J. P. JACKSON.

MOLD FOR CONCRETE WALL CONSTRUCTION.

APPLICATION FILED DEC. 20, 1911.

1,164,352.

Patented Dec. 14, 1915.

4 SHEETS—SHEET 1.

Fig. 1.

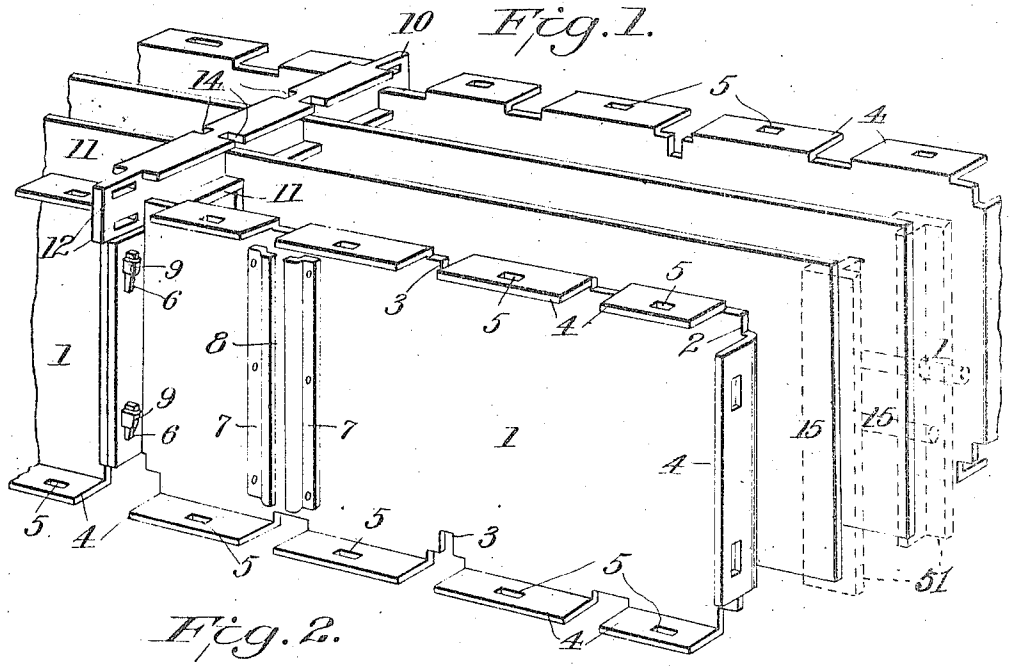
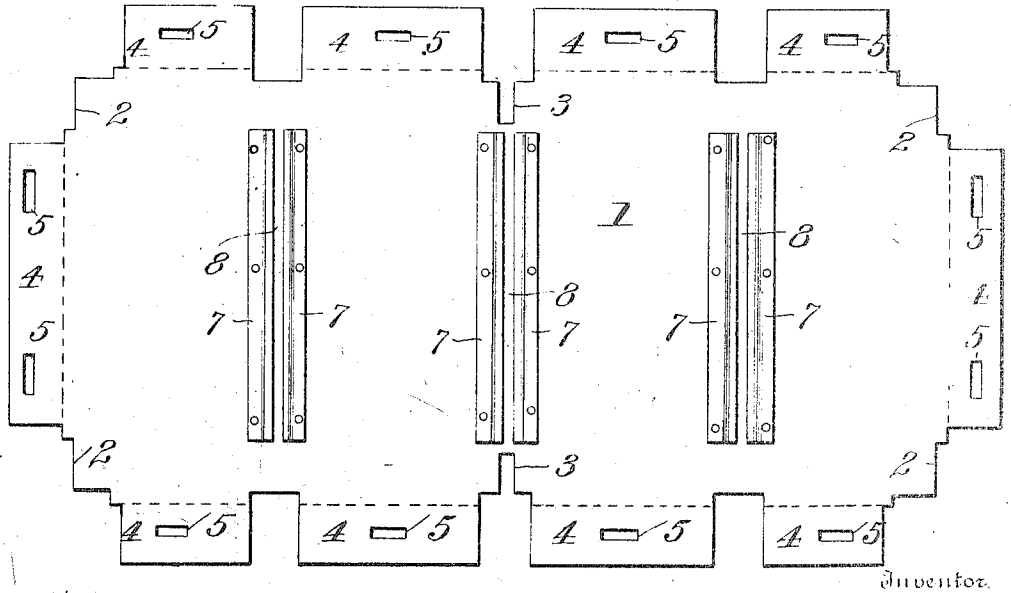


Fig. 2.



