numeral 22 and the corresponding outer corner member by reference member 23. Distance c is equal to a plus 3 inches. Distance d depends on the thickness of the wall and in Figure 5 $d=T'+a+3$ inches. Distance a is one-half the distance between bolts 16 as shown in Figure 1. The distance from the bolts nearest each corner to the inside of the forms being always 3 inches as shown in Figures 5 and 6.

In building a residence, for example, it is necessary to construct partitions in predetermined places and for this purpose corner angles like those designated by reference numerals 25 and 26 are provided. When the length of a wall or the positions of partitions is greater than a multiple of the width of the panels or plates and the standard corner plates, it is necessary to provide narrow panels 24, like those shown in Figure 4 to bring corners and/or the partition wall to the proper place. The forms can thus continue from the partition wall to the next corner, or to another partition wall, and by means of the special narrow adjustment, panels 24, the large form panels can be positioned in proper relation for the entire building wall.

Wherever doors or windows are to be formed in the wall, rectangular spacers of the proper size are positioned between the form panels in a manner common and well known.

In Figure 6, the construction of partition forms has been shown. Where the thickness of the partition is four inches, the dimensions are as indicated on the drawing; where the partition is thicker or thinner than this, corresponding changes in dimensions must be made. Where pilasters are desired, special plates like those shown in Figure 7 may be used, long bolts 13a may be employed in the manner shown to hold the parts from spreading.

By means of the form sections and panels described herein and illustrated on the drawing and with the aid of corner members like 22 and 23 and a few narrow panels like 24, it is possible to construct a mold to conform to practically any floor plan. After the first row of plates or panels have been assembled and filled with concrete and the concrete has been allowed to set, the various form parts are removed by removing the nuts 14 from the spacer bolts 16 to release the panels.

The form plates are then moved upwardly and secured to the upper edge of the wall by bolts 16 at the upper row of holes, which are left in position for this purpose. The spacer bolts are then rearranged and after the form has been reassembled, another section of concrete can be poured and left to set. Bolts 16 are removed from nuts 15 when they have served their purpose. Nuts 15 are also, as a rule, removed leaving bolts 13 in place.

The size of the plates can be selected to suit the convenience of the designer. For an ordinary residence wall, the plates may be of such width that only two pourings are required to complete the wall. Of course it is possible to make the plates of a width equal to the height of the wall, but this is not considered to be the desirable way.

Particular attention is called to the manner in which the plates are reinforced to resist strains imposed upon them by the hydrostatic action of the concrete and to their relative arrangements which is such that the strengthening ribs of one plate will be in alignment with the corresponding rib on the other plate, as shown most clearly in Figure 1.

Strengthening ribs are not essential for the corner plates like those designated by reference numerals 22 and 23; however, they may be and usually are, provided.

From the above description and from the drawing, it will be seen that the forms necessary for pouring the walls and partitions are comparatively simple, and therefore inexpensive. The plates may be made from any desired material, but for ordinary dwellings, aluminum alloy plates and ribs are recommended because when this material is employed, the weight is greatly reduced, which facilitates handling.

Having described the invention what is claimed as new is:

1. A form for use in molding concrete walls and partitions for buildings, comprising a pair of substantially rectangular plates of metal disposed in spaced parallel relation, each having opposite edges provided with a row of holes, the holes being positioned identically with reference to the ends of the plates, an outwardly extending flange along each end of the plate, the flanges being provided with a plurality of holes for the reception of clamping bolts, spaced alike with the reference to one edge of the plate, each plate having the surface from which the flanges project provided with spaced parallel diagonally extending reinforcing ribs the intermediate ribs which extend between opposite edges of a plate overlying holes in the opposite edges thereof, the end ribs overlying an aperture in an edge of a plate and terminating between the edges thereof along a flange, the end ribs being apertured where they terminate at a flange, and tie bolt extending between the ribs where they overlie the apertures along the edges of the plates.

2. A concrete form for use in constructing houses with partitions, comprising a number of plates of equal height, each plate having a number of equidistantly spaced bolt holes along its top and bottom edges, the holes nearest the ends of the plates being spaced from the ends a distance equal to one-half the distance between adjacent bolt holes, the lengths of the plates being a multiple of the distance between the bolt holes, the plates having diagonally strengthening ribs extending from one edge to the other, the opposite ends of adjacent ribs being directly opposite from each other, each rib and plate having a hole at

the middle point of the rib, the plates having each vertical edge provided with an outwardly directed flange, each flange having a row of holes similarly spaced for the reception of attaching bolts the ribs which cross the flange having a point of juncture thereat, and the remaining ribs being continuous integral members.

3. A form for use in molding concrete walls, comprising, a pair of plates secured together along edges thereof, a diagonal rib having portions secured on each plate, ends of each portion being juxtaposed at said edges, the ribs being apertured at their point of juncture to receive a tie bolt for preventing bulging of the plates.

4. A form for use in molding concrete walls, comprising, a rectangular plate, means at opposite ends of the plate for securing same to other plates, parallel end ribs secured to the plate adjacent opposite ends thereof, each end rib extending diagonally to a point between the side edges of the plate at an end thereof, each of said end ribs being apertured at said point to receive a tie bolt, an intermediate rib interposed between the end ribs in parallel relation thereto secured to the plate, and apertures in the last named rib and the plate for receiving other tie bolts.

5. A form in accordance with claim 4 wherein the end ribs are apertured adjacent an edge of the plate, and the apertures in said last named rib and the plate are also disposed adjacent the edges of the plate, all apertures along the edges being in alignment.

6. A form in accordance with claim 5 wherein the intermediate rib and plate are apertured to receive a tie bolt intermediate its ends in alignment with the points where the end ribs receive tie bolts.

7. A form in accordance with claim 3 wherein the rib is constructed with flanges along its edges secured to the plates, and an upstanding portion between the flanges.

8. A form in accordance with claim 7 wherein the upstanding portion tapers from the flanges toward the center of the rib.

9. A form in accordance with claim 8 wherein the rib portions are secured together by a member conforming to the shape of the taper, the member engaging both rib portions.

10. A form in accordance with claim 4 wherein the ribs are constructed with flanges along their edges secured to the plates, and an upstanding portion between the flanges.

11. A form in accordance with claim 10 wherein the upstanding portions taper from the flanges toward the center of a rib.

12. A form in accordance with claim 10 wherein a tie bolt has means thereon engageable with a member conforming to the shape of the taper.

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