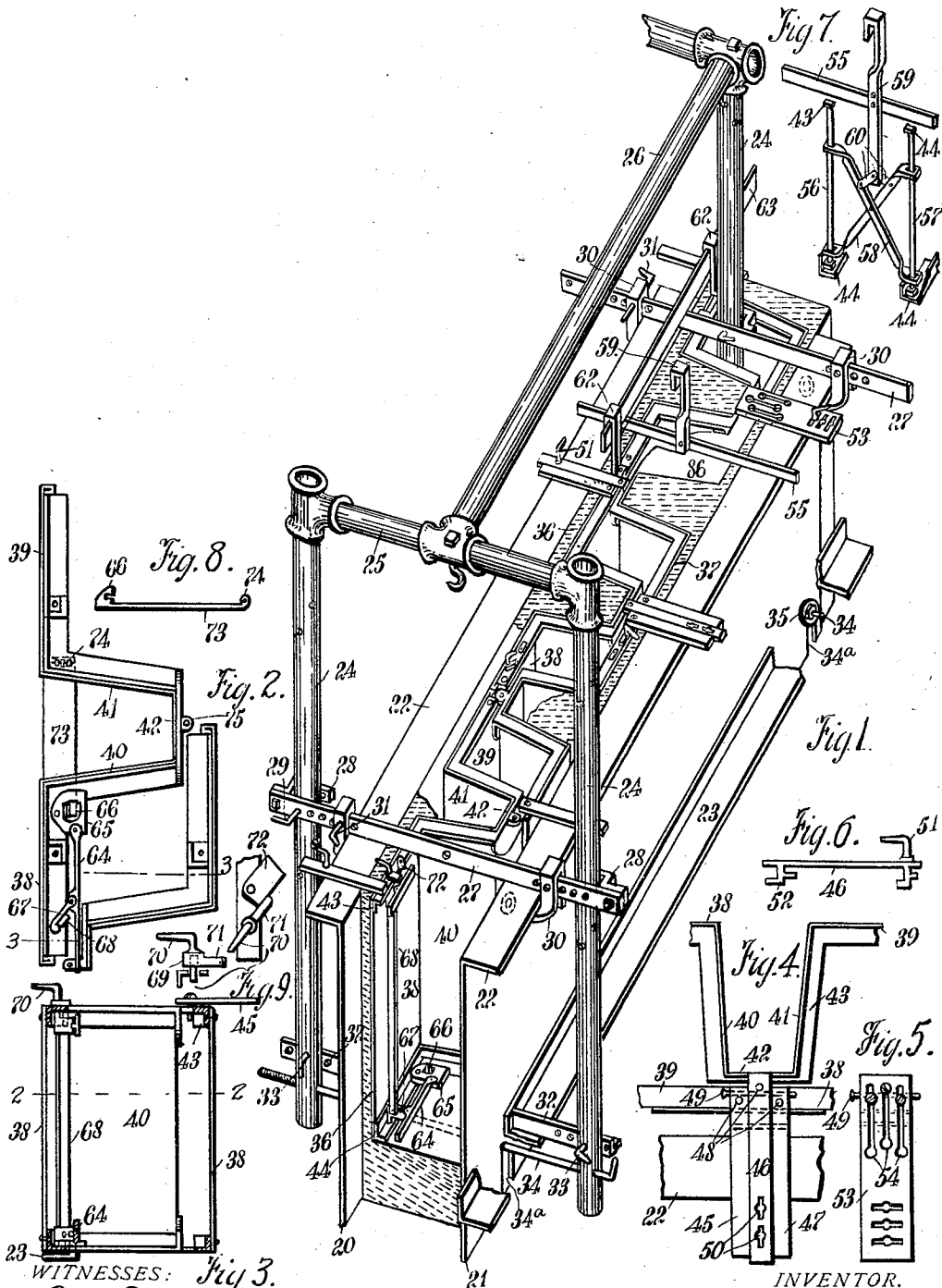


E. A. ISLES.
MOLD FOR MAKING CONCRETE WALLS.
APPLICATION FILED JAN. 27, 1910.

1,077,079.

