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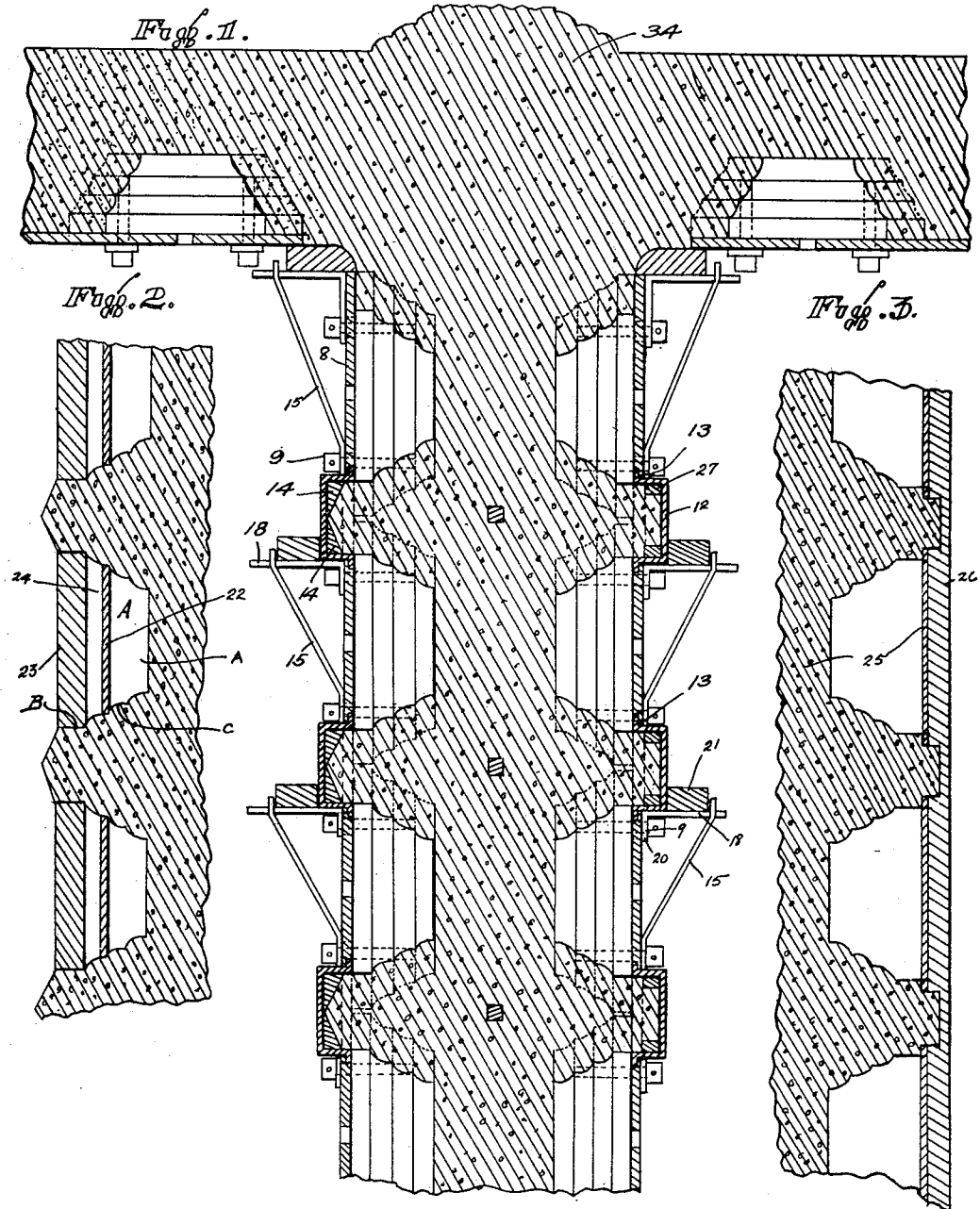
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1,841,074

