Feb. 15, 1927. 1,617,746

A. DENGER

CONCRETE FORM

Filed March 26, 1925 2 Sheets-Sheet 1

Fig. 2.

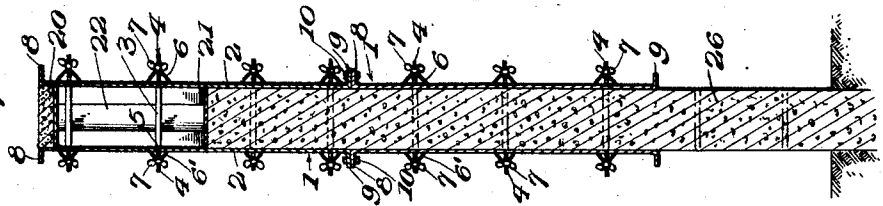
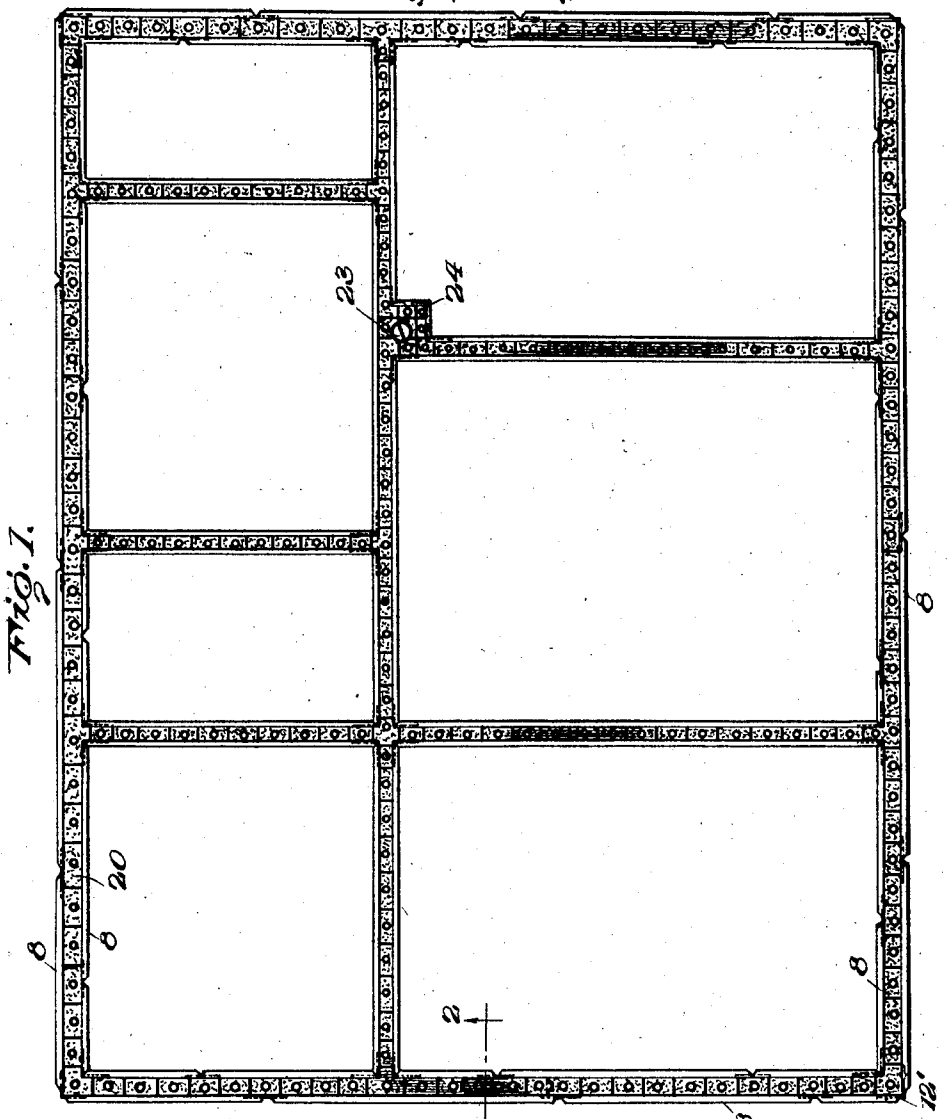


Fig. 1.