Patented Oct. 28, 1913.

2 SHEETS—SHEET 1.



WITNESSES: *Fig. 3.*
J. P. Davis
C. R. Rollhaus

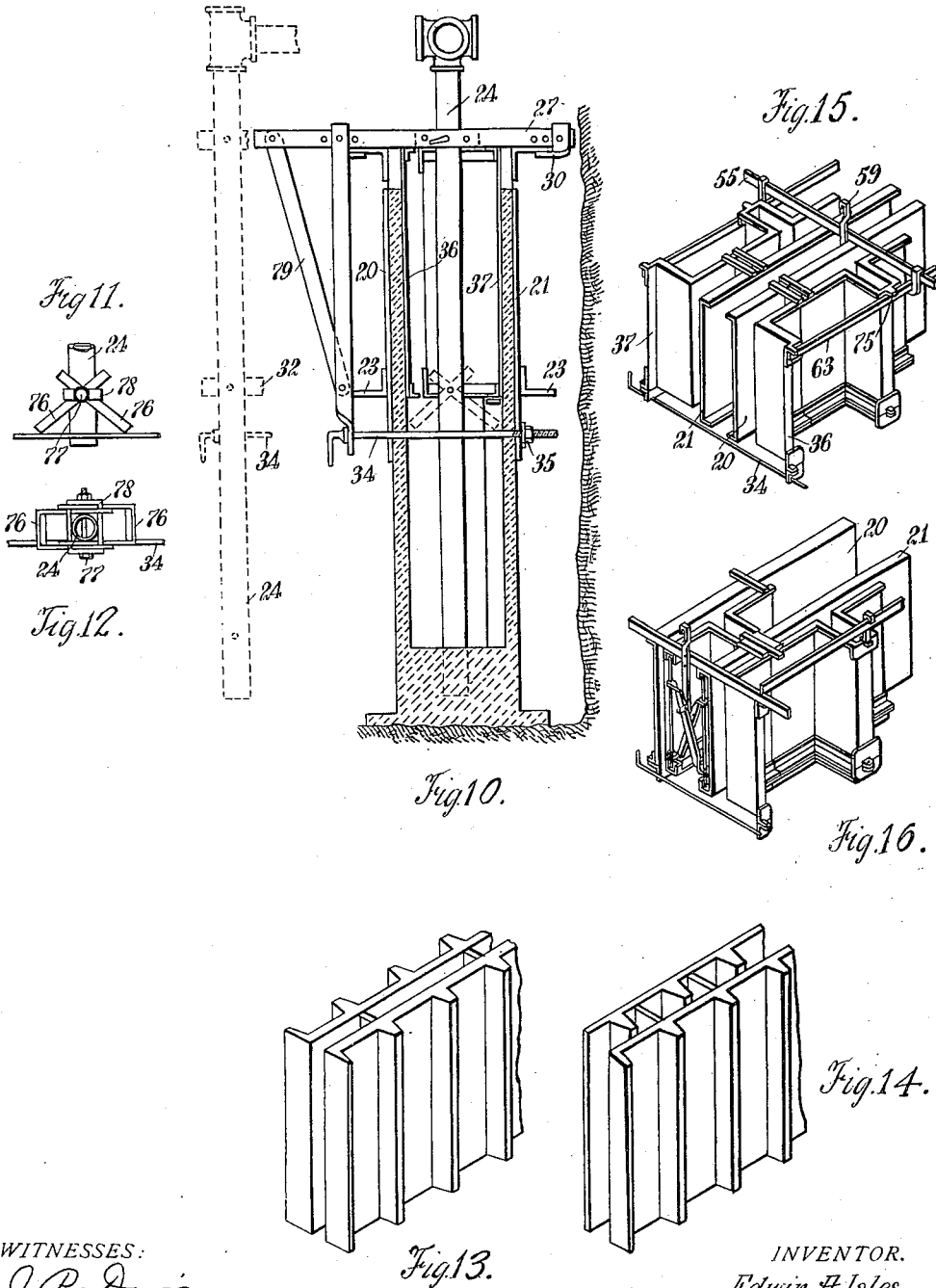
INVENTOR.
Edwin H. Isles
BY *Munroe*
ATTORNEYS

E. A. ISLES.
MOLD FOR MAKING CONCRETE WALLS.
APPLICATION FILED JAN. 27, 1910.

1,077,079.