CONCRETE BUILDING MOLD

Filed July 23, 1928

3 Sheets-Sheet 1



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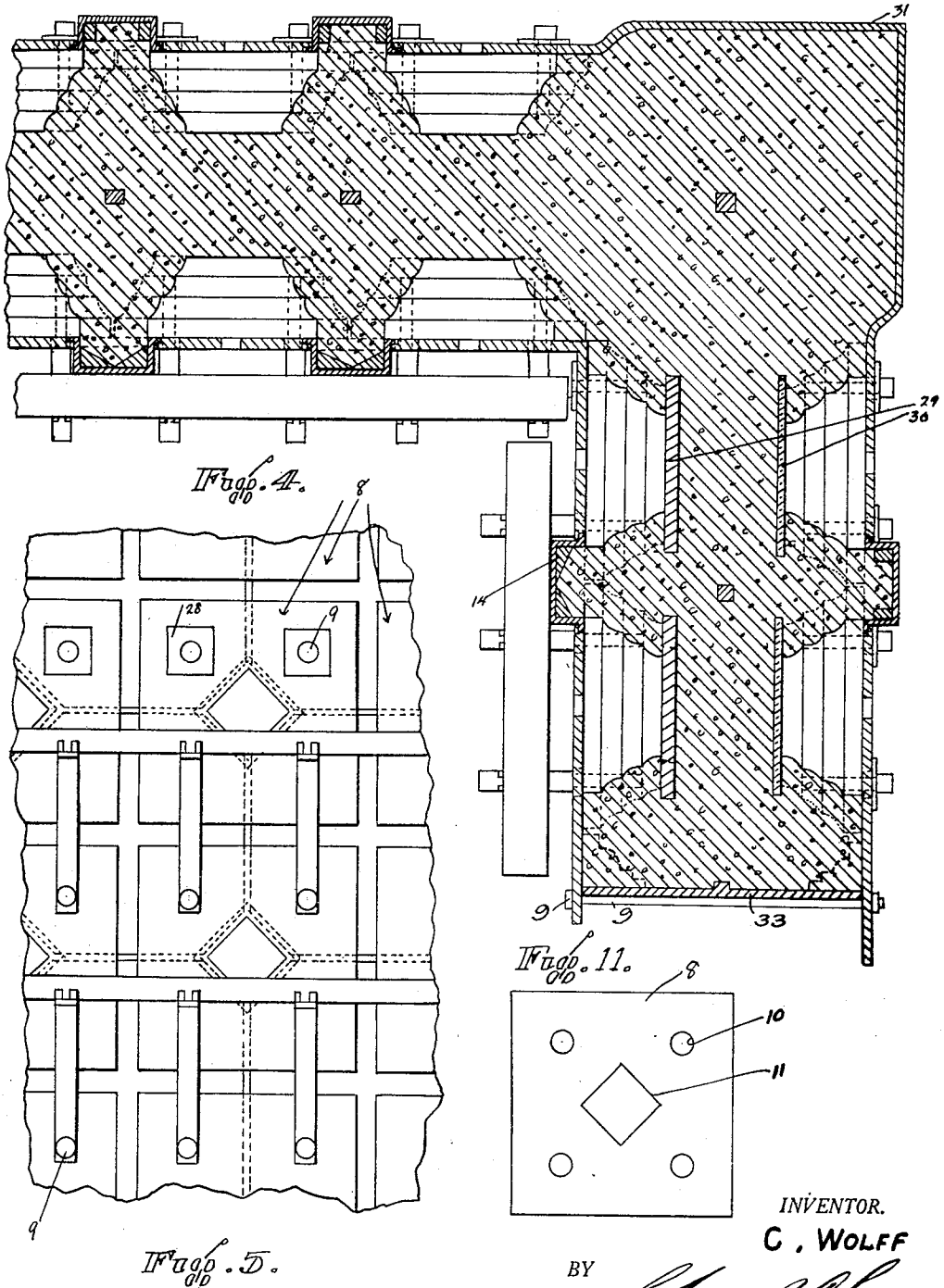
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3 Sheets-Sheet 3