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4 SHEETS—SHEET 2.

Fig. 3.

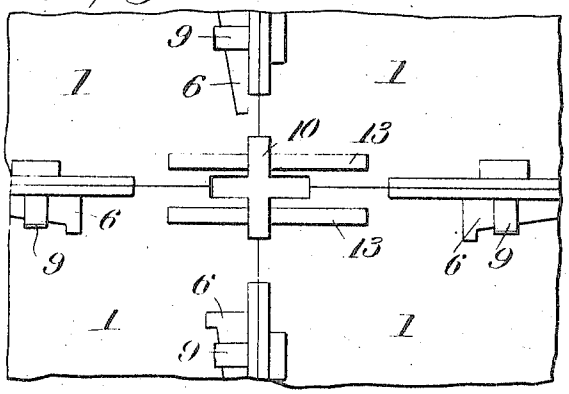


Fig. 4.

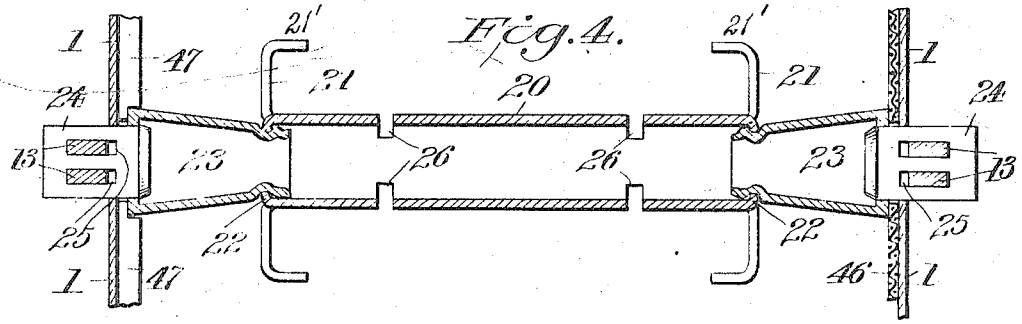


Fig. 5.

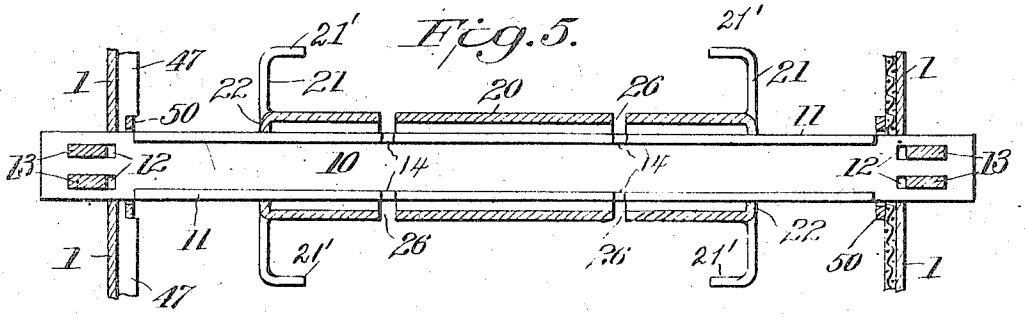
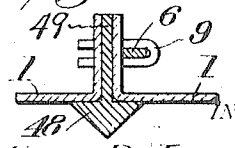


Fig. 11.



Fig. 12.



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4 SHEETS—SHEET 3.

Fig. 13.

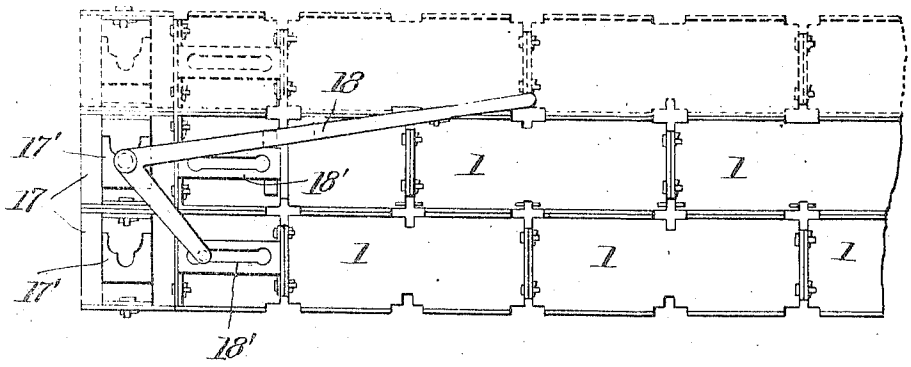


Fig. 14.