Patented Oct. 28, 1913.

2 SHEETS—SHEET 2.



WITNESSES:
J. P. Davis
E. L. Rollhaus

INVENTOR.
Edwin H. Isles
BY *Mum Co*
ATTORNEYS

UNITED STATES PATENT OFFICE.

EDWIN A. ISLES, OF NEW YORK, N. Y.

MOLD FOR MAKING CONCRETE WALLS.

1,077,079.

Specification of Letters Patent.

Patented Oct. 28, 1913.

Application filed January 27, 1910. Serial No. 540,353.

To all whom it may concern:

Be it known that I, EDWIN A. ISLES, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented new and Improved Molds for Making Concrete Walls, of which the following is a full, clear, and exact description.

My invention relates particularly to a machine or mold for use in the forming of concrete floors, walls, partitions and the like.

My improved mold is of that type in which the walls of the mold are raised successively as the wall is built up in thickness, and may or may not be supported by the lower portion of the wall already built.

My improved mold is adapted for the manufacture of walls in which air spaces extend continuously horizontally through the wall, in contradistinction from walls in which separate and isolated air spaces are formed by the use of separate cores.

Although the parts of the mold may be combined for making different types of walls, yet the mold in its preferred construction is designed for manufacturing a monolithic wall having a Flemish bond. In other words, a wall in which there is an interior chamber into which extend flanges or projections from the sides, said flanges or projections being so arranged as to bind the sides together, and to provide continuous vertical and horizontal passages.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, and in which—

Figure 1 is a perspective view of a portion of a wall with my improved mold in operation; Fig. 2 is a horizontal section through a portion of the mold, said section being taken on the line 3—3 of Fig. 3; Fig. 3 is a vertical section on the line 4—4 of Fig. 2; Fig. 4 is a top plan view of a portion of the mold, showing the spacing means and the means releasing and collapsing the wall sections of the mold; Fig. 5 is a detail view showing another form of spacing means; Fig. 6 is a detail showing in side elevation, one of the spacing members shown in Fig. 4; Fig. 7 is a perspective view of one of the spacing devices used between the two inner wall sections of the mold; Fig. 8 is a side elevation of the spacing member shown in plan in

Fig. 2; Fig. 9 shows in plan and in side elevation, a fastening member used for connecting the sections; Fig. 10 is a vertical section through a wall showing the mold-supporting devices disposed within the wall; Fig. 11 is a side elevation of a clamping device illustrated in Fig. 10; Fig. 12 is a top plan view of the parts shown in Fig. 11; Fig. 13 is a perspective view of a wall having the flanges or buttresses extending outwardly from the outer surface of the wall rather than extending into the interior chamber; Fig. 14 is a perspective view of a wall having one side of flanges or buttresses extending outwardly and one set extending inwardly; Fig. 15 is a perspective view of a portion of a mold for forming the walls shown in Fig. 13; Fig. 16 is a perspective view of a mold for forming the wall shown in Fig. 14.