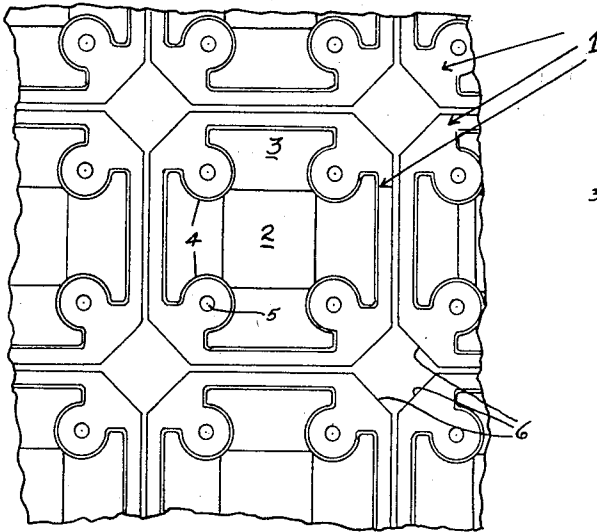


Fig. 6.

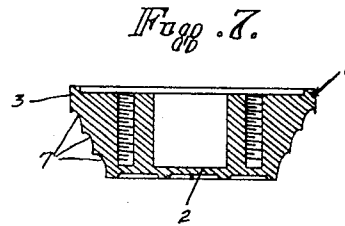


Fig. 7.

Fig. 9.

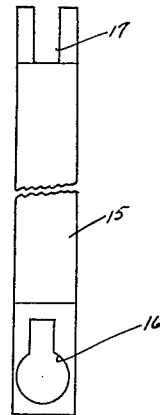


Fig. 10.

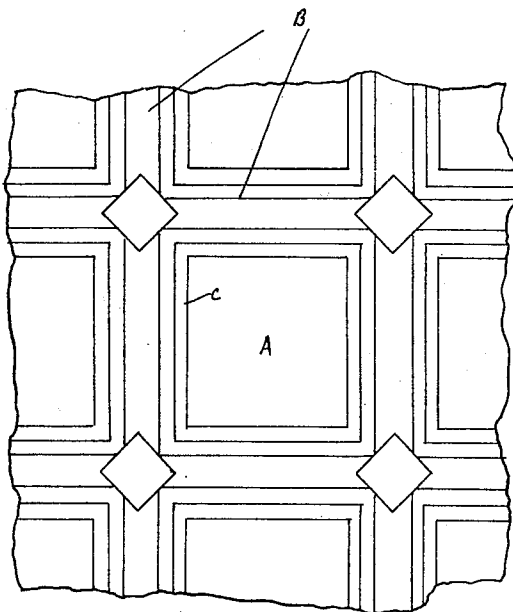
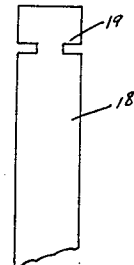


Fig. 8B.

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CONCRETE BUILDING MOLD

Application filed July 23, 1923. Serial No. 294,704.

This invention relates to improvements in the building art and resides not only in the provision of a new and improved mold which will facilitate the building of concrete structures but also takes into consideration the provision of a novel wall construction which may be embodied in ceilings, floors, columns and other building structures.

One of the purposes of the invention is to provide a method for erecting concrete building structures of all kinds more expeditiously than is possible under present methods.

By the method and means of my invention a saving in material may be effected without sacrificing strength and rigidity of construction, it being possible to make at less expense and more expeditiously, a three ply concrete wall construction which is thermally insulated by provision of dead air spaces, and is as strong, if not stronger, than an ordinary solid wall, with the advantages that less material is required than in the case of a solid wall and provision is made for easy and inexpensive decorative finishes without appreciably adding to the construction costs or requiring appreciably greater time than when plain finishes are provided.

The mold of my invention is constructed inexpensively and such that it may be quickly and easily set up to provide building constructions of various kinds, and units of building constructions, in less time and at less expense than is possible with methods heretofore employed.