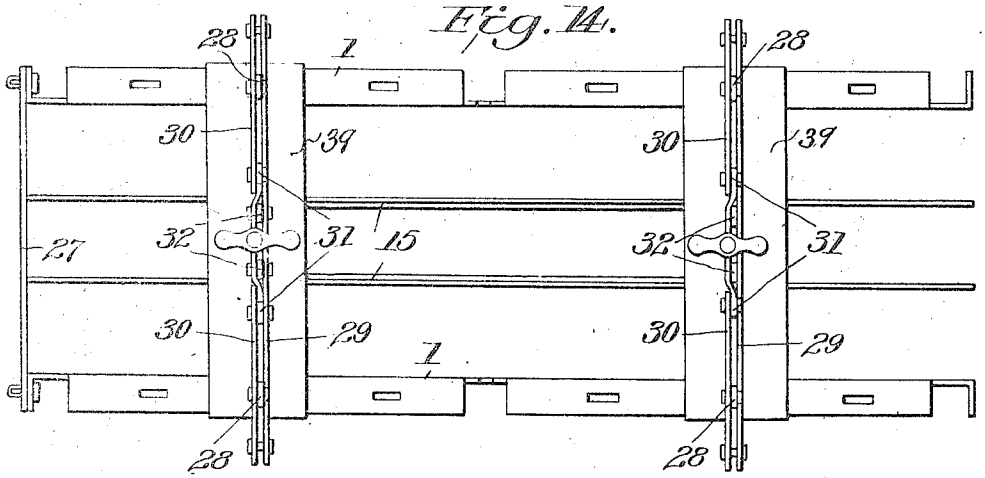


Fig. 6.

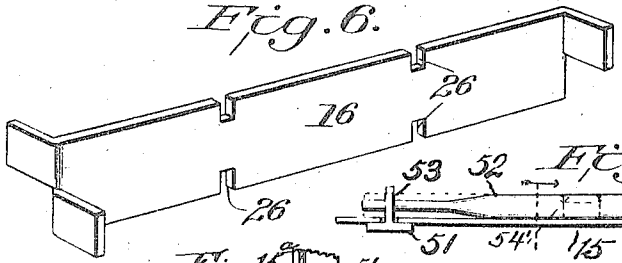


Fig. 15.

Fig. 15a.



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4 SHEETS—SHEET 4.

Fig. 9.

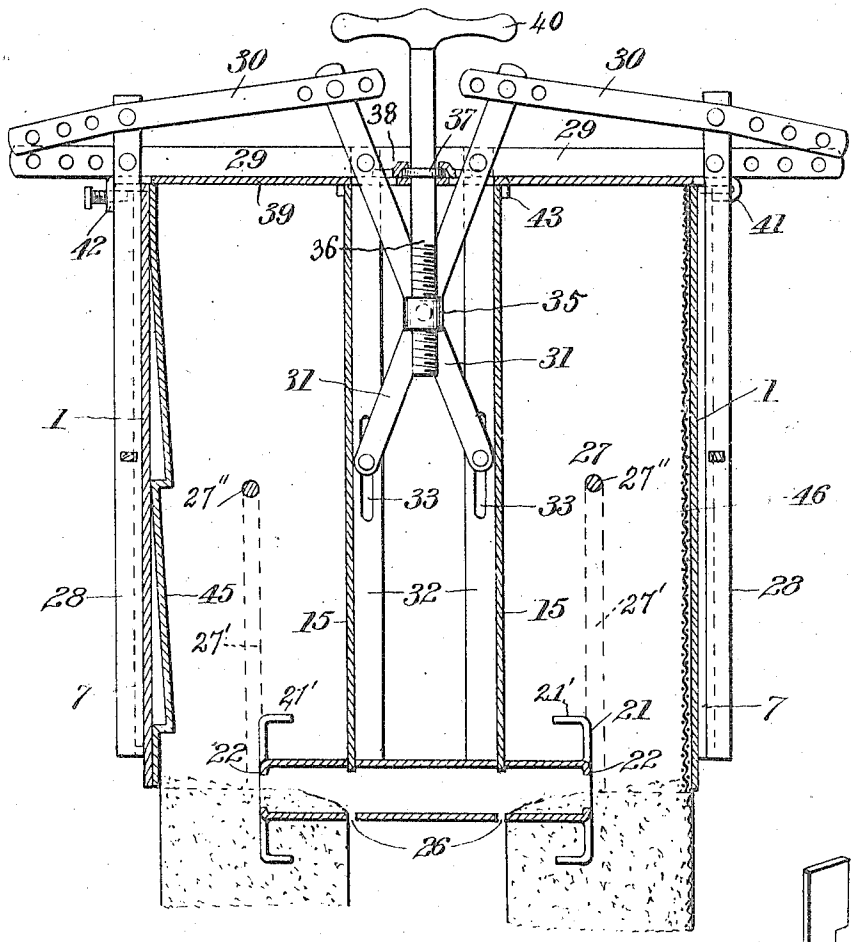


Fig. 8.