My improved mold includes four wall sections, which extend lengthwise of the wall and may be made of any height desired. Two of these wall sections are preferably straight and the other two have vertical corrugations. The separate wall sections may be combined in different ways to form different kinds of monolithic concrete walls. By placing the straight sections upon the exterior and placing the corrugated sections therebetween with the corrugations of one spaced alternately with the corrugations of the other, a monolithic concrete wall having a Flemish bond may be produced, as illustrated in Fig. 1. By arranging the two corrugated walls upon the exterior, a wall may be formed with exterior flanges or corrugations, as illustrated in Fig. 13. By arranging alternately the straight and corrugated wall sections, a wall may be built with one smooth surface and one flanged or buttress surface, as illustrated in Fig. 14. The mold is used preferably for forming the wall with two smooth outer surfaces, and in Fig. 1, I have illustrated the parts combined and arranged for forming such a concrete wall. The two outer wall sections 20 and 21 are preferably formed of sheet metal, or at least, they present a sheet metal working face. As illustrated, they are each formed of a sheet with its upper edge 22 bent over to form a reinforcing flange, and also to form a level upper surface. Adjacent the lower edge of the wall, an angle iron 23 is secured thereto for

reinforcing the mold wall at a point above the lower edge of the latter. These two outer mold walls 20 and 21 are held rigid in respect to each other and are clamped
5 against the sides of the portion of the wall already constructed.

The wall sections may be supported from the concrete wall being built and may carry uprights, or they may be supported by
10 these uprights. As shown in Fig. 1, I employ a plurality of posts 24 formed of tubing and rigidly connected together. The posts may be arranged in pairs and connected together at the top by transverse
15 members 25, and these transverse members may be connected by braces 26 extending lengthwise of the wall, but above the constructed portion thereof. Instead of arranging the posts in pairs, a single row of
20 posts may be employed and supported within the hollow space left in the wall. For connecting the posts to the outer side wall sections 20 and 21, I employ a transverse member 27 extending transversely of the
25 wall and resting upon the upper flanges 22. This transverse member, at its outer end, has brackets 28, which receive the posts 24, and suitable pins 29 may extend through the member 27, the posts and the brackets,
30 so as to hold the posts and transverse member rigid in respect to each other. The transverse member 27 carries hangers 30, which are slidable along said member and may be secured against sliding movement
35 by suitable pins 31. The lower ends of the hangers extend beneath the flanges 22, and may, if desired, be rigidly secured to the under sides of said flanges, or may merely rest therebeneath. Preferably, they are
40 rigidly connected.

For connecting the posts to the lower portions of the wall sections 20 and 21, the posts may carry braces 32, which extend inwardly toward the wall sections 20 and 21, and rest
45 upon the flanges of the angle iron 23. The brackets may, if desired, be rigidly secured to these angle irons, and their outer ends may be secured in adjusted position in respect to the posts by suitable pins 33. For
50 preventing the lower portions of the posts from spreading apart, a tie bolt 34 may extend through the concrete wall and through not only the posts 24 but also the side wall sections 20 and 21. The tie bolt may have
55 threaded engagement with the posts, as shown in the lower portion of Fig. 1, or they may have suitable nuts and washers 35 at their opposite ends, if a single post be employed and this post be spaced between the
60 wall sections. To facilitate the lifting of the wall sections independently of the posts, the openings in the wall sections through which the tie bolts 34 extend, are preferably in the form of slots 34^a extending vertically
65 to the lower edge of the wall sections.

As far as the structure of the posts and outer wall sections 20 and 21 are concerned, they might be used in the formation of an ordinary concrete wall having smooth outer
70 surfaces, and, therefore, this portion of the structure might be replaced by other and similar mechanism which would accomplish the same result, although certain of the details above referred to I consider important though not positively essential.