In carrying out the invention I employ a series of especially formed and constructed mold members which, through the employment of a novel means for attaching the mold members together and holding them in the proper relation, will provide for the formation of walls, ceilings, floors, beams, and other concrete structural units, which units or elements will be exceptionally strong and are capable of being readily set up in various decorative finishes.

Another of the purposes of the invention is to provide novel means of assembling together a plurality of especially constructed mold members of this invention, which means

provides for a saving in time, expense and labor.

With the above mentioned and other objects in view, the invention consists in the novel construction and combination of parts hereinafter described, illustrated in the accompanying drawings, and set forth in the claims hereto appended, it being understood that various changes in the form, proportion, size and minor details of construction within the scope of the claims may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Referring to the drawings:

Fig. 1 represents a fragmentary vertical sectional view of the mold apparatus of this invention shown as it would appear when arranged to form an upright wall, together with a floor and ceiling.

Fig. 2 represents a fragmentary vertical sectional view of a wall as formed in accordance with the invention.

Fig. 3 represents a fragmentary vertical section of a wall constructed in accordance with the invention and as when having a plaster surface or finish.

Fig. 4 represents a fragmentary horizontal sectional view showing the mold as arranged when forming two walls joined and extending at right angles to one another, this view also showing the provision for different decorative finishes.

Fig. 5 represents a front elevation of the mold apparatus of the invention as shown in connection with a fragment of the wall.

Fig. 6 represents a front elevation of a fragment of the mold apparatus with means for holding the molds assembled.

Fig. 7 represents a cross sectional view of one of the molds of the invention.

Fig. 8 represents a fragmentary view in front elevation of a wall finished in accordance with this invention.

Fig. 9 represents a top plan view of one of the elements used in assembling the mold.

Fig. 10 represents a top plan view of another element used in connection with the one shown in Fig. 9.

Fig. 11 is a top plan view of one of the

plates for holding the mold members assembled.

The mold apparatus of this invention consists primarily in a plurality of mold members which are formed of cast iron or other suitable material, preferably material which is rust proof or treated so as to be rust proof, which mold members are arranged in the form necessary to produce floors, walls, columns, ceilings and the like, which mold member is so shaped that when a series of them are fastened together by the especially constructed means of this invention, there may be provided a form for a wall or the like which will provide in a finished wall, a series of air spaces or pockets, yet permit of the giving of a smooth finish with the appearance of a solid wall. The construction of each mold and the arrangement of the molds provides for making decorative finishes as well as features of utility in the finished wall without appreciably adding to the expense of molds or expense of assembling them in the proper form. The mold members and the means employed for holding them assembled are constructed in a permanent nature so that they may be used time after time and assembled in various ways to produce different kinds of walls and concrete building structures.

Referring particularly to the embodiment of the invention shown in the accompanying drawings I shall first describe the mold of which a plurality are employed in carrying out this invention. The mold members are designated 1 and each is in the form of a substantially rectangular receptacle having a bottom wall 2 and four side walls 3, all formed integral with one another and arranged so that the mold is of less diameter at the closed side than the open side. In other words the mold is of substantially pyramidal form or shape and preferably constructed of cast iron but may be made of any material which is rust proof or which may be treated so as to be rust proof. Interiorly of each mold member are a plurality of bosses 4 which have screw threaded openings 5 therein, these bosses being located adjacent the corners. In this connection it will be noted that the molds are cut away or beveled as at 6 at the corners thereof for a purpose which will be later more fully described, although if desired the mold members may be formed with right angular corners. By forming the outer surfaces of the walls 3 of the mold with grooves indicated at 7 provision is made for a series of shoulder-like ribs or beads in the finished concrete construction and not only is the structure made stronger by these bead-like constructions but the beads facilitate the supporting of inlaid finishing pieces such as slate, tile or plate-like members. These grooves are parallel and extend lengthwise of the walls 3 of the mold.