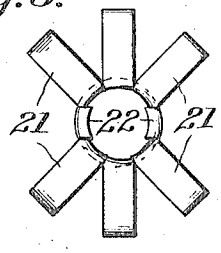


Fig. 10.

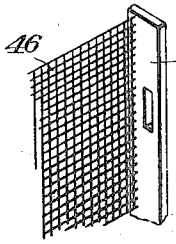
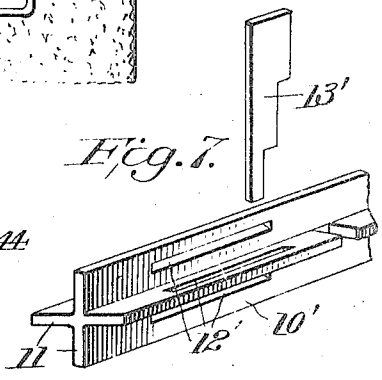


Fig. 7.



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UNITED STATES PATENT OFFICE.

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MOLD FOR CONCRETE WALL CONSTRUCTION.

1,164,352. Specification of Letters Patent. Patented Dec. 14, 1915.

Application filed December 20, 1911. Serial No. 666,979.

To all whom it may concern:

Be it known that I, JOHN P. JACKSON, a citizen of the United States of America, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Molds for Concrete Wall Construction, of which the following is a specification.

This invention relates more particularly to improvements in molds for use in the construction of concrete or cement walls of buildings, such walls being made of cement, concrete or artificial stone which is placed when in a plastic condition in a mold to form when set either solid or hollow walls.

One of the primary objects of this invention is to provide a mold and attachments therefor which may be used as a unit in the construction of hollow walls and the make up of the sides are such that a plurality of the side pieces may be assembled for use in the erection of either solid or hollow walls, which will be molded in lengths rather than in short sections or blocks.

The means used in the construction of walls from plastic material comprises side plates or units which may be used in pairs with suitable ties and inner plates to form a block-mold such side plates being adapted to be associated with similar side plates to form the sides of a trough into which the cement is placed until set, the side plates and ties or connecting means being of such construction that they may be associated with parts to form the character of wall desired and with means for manipulating the mold so that the sides may be readily removed from the wall after the plastic material has set or hardened, as in practice the troughs are connected or associated with a similar set of side pieces which contain cement which forms a lower course and carries the upper set of molds. The units or sides pieces either individually or when associated are connected by cross bars, which are subsequently removed from the wall, and permanent ties are used to connect the sides of the wall. The sides pieces which form a trough or mold are adapted to maintain facing and scoring or furrowing means as well as indenting strips or bars which are adapted to form recesses in the outer face of the wall, as will hereinafter more fully appear.

In the accompanying drawings which illustrate a preferred form of mold and the parts which are adapted to be used in connection therewith for the purpose of constructing or molding of walls for buildings, Figure 1 is a perspective view illustrating the construction of the side-plates and showing the side-plates in position for use in the construction of a hollow wall. Fig. 2, is a plan view of one of the side-plates, before being bent to provide flanges, the parts being subsequently bent at right angles on the dotted lines. Fig. 3 is a side elevation showing in detail the corner portions of adjacent side-plates. Figs. 4 and 5 are sectional views of tie bars for hollow walls and means for associating connecting means for the side-plates thereto. Fig. 6 is a detail perspective view of a connecting bar for the side-plates of the mold. Fig. 7 is a detail perspective view of a modified form of connecting bar. Fig. 8 is an end elevation of the tie-bars, shown in Figs. 4 and 5. Fig. 9 is a sectional view of a mold for a single block. Fig. 10 is a detail view of a scoring attachment. Figs. 11 and 12 are detail views of attachments for grooving or recessing the face of the cement. Fig. 13 is a side elevation showing means for manipulating the molds when the side-plates are connected in series. Fig. 14 is a plan view of the mold and attachments shown by Fig. 9. Figs. 15 and 15ª are detail views of braces for the inner plates of the mold.