WITNESSES

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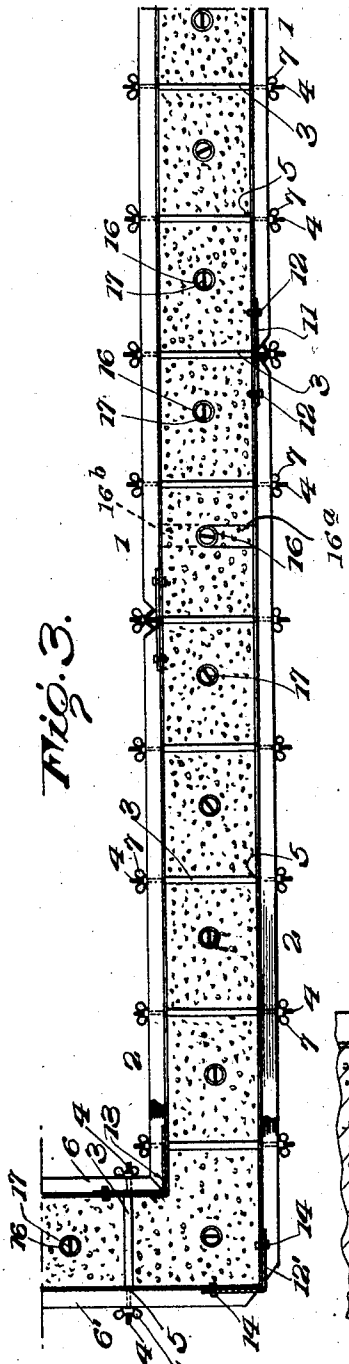


Fig. 3.

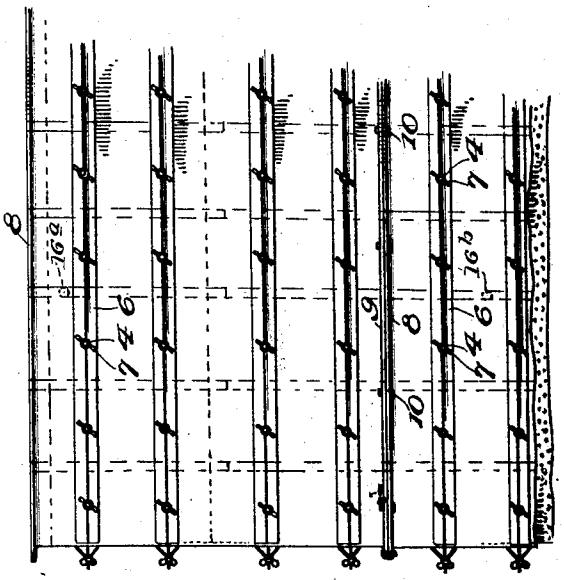


Fig. 5.

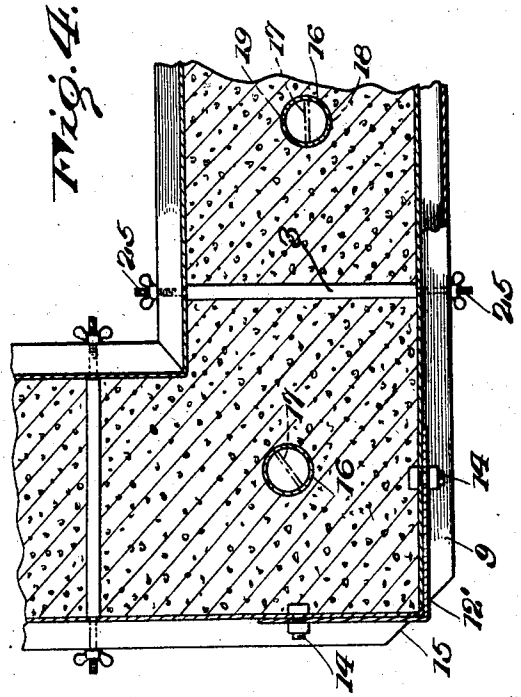


Fig. 4.

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UNITED STATES PATENT OFFICE.

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CONCRETE FORM.

Application filed March 26, 1925. Serial No. 18,577.

My invention relates to improvements in forms for use in the construction of walls of concrete or like material, and it consists in the combinations, constructions and arrangements herein described and claimed.

An object of the invention is the provision of a metallic form of the character described which comprises form members and means for holding the form members securely although separably in a desirable relation in respect to each other, so that a wall can be constructed of plastic concrete or like material by the use of the form and the parts of the form then can be conveniently and easily detached from the wall after the concrete has set hard and used for adding to the wall or in the construction of a separate wall.

A further object of the invention is the provision of a concrete form of the character described which has facilities for effectively bracing and staying the form members against relative movement so that a wall of desired dimensions can be formed accurately.

A still further object of the invention is the provision of a form of the character described which affords facilities for providing air passages in the wall at the time the latter is formed, and which also affords facilities for forming apertures in the wall for the reception of a window frame and door frame or the like.