To make the forms of the concrete structure with the molds of this invention, a plurality of mold members arranged in columns or rows are assembled as shown in detail in the accompanying drawings, particularly, however, by means of series of assembling plates 8. These plates are square or substantially square and constructed of any suitable metal, and each is adapted for connection with four of the mold members. Bolts 9 are inserted through openings 10 located near the corners of the plates 8 and said bolts are turned in the threaded openings 5 of the bosses 4 on the mold members. The plates are so arranged that the mold members will be supported in such properly spaced relation to one another as to permit of expansion and contraction of the mold members when set up to provide a form. The plates are also spaced from one another so as to take care of the expansion and contraction thereof. The heads of the bolts 9 are of smaller diameter than the openings 10 in the plates 8 to facilitate a quick assembling and disassembling and this requires the use of members which will serve as washers as will be later described. Each plate is provided with a diamond shaped central opening 11 which is in registration with the diamond shaped space provided between each four mold members at the corners thereof, the beveling of the corners of the mold members providing this space.

A plurality of cap members 12 are mounted in the openings 11 and project outward beyond the plates 8, there being flanges 13 which engage the inner sides of the plates so as to hold these caps in place. The caps 12 serve to extend the space between the molds at the corners of the mold members and form projections in the concrete structure provided by the mold apparatus of the invention. If desired, however, these plates may be unbroken so as to provide a smooth wall surface instead of projections. Interiorly of the cap-like projections are oppositely beveled members 14 forming beveled or more or less pointed ends, on the projections in the finished wall. By placing differently shaped members 14 inside of the cap, various decorative effects may be produced in the outer ends of the projections. These projections may be utilized in various ways in walls and ceilings not only as ornamental projections but for utilitarian purposes such as providing reinforcing elements and bond members for cementitious substances applied to the outer surfaces of the concrete wall. They may also be used as abutments for tile and plate-like members used to surface or finish the walls or ceilings.

I prefer to use bracket arms 15 in connection with the plates 8, one of said arms being shown in detail in Fig. 9. The lower ends of these arms are provided with key hole open-

ings 16 adapted to receive the heads of the bolts 9, the smaller portions of said openings preventing the heads of the bolts from pulling through the key hole openings and through the openings 10 and serving to hold the plates 8 upon the bolts in such manner that a quick disassembling of the apparatus may be had. The upper ends of these bracket arms are bifurcated as at 17 and adapted to receive horizontal bracket members 18, the outer ends of which are notched on opposite sides as at 19 to cooperate with the bifurcations 17. The bracket arms 18 are provided with right angularly bent terminals 20 which have key hole openings therein through which the bolts 9 extend. The brackets provided by the members 15 and 18 are in this way detachably set up and connected with the plates and provide for supporting the scaffold bars 21, these bars being rested on the horizontal pieces 18. The bars 21 may be formed of any suitable metal and serve as scaffolding also to hold the forms properly assembled and against buckling out of alignment. The upper ends of the members 15 act as abutments for the bars 21 and the cap projections 12 are engaged by the inner sides of the bars, thereby providing a snug seat for said bars and holding them in place on the brackets. Comparatively few plates 8 and their associated parts are necessary to set up a form comprising a comparatively greater number of mold members 1.

As shown in Figs. 1, 4 and 5, these members are set up to provide forms for making walls, ceilings and floors. The construction of the mold members and the special means of this invention for assembling them to provide a mold form, permit of much quicker assembling than is possible with other types of mold apparatus for making concrete structures. The connections between the plates 8 and the mold members facilitate an easy and quick assembling and taking down of the form without damage to the mold members and their associated parts and thus these mold parts may be used repeatedly and in being constructed of metal will last for long periods of time.

As shown in Fig. 1, the mold elements of my invention are set up to provide a wall joined with a floor and ceiling, only half of the ceiling and floor arrangement of mold apparatus being shown.

In Fig. 4 the arrangement of the mold apparatus is for forming right angularly extending walls which are integral and provide a corner.

With the mold apparatus set up as shown in Fig. 1, the concrete is poured into the space between the forms, which forms compose spaced structures made up of series of mold members of this invention attached together in each series as hereinbefore described. The concrete passes into the spaces between the

molds and into the cap-like extension spaces provided by the caps 12.