The side-plates 1 of the molds shown by the accompanying drawings are each made from a flat rectangular sheet of metal and as fully shown by Fig. 2 of the drawings the corners are cut away to provide recesses 2 that are not quite as wide as intermediate recesses 3, which are formed in the sides of the blank. The plate or blank is also shaped to provide when bent flanges 4, which have therethrough openings or apertures 5, for the passage of U-shaped clips through the looped portions of which are passed wedges 6 to connect and draw the flanges together when adjacent plates are connected. Each of the side-plates 1, have attached thereto bars 7 that are arranged in pairs, the bars being shaped and spaced to provide between the bars ways 8, such ways being in line with the spaces between the longitudinal flanges 4. The bars 7 serve to reinforce the side-plates 1, and provide means for con-

necting thereto a detachable frame that is used more particularly in building a wall by successively molding single blocks.

Both of the side-plates are identical in construction and size so that when placed edge to edge the apertures will register and the connecting means will hold the plates in alinement.

To connect the side-plates to form a receptacle for concrete or cement, I use cross-bars 10 which are placed at suitable intervals to space the side-plates apart and to hold them in position for forming a wall of the desired thickness, and after the cement has set the cross-bars are removed for reuse. The cross-bars 10 which do not form a permanent part of the wall have flanges 11 and slots or apertures 12 for the reception of wedges 13 which abut or contact with the side-plates above and below their vertical flanges, as shown by Fig. 3, and the shoulders on the plate-ties or cross-bars 10 will bear against the inner faces of adjacent plates. Instead of forming the ends of the plate-ties as shown by Fig. 1, with horizontal flanges and a central web, the same may be made from a cross-bar 10′ see Fig. 7 and with such form of bar the slots 12′ will be extended and a spacing wedge 13′ with steps will be used, such construction or arrangement being used with outer wedges 13, which have one straight face and the other inclined, by the use of the step-wedges 13′ and the long slots means are provided for varying the distance between the plates and the thickness of the wall.

The plate-ties 10, have their horizontal flanges cut away to form recesses 14 to hold in place division plates 15, used in the construction of hollow walls. In constructing hollow walls it is desirable to use wall-ties and with the structure shown by Fig. 1 I use wall-ties as shown by Fig. 6, such ties 16, being made of a flat strip of metal the ends being slitted and bent in opposite directions, and in practice these ends will be positioned so as to lie about midway between the sides of the hollow wall. In using the ties 16, they may rest upon the plate-ties 10 and between the vertical plates 15.

In connection with the side plates 1, I use corner sections 17 which are made up to carry or have attached thereto lever supports 17′ which are cut away or shaped to receive the fulcrum of a lever 18, the short end of the lever being adapted to engage with a slotted piece 18′ secured to one of the side-pieces 1, the slot having enlarged ends to admit of a headed pin on the short arm of the lever being passed through to engage the narrower portion of the slot. The part 18′ may extend from one end flange of a plate to the other end, or it can be attached to one end flange and engage with the bars or braces 7.

The corner sections of the mold may be made so that the wall exteriorly will project, and in every instance there will be present vertical flanges to which the side plates are attached by means of U-clips and wedges.

In building hollow walls it is desirable that the sides thereof shall be connected by wall-ties and a preferred form of wall-tie is shown by Figs. 4, 5, 8 and 9 which consists of a tube 20, both ends of the tube being slitted and bent to provide parts 21 the ends 21′ of which are bent so that the opposite ends 21′ will extend one toward the other, as shown, and other parts 22 are bent toward the center and are cut away to provide inward projecting portions with which the ties 10, for the side-plates may engage to center the ties thereon, or to receive the threaded ends of conical sockets 23, the larger ends of the sockets having an opening through which are passed headed slides 24 that are provided with slots 25 for the passage therethrough of wedges 13, that impinge against the plates 1, as shown in Fig. 3 of the drawings. The wall-ties 20, and 16 have formed therein recesses 26, for the reception of plates 15 that form the inner walls of the molds in making hollow walls.