A still further object of the invention is the provision of a form which is adapted for use in the construction of walls of concrete or like material so that such walls can be formed quickly and accurately without the exercise of any unusual skill, and therefore at a relatively low cost.

Other objects and advantages of the invention will be apparent from the following description, considered in conjunction with the accompanying drawings, in which:

Figure 1 is a plan view showing the form embodying the invention in position for use in the construction of the outer and partition walls of a house,

Figure 2 is a slightly enlarged vertical section along the line 2—2 of Figure 1,

Figure 3 is a further enlarged fragmentary plan view of a corner portion of the structure exhibited in Figure 1,

Figure 4 is a plan sectional view, still further enlarged, of a corner portion of the wall and the members of the form used in the formation of the corner portion of the wall, and

Figure 5 is a side elevation of the structure exhibited in Figure 3.

The form embodying the invention may be made up of any desirable number of form units. Each unit comprises a pair of form members designated generally at 1. Each form member 1 comprises one or more plates 2 made of any suitable metal and disposed vertically edgewise. Corresponding plates of the two members 1 are connected and held in spaced parallel relation by means of combined strut and tie rods 3, each of which is provided with reduced end portions 4 extending through alined openings in corresponding plates 2 of the two members 1 so that outwardly facing shoulders 5 of the end portions of the combined strut and tie rod abut the inner faces of the corresponding plates 2 of the two members 1. The reduced end portions 4 of the combined strut and tie members extend through openings in reinforcing angle irons 6 and are threadedly engaged by clamping wing nuts 7 which force the angle irons 6 against the outer faces of the plates 2 and hold the plates 2 against the shoulders 5. It may be observed at this point that the openings in the plates 2 through which the reduced end portions 4 of the combined strut and tie rods extend are arranged in horizontal rows and the openings in the angle irons 6 through which these reduced end portions 4 extend are formed at the juncture of the legs of each angle iron, whereby the edges of the legs of the angle irons will closely contact with the outer faces of the plates 2 at all points along the length of the angle irons.

Each plate 2 is formed with an outwardly extending flange 8 at its upper edge and with an outwardly extending flange 9 at its lower edge. Each member 1 therefore may be made of any desirable height by superimposing one plate 2 on another plate 2 so that the flange 9 of the upper plate will rest flatwise on the flange 8 of the plate 2 next therebelow, the superimposed flanges 9—8 being secured together by rivets 10 or any other suitable known fastening devices.

Each form unit may be made of any desired length by making the plates of the respective members 1 of a desired length which may vary according to the requirements of a particular case. Also, the length

of each form unit can be varied by forming each member 1 of a plurality of the plates 2 arranged in horizontal alinement or in other words, in end to end relation, the meeting end portions of horizontally alined plates being secured firmly each to the other by means of splice plates 11 and fastening devices, such as the bolts and nuts indicated at 12. When each of the members 1 is formed of a plurality of the plates 2 arranged in end to end relation, the joints between adjacent plates of the two members are arranged in staggered relation as best seen in Figure 3.

Form units may be connected together for use in forming a wall having any desirable configuration. For example, adjacent form units may be connected together to extend at right angles to each other for use in forming the corner portion of the wall of a house or like structure, as shown in Figures 1, 3 and 4. As illustrated in these views, the meeting ends of plates 2 of the two members 1 of units arranged at right angles to each other are secured to each other and braced by angle bars, such as indicated at 12′ in Figures 1, 3, 4 and 5 at the outer side of the angle and at 13 in Figures 1, 3 and 5 at the inner side of the angle, such corner bracing and splicing bars being secured to the meeting ends of the plates 2 with which they are associated by suitable fastening devices such as the bolts and nuts indicated at 14. Also, it will be understood that the flanges at the upper and lower edges of the inner members of the form units arranged in angular relation to each other are beveled suitably at their meeting ends so as to permit close contact of the meeting ends of the plates of the inner members at the angle. The flanges at the upper and lower edges of the plates of the outer members 1 of form units which are arranged in angular relation to each other may be beveled at their meeting ends as indicated at 15.

The wall which is formed by pouring plastic material which will set hard between the members 1 of each form unit can be provided with vertical air vents by arranging spaced vertical tubes 16 equi-distant between the members 1 of each form unit, such tubes extending below the form unit into the ground or other supporting material, and being adapted to be removed from position between the members 1 of each form unit by being pulled vertically upward after the concrete that has been poured between the members 1 has set. Each tube 16 therefore is provided adjacent to its upper end with a diametrical rod 17 which can be grasped when it is desired to pull the rod upward. In addition each tube 16 may be provided with alined openings 18 adjacent to its upper end for the reception of any suitable attaching device or tool for use in turning the tube to loosen it from the surrounding concrete or other material through which it extends or in which it is embedded.