To disassemble the forms the bars 21 are removed from the brackets, then the arms 15 are moved downward to bring the larger portions of the openings 16 into registration with the heads of the bolts 9, following which said arms may be readily removed. The members 18 are disconnected from the bolts 9 in a similar manner and the plates 8 can then be moved off of the bolts 9, which bolts will remain attached to the mold members and the mold members may be taken out and placed to one side. The outer surfaces of the concrete wall appear as shown in Fig. 8, being a series of rows of spaced depressions, which depressions are provided between intersecting horizontal and vertical rib portions B. These rib portions B are beveled, that is, are narrower at their outer edges and gradually increase in width towards the bottom of the depressions A. The faces of the ribs B forming the walls of the depressions A are provided with a series of rib-like projections C, which lend strength to the structure and provide for supporting tiles and the like as will be later more fully described, as well as serving as decorative members.

With the wall or structure formed in this manner, it is possible to readily and easily provide a three ply wall and this may be done either as shown in Fig. 2, or as shown in Fig. 3. In Fig. 3 there is shown but one half of the wall, the omitted half being the same as that shown. In this form of the invention, plates 22 of slate or other material are placed in the depressions A so as to rest upon certain of the rib members C. These plates leave an air space in the inner ends of the depressions. Next tile pieces 23 of any suitable color, design or material are placed in the outer ends of the depressions A so that their outer faces may be disposed substantially flush with the outer ends of the ribs B, said tile pieces being held in place by a layer of cement indicated at 24. By this simple arrangement, the wall will be provided with a series of dead air spaces on opposite sides of the center core of solid concrete but will have the appearance of a solid concrete wall. By this arrangement a great deal of saving in material may be had without sacrificing strength and with the advantage of providing thermal insulation by reason of the air spaces on opposite sides of this central solid core of the wall.

In Fig. 3 I have shown half of a wall constructed in accordance with the invention having a plaster finish on its outer surfaces. In this form of the invention a plurality of air pocket forming plates 25 similar to the plates 22 are placed in the outer ends of the depressions so as to seal said depressions, and plaster or other cementitious surface coating indicated at 26 is applied to these

plates 25, thus giving a smooth plaster finish to the wall while at the same time providing the three ply arrangement as provided in the wall shown in Fig. 2, there being air pockets or spaces on either side of the solid center core. By three ply, I mean as one ply, the outer surfacing constituting the material 26 and plates 25; as the second ply, the solid center core; and third, the similar plates and coating 26 on the other side of the wall, this side being omitted in Fig. 3. When the plaster finish is to be had as shown in Fig. 3 ring members 27 are mounted in the caps 12 to form shoulders 28 on the projections of the concrete molded in the caps 12, the plates 25 are rested on these shoulders as shown in Fig. 3. Thus the plaster coating may be extended over the outer ends of the projections formed by the caps 12.

Instead of bracket arms 15 I may employ washer members 28 for cooperation with the heads of the bolts 9 for the purpose of holding the plates and mold members assembled, there being key hole openings in these washers 28, the washers being shown in Fig. 5.

As shown in Fig. 4, the decorative features of the walls or structures may be provided by placing decorative tile plates or sheets indicated by the numerals 29 and 30 at the inner ends of the mold members so that when the mold members are removed, these plates will be embedded in the wall in part, but for the most part will be revealed at the inner ends of the depressions A which are formed by the mold members. In the arrangement of the mold apparatus shown in Fig. 4, to provide a corner, a special corner molding piece 31 is employed in conjunction with the mold members, said corner molds 31 being attached in any suitable manner to the mold members and plates therefor. The plates 29 and 30 may be attached to the mold by fastenings extending through the bottom wall of the mold members, which fastenings are not shown but may be of any suitable kind.