A hollow wall or a section thereof may be molded by using two side plates and an end plate 27, which in use will be attached to an end of the side plates by U-shaped clips and wedges, as shown by Fig. 14, and to provide means for connecting the sides 1, I provide a frame that comprises on each side bars 28 that may be seated in and secured between the flanged bars 7 attached to the outer faces of the side-plates 1, the bars 28 extend above the side-plates 1 and are provided with bolt holes through the parts that extend upward and to the bars 28 there is secured a transverse bar 29 and arms or links 30 which are pivotally connected or bolted to the upper ends of the bars 28 and are in turn connected to crossed arms or links 31 which are pivoted to the upper ends of vertical bars 32 which are fastened to the inner faces of the core plates 15, such bars 32 having formed therethrough slots 33 for the reception of studs 34 on the lower ends of the links 31. The links at their point of intersection are connected pivotally to an internally threaded nut 35 through which passes a screw 36 that has above its threaded portion a collar 37 which by engagement with flanges 38 on a plate 39 holds the screw against longitudinal movement and the screw is turned by the handle 40 that is fast upon the upper end of the screw. The plate 39 which extends across the mold has its ends bent, one end being formed into a hook 41 and the other end extends downward to receive a screw or bolt 42 the end lying under the outward extending flange on the outer side plate 1. When the parts shown by Figs. 9 and 14 are posi-

tioned as indicated the inner mold plates 15 will bear in the recesses 26 formed in the wall-tie 20 and the upper edges will abut against the lugs 43, which depend from the cross-plate 39.

After cement has been placed between the inner and outer plates and has set or hardened the cross bar or piece 39 is released so that it may have a slight upward movement when the screw is turned, sufficient to release the plates 15 from the recesses in the tie having the recess 26 and when the screw is turned to move the nut upward which movement causes the ends of the crossed links 31 to approach each other first moving the inner mold plates upward and then inward and the lower ends of the outer plates outward thus loosening the plates from the cement so that the mold may be raised, but prior to turning the screw the bolt 42 is loosened and the hook detached to admit of a limited movement of the outer plates.

In many instances it is desired to roughen or score the inner face of the wall and to shape the outer face, the inner face being roughened to receive plaster and the outer face a stucco or other finish or shape, as in imitation of stone, to accomplish this end the inner plate may be overlaid by a grille or screen attached to end strips 44, see Fig. 9, which will overlie the vertical flanges of the plate 1 and be attached thereto by clips and wedges. The outer plate is also provided with a shaping plate to give the desired finish to the outer face of the wall and such shaping plates 45 and scoring frames 46 are applicable to assembled side plates when used in the construction of either solid or hollow walls.

In case it should be desired to use the means illustrated by Figs. 9 and 14 in molding a solid wall, as for a foundation or footing I may disconnect the links 31 from the links 30, removing the crossed links 31 and the cross piece 39, and after the removal of these parts the outer ends of the links 30 are attached to the cross-bar 29 serving when connected to hold the sides 1 in parallel alinement for use. When such parts are used, the inner plates 15, bars 32 and cross piece 39 will not be used and the bars 30 are attached to the ends of the bar 29 the upper ends of the mold plates will be held in parallel alinement.

It is often desirable to form grooves or recesses in the outer face of the wall to imitate blocks of stone and to form such recesses I use either strips 47 or 48 as shown by Figs. 11 and 12, which are placed between the mold plates so that parts may extend inward and indent the concrete or outer wall opposite the joints between the mold plates. The strip 48 has a flange 49 with openings which are spaced to register with the openings through the flanges of the plates 1, and when secured in place will cover the joint between the plates, the strips are used both vertically and horizontally, and when used a scoring plate 44 Fig. 10 will be used between the joints of the rear plate in order that the connected plates on both sides may be of the same length. When a strip 47 is used the ends are notched and such reduced ends will be overlaid either by a ring 50, as shown in Fig. 5, which will abut against the flange of the plate tie 10 or as shown by Fig. 4 against the ends of the parts 23. When the strips 47 are used to form recesses in the face of the outer wall scoring means 46 will be used on the inner faces of the plates 1 that form the inner face of the mold.

The parts herein described form a complete outfit for constructing either hollow or solid walls of the desired thickness, for footings, foundations and partitions which may be solid while the external walls will be hollow, and in constructing buildings no outside scaffolding will be required, which materially reduces the costs.

The concrete may be poured or used in plastic condition to be tamped while being placed in the molds, and when the cement has set in the trough-mold made up of a series of connected plates, the lower plates are disconnected from those above by removing the clips and wedges and levers 18 are caused to engage the fulcrum plates 17′ and the slotted plates 18′, the levers are moved simultaneously outward and carry the plates beyond the flanges and then by raising the levers the position of the plates may be changed to rest upon those above and after being clipped and wedged in place are ready to receive cement. The bars or means for holding the plates may be left in the wall until it is hardened and when in place carry a greater portion of the weight of the molds, a part also being carried by the wall ties 20. Often it is desirable to use a short or half plate in order that the joints on the different rows may break joints as shown by Fig. 13, and such a short section may be used and is preferably constructed as shown by Fig. 9 of the drawings.