When form units are arranged as illustrated in Figure 1, for use in forming the outer walls and the partition walls of a house, provision may be made for door and window openings in the walls by placing a frame between opposed members 1 at a desired place. In Figure 2, a frame of rectangular configuration in vertical sectional contour is arranged between the form members 1 and comprises a horizontal upper member 20, a horizontal lower member 21 and a pair of spaced vertical side members 22, the side members 22 being clamped between the upper and lower members 20 and 21 respectively, and the latter being clamped in place between opposed members 1 of the form unit.

A chimney opening or flue passage can be provided by placing a vertical tube of relatively large diameter, such as that indicated at 23, between opposed members 1 of the form. As shown in Figure 1, the form units are arranged about the tube 23 to provide a relatively thick wall, this arrangement being effected by making use of a number of combined strut and tie rods of relatively great length and by arranging one of the members 1 of the unit with which the tube 23 is associated with an angular portion as indicated at 24.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. The tubes 16 and the combined strut and tie rods 3 are wiped with an oily cloth before concrete or like material is poured or packed around them. The combined strut and tie rods of each horizontal row are spaced equidistant apart and each combined strut and tie rod is provided with transverse openings 25 in its reduced end portions for the reception of a suitable tool by means of which the rod can be turned after the clamping nuts have been loosened to loosen the tie rod from the mass of concrete which surrounds it. The rods 3 can be withdrawn from the concrete after the latter has set, after the members 1 have been detached from the tie rods. The tubes 16 and 23 likewise can be withdrawn from the concrete which surrounds them after such concrete is hardened. In forming a wall structure, a base or lower section such as indicated at 26 in Figure 2 can be formed and after the material of which such section is composed has hardened, the form can be raised to add to the height of the section already formed, the lower edge portions of the members 1 of the form overlapping the upper edge portion of the section or wall that has already been formed, and the tubes 16 having their lower ends re-

ceived in the upper ends of the openings in the section 26 from which they have been previously withdrawn. It will be manifest that a wall of any desired height within limits and of any desired length can be formed by means of a single form unit, the position of the form unit being changed as required to add to the height and length of the wall. A plurality of form units can be arranged as shown in Figure 1 so that the base sections of the outer and partition walls of a house can be constructed without any change of position of the form units, and such wall sections can be enlarged vertically as required by raising the form units after the lower sections of the walls have hardened. It therefore will be obvious that the invention provides means whereby walls of a house or like structure can be constructed of concrete or the like quickly and accurately by a workman who has no great experience in such work and therefore such house or like structure can be constructed cheaply. The openings defined, when the tubes 16 are withdrawn, provide air passages in the walls and can be used for the reception of electrical conducting wires, pipes or the like. The walls formed by use of a form unit embodying the invention will be uniform in thickness since the form members are firmly secured against relative movement when connected together and reinforced in the manner hereinbefore described.

Air vents for the passages which will be defined when the tubes 16 are withdrawn may be provided in any suitable manner at the upper and lower ends of one or more of said passages, as by means of short tubes arranged at the upper and lower ends of one or more of the tubes 16 when the concrete is poured, as at 16^a and 16^b, respectively, in Figs. 3 and 5, whereby air may pass freely from the basement or ground level through the passages that the tubes 16 define to the attic or outside of a building which comprises concrete walls formed according to the invention.

Obviously, my invention is susceptible of embodiment in forms other than that which is illustrated in the accompanying drawings, and I therefore consider as my own all such modifications and adaptations thereof as fairly fall within the scope of the appended claims.

I claim:—

1. A form of the character described comprising a pair of form members, each including a plate disposed vertically edgewise, the plates of said two form members having aligned openings, rods extending through said alined openings beyond the outer faces of said plates, an angle iron for each of said form members, said angle irons having openings at the juncture of the legs thereof through which said extending end portions of the rods project, the edges of the legs of the angle irons contacting with the outer faces of said plates, and clamping nuts screwed on the outer end portions of said rods for clamping said angle irons against said plates.

2. A form of the character described comprising a pair of form members, each including a plate disposed vertically edgewise, the plates of said two form members having aligned openings, rods extending through aligned openings of the plates of the two members, each rod having shoulders abutting the inner faces of said plates and having end portions extending beyond the outer faces of said plates, said transverse openings being arranged in horizontal rows, an angle iron for each of said form members, said angle irons having openings at the juncture of the legs thereof through which said extending end portions of the rods project, the edges of the legs of the angle irons contacting with the outer faces of said plates, and clamping nuts screwed on the outer end portions of said rods for clamping said angle irons against said plates and said plates against said shoulders.

ARTHUR DENGER.