While I have shown the mold apparatus set up to provide two different building structural units, it is obvious that the mold apparatus may be set up in various ways to provide other concrete structural units. One of the main advantages of the mold apparatus of this invention is that it may be quickly and easily set up to provide a new type of concrete wall construction and is easily taken down, the use of the apparatus providing for a saving in material and expense in constructing concrete structures. A further advantage is the provision for repeated use of the mold apparatus to make various kinds of structures without necessitating the changing of the construction of the mold apparatus. A transverse plate 33 is shown in Fig. 4, supported by bolts 9, to illustrate the provision made for window and door openings. The transverse plates 33 extend

across the space between the opposite plates 8, adjacent the outer ends thereof, and are arranged so as to conform to the size and shape of the desired window or door opening. Thus, an entire building mold may be built, with door and window openings in their proper places, and the concrete is readily poured in one operation for the entire building. The plates 33 are readily removed after the molds and the bolts 9 are disassembled. The plates 33 when in place, also serve as a reinforcement for the mold structure to further strengthen the same against lateral spreading.

It is to be noted that when the molds for the side walls are assembled above the floor or ceiling molds at the juncture 34 of said walls, a comparatively large space is provided, so as to increase the strength of the wall structure, by the larger mass of concrete molded at said juncture.

I claim:

1. Apparatus for molding concrete structures comprising a plurality of cap-like mold members arranged in spaced rows to provide opposed sides of a form for making a wall structure, a plurality of spaced rows of plates connected with said mold members, each plate having connection with four of the mold members, means outside of the mold members for detachably connecting the plates and said mold members, said mold members being of rectilinear outline with the corners thereof cut away providing a mold space between each group of four mold members at the cut away corners thereof; and inverted cap-like members attached to and extending outwardly from the plates and in registration with the mold space provided between the corners of the mold members.

2. Mold apparatus for concrete structures comprising opposed spaced wall forms each comprising a plurality of rows of spaced mold members of rectilinear outline, a plurality of mold connecting plates each of which plates is connected with four of said mold members, means for detachably connecting the plates with the mold members, said plates having openings therein, which openings register with the spaces provided between the corners of each group of four mold members and cap-like members mounted in the openings of the plates and extending outwardly from the plates to provide extensions of the spaces between the corners of the mold members.

3. Mold apparatus for concrete structures comprising opposed spaced wall forms each comprising a plurality of rows of spaced mold members of rectilinear outline, a plurality of mold connecting plates each of which plates is connected with four of said mold members, means for detachably connecting the plates with the mold members, said plates having openings therein, which

openings register with the spaces provided between the corners of each group of four mold members, cap-like members mounted in the openings of the plates and extending outwardly from the plates to provide extensions of the spaces between the corners of the mold members, and a plurality of horizontally disposed bars supported on each horizontal row of said plates.

4. Apparatus for molding concrete structures comprising spaced opposed forms each composed of a plurality of mold members arranged in spaced relation to one another in rows, which rows extend vertically and horizontally and are spaced from one another, each of said mold members being in the form of a receptacle having their convex sides opposed, bolts secured interiorly of each mold member and projecting outwardly from the open sides of the mold members, a plurality of assembly plates provided with openings therein, the diameters of which openings are greater than the diameter of the heads of the bolts and through which openings the bolt heads extend with the plates engaging the outer sides of the mold members, each plate being secured to a group of four mold members and means engaged upon the bolts for detachably securing the plates to said mold members.

5. Apparatus for molding concrete structures comprising spaced opposed forms each composed of a plurality of mold members arranged in spaced relation to one another in rows, which rows extend vertically and horizontally and are spaced from one another, each of said mold members being in the form of a receptacle having their convex sides opposed, bolts secured interiorly of each mold member and projecting outwardly from the open sides of the mold members, a plurality of assembly plates provided with openings therein, the diameters of which openings are greater than the diameter of the heads of the bolts and through which openings the bolt heads extend with the plates engaging the outer sides of the mold members, each plate being secured to a group of four mold members and means engaged upon the bolts for detachably securing the plates to said mold members, which means includes brackets and bars supported horizontally on said brackets.

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