To close the openings between the ends of the plates 15, 15, I use T-bars 51 which are of a length to engage with the underside of the tie-bars 10 or 11, the flange of the bars are passed through the spaces between the plates and then bars 52, which are elliptical in cross section are passed through openings 53 through the flanged bars 51 and when turned will jam against the inner faces of the plates 15 to prevent the same buckling or bending, see Figs. 1, 15 and 15ª. As the openings 53 extend through the center flanges and the bars 52 are about the same width as the circular openings such bars when turned from a horizontal position will bear against the inner face of the plates 15 and

the side of the opening farthest from the point of contact.

The bars 52 may have an opening therethrough for the reception of a bar or rod for turning the same or a handle 54 may be attached to the bar.

In a mold as shown by Figs. 1 and 9, the end plates 27 will have slots 27′ for the passage of longitudinal tie bars 27″.

The construction of the several parts may be modified or changed as it is desirable in the make up of both single molds that are used in building walls from rather stiff cement which is tamped or rammed, and in connected forms for building walls from cement of a consistency that it may be poured to use as far as possible stock material cut and shaped in proper form.

The leading idea of my invention is to provide means for constructing walls by the use of one set of molds which can be used to make footings or foundations, hollow exterior walls and solid thin partition walls by merely varying the length of the mold-ties or connecting bars between the vertical plates of the molds.

With the means illustrated it will be unnecessary to erect exterior scaffolding as the molds may be manipulated entirely from platforms sustained by the floor beams which are put in place as the construction of the walls progress.

I claim:

1. A sectional mold for concrete wall construction comprising similar metallic wall-plates each having marginal projecting flanges provided with apertures positioned beyond the outer face of the wall-plates, recesses in the wall plates between the ends of the flanges, means adapted to be passed through the apertures formed by adjacent recesses for maintaining opposite plates in parallel relation and means for connecting adjacent and abutting wall-plates one to the other.

2. A sectional mold for concrete wall construction comprising metallic wall plates having corner and intermediate edge recesses which are spaced at uniform distances one from the other, projecting marginal flanges having apertures therethrough, means engaging the flanges for connecting the wall-plates in longitudinal and vertical alinement, tie-bars which pass through the recesses and associate opposite wall-plates and maintain the same in parallelism.

3. A sectional mold for concrete wall construction comprising rectangular wall-plates having projecting flanges with apertures therethrough, corner and intermediate recesses located between sections of the flanges, means for detachably connecting the wall-plates in longitudinal and vertical alinement, tie-bars adapted to extend beyond the wall plates said tie-bars having slotted ends for the reception of wedges and with shoulders that bear against the inner surfaces of adjacent wall-plates.

4. A wall mold of the character described comprising spaced series of mold plates each plate being rectangular in form and provided with outward projecting flanges, notches formed in the upper and in the lower edges of the mold plates, openings through the outward projecting flanges of the mold plates, means for engagement with the projecting flanges of the plates adjacent to the openings therethrough to connect adjacent plates and ties which engage opposite plates in said notches to associate them in parallel relation with each other.

5. In combination, means for molding a hollow wall, consisting of side members connected by a tie-bar which has formed therein recesses which are spaced to register with the aperture through the wall, inner plates which are maintained in position by engagement with the ties when associated, and a wall-tie comprising a hollow body portion having apertures formed through the tie and located between its end portions to register with the recesses on said tie bar, said wall-tie being for use in association with said tie-bar.

6. In combination with inner and outer mold plates for use in constructing hollow walls of concrete, a wall-tie consisting of a hollow body portion having recesses formed therein to receive a portion of inner mold plates, and projections integral with the wall-tie for anchoring the wall-tie in the walls.

7. In a mold, side wall plates comprising a series of metal panels provided on the side edges with projecting flanges, means for securing the projecting flanges together, means for indenting the concrete located between adjacent plates and maintained in place by the means for securing the flanges on the plates together.

8. In combination with a sectional mold, outer wall-plates which are adapted to be connected one to the other, inner wall-plates, means for associating the upper ends of the inner wall-plates in parallel relation with the outer wall-plates, a hollow wall-tie having openings to receive the lower ends of the inner plates and a mold-tie which passes through the hollow wall-tie and is removably associated with the outer mold-plates.

9. A sectional mold comprising plates shaped to provide the same with marginal flanges that extend outward and have a length less than the portion of the plate from which they project to provide between adjacent plates when associated recesses for tie-bars, means engaging the flanges of adjacent plates for connecting like plates together, ties for holding in parallel relation inner and outer mold plates said ties having

formed therein intermediate recesses and inner plates which are held in proper relation to the mold plates by engagement with the ties adjacent to the recesses.

10. As a new article of manufacture a hollow wall-tie having formed therein recesses to receive mold-plates and end extensions formed integral with the tie to extend laterally therefrom and removable means associated with the tie to engage with mold plates.

11. In combination with a sectional mold comprising outer wall plates which are adapted to be connected, means for connecting the outer wall plates, a hollow wall-tie associated with the outer wall plates of the sectional mold and provided with intermediate cut away portions and means for securing the ties in the walls, inner wall plates which are adapted to engage with the cut away portions of the ties to be spaced and supported thereby.

12. Mold plates for use in constructing hollow walls of concrete comprising a plurality of metal plates having flanges which project therefrom a portion of the plates adjacent to the ends of the flanges being removed to provide spaces between connected plates to receive tie-bars, and openings through the flanges to admit of the passage therethrough of means for connecting the plates.

13. In combination with mold plates for forming hollow walls, a wall-tie provided at its ends with inward projecting portions for engagement with a mold plate tie, said wall-tie having in opposite sides recesses to receive the ends of inner mold plates, a flanged mold plate tie which is recessed so that the recesses therein will register with the recesses in the wall-tie when the ties are associated, shoulders for engagement with the inner faces of the outer mold plates and means that engage with the mold tie and the outer face of the outer mold plates.

14. In combination with inner and outer mold plates a hollow wall-tie provided with apertures through an intermediate portion of said tie, and anchoring means at the ends of the wall-tie, a mold tie of greater length than the wall-tie and provided with recesses which are spaced to register with the apertures through the wall-tie when the ties are associated; the wall-tie spacing the inner mold plates and the mold tie engaging the outer mold plates.

15. In combination with horizontal series of mold plates, lever supports having notches adapted to serve as fulcrums for levers attached to end mold plates, a longitudinally slotted and outward extending lever engaging plate attached to the mold plates adjacent to the end plates, and a lever for detachable engagement with the parts attached to the mold plates.

16. In combination with mold plates provided with outward projecting marginal portions having apertures therethrough, means which pass through the apertures for connecting adjacent plates, a lever support having a notch adapted to serve as a fulcrum for a lever attached to one of the mold plates so that the lever engaging portion will be positioned beyond the outer surface of the mold plate to which it is attached, a plate attached to an adjacent mold plate to extend outward therefrom said plate having a horizontal slot therethrough, and a bent lever having studs for engagement with the fulcrum plate and the slotted plate.

17. A sectional mold for use in the construction of concrete walls comprising exterior mold-plates or units of like construction and size each mold-plate or unit having apertured marginal flanges, means for indenting the exterior of the wall comprising bars having heads which overlie the joints between adjacent plates, means for spacing the opposite mold-plates to correspond with the plates carrying the wall indenting means, means including tie-bars for connecting the exterior mold-plates and means for connecting the exterior wall-plates with the indenting means and with the spacing means.

18. In combination with metallic mold plates provided with outward projecting flanges having apertures therethrough, means for connecting the plates, a plate adapted to serve as a fulcrum for a lever attached to one of the horizontal series of the mold plates, a horizontally slotted plate with which one end of the lever engages attached to one of a series of the mold plates to be out of vertical alinement with the fulcrum of the lever, and a lever having studs to engage the fulcrum and the slotted plate the long arm of the lever being of a length to extend from the fulcrum to a point above the upper edge of the upper series of mold plates when the fulcrum and the short arm of the lever engages with the slotted plate.

19. A sectional mold for use in the construction of concrete walls, comprising a plurality of outer wall-plates of like construction and size, end mold-plates of like construction but of one-half the length of the plates with which they are associated; for the purpose of breaking the vertical joints between superimposed outer wall-plates, the end mold plates having attached thereto projecting notched lever supporting plates to provide fulcrums for levers and the adjacent mold plates provided with projecting portions having horizontal slots therethrough, and levers for engagement with the fulcrums and the projecting portions having horizontal slots therethrough.

20. The combination with a sectional mold

for use in the construction of concrete walls comprising a plurality of outer wall-plates, and plates of one-half the length constructed to provide continuations of a line of connected wall plates to locate the joints of adjacent plates out of vertical alinement, of means adapted to be associated with the shorter plates to provide fulcrums for levers and means associated with the plates for engagement with the end of a lever, and a lever which is adapted to engage with an upper and lower plate to transfer the lower plates so as to rest upon the upper plates.

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