Between the wall sections 20 and 21, I
75 employ two additional wall sections which are spaced apart to leave an air chamber within the wall, and each of these second wall sections is so spaced from its corresponding outer wall section, as to leave a
80 space to receive the concrete. These wall sections 36 and 37, each have vertical corrugations and the corrugations of one inner mold wall are arranged alternately with the
85 corrugations of the other inner mold wall, so that the resulting air chamber will be of zigzag or undulating form and will extend continuously from one end of the concrete wall to the other. The concrete between
90 each inner wall and its corresponding outer wall, will present a smooth outer surface and a flanged inner surface, as is shown in Fig. 1. The inner walls 36 and 37 are preferably subdivided into sections, and each
95 section has two end portions 38 and 39, in alinement with each other, and a corrugation or groove between these end portions. This corrugation or groove is preferably
100 angular in cross section, and has two side portions 40 and 41 and a connecting portion 42. This connecting portion is substantially parallel to the two end portions 38 and 39, and the two side portions 40 and 41 of the
105 corrugation preferably converge toward the connecting portion 42. The portions 38, 39, 40, 41 and 42, may be made of a single piece of sheet metal bent to the desired form, or they may be formed of separate pieces
110 secured together. In any event, they are held substantially rigid in respect to each other. One form of reinforcing means which I may employ for holding the parts rigid, includes angle irons 43 and 44, following the
115 upper and the lower edges of the separate portions and riveted thereto. In forming the wall, as shown in Fig. 1, the portion 42 comes adjacent to the ends of the portions
120 38 and 39 of the sections in the opposite inner wall which in turn are and is spaced from the outer wall permitting the continuous run of concrete which will form the concrete wall between said inner and outer
125 walls. For holding these portions rigid in respect to each other and rigid in respect to the adjacent outer wall 20 or 21, I may employ the construction illustrated particularly in Figs. 4, 5 and 6. In the form shown in Fig. 4, three separate bars 45, 46 and 47
130 are mounted substantially parallel to each

other. The middle bar 46 is connected to the portion 42, while the two outer runs 45 and 47 are connected to the two abutting end portions 38 and 39 of the opposite inner wall. The three bars may carry studs 48, and pins 49 may be inserted transversely between these studs, to prevent relative longitudinal movement of the center bar in respect to the outer ones. Any number of studs may be employed, and they may be spaced at varying distances so as to facilitate a wide range of adjustment. The three bars extend across the top flange 22 of the outer side wall, and the center bar 46 may be provided with openings 50 therethrough, adjacent its outer end. A suitable rotary locking member 51 (see Fig. 6), may be inserted through any one of the openings 50, and by rotating may lock beneath the edge of the flange and hold the bar rigid in respect to the outer wall. Each of the bars may be secured to their respective portions 38, 39 and 40, in any suitable manner. The portion 46, as shown in Fig. 6, has a depending lug or bracket 52 upon one end thereof, which may be interlocked with the portion 42, to hold the bar against longitudinal movement in one direction. Instead of employing the three bars as shown in Fig. 4, I may employ a single bar 53 having slots 54 extending lengthwise thereof. Pins extending upwardly from the portions of the inner walls, may extend through these slots, and the pins may be in the form of set screws to bind the parts to the plate, or they may be in the form of studs or projections and a pin 49 may be inserted between them.

For supporting the inner walls of the mold against vertical displacement, I may, and preferably, do, employ the construction illustrated particularly in Fig. 7. This includes a transverse bar 55, of a length greater than the thickness of the wall and having its outer ends resting upon the upper flanges 22 of the outer walls. Beneath this bar, two vertical rods 56 and 57 may be supported adjacent the opposed sides of the inner walls, and each rod may be secured at its upper end beneath the upper flange 43, and at its lower end upon an angle iron or flange 44, so as to be held rigid in respect to its wall section. Diagonal braces 58 are pivoted together and each has one end mounted upon the rod 56 and the other end mounted upon the rod 57. It is thus evident that if the two braces 58 be moved about their pivots, the rods 56 and 57 must come toward each other. For bringing about this movement of the braces, the transverse bar 55 may carry a vertical arm 59, the upper end of which constitutes a hook to permit the lifting of the device, and the lower end may be connected by pivoted links 60 to the brace rods 58 above the pivots in the latter.

A pulling-up on the bar 55 tends to bring

together the upper ends of the braces, and to thus bring together the two inner walls and move them away from the concrete after the latter has hardened.

To insure the proper alinement of the several inner wall sections and to additionally support the latter, each inner wall section may at the opposite ends of its portions, 38 and 39, have upwardly-extending hook brackets 62, which may engage with a bar 63 extending lengthwise of the wall and itself supported upon the transverse bars 55 and 27. This tends to insure the accurate positioning of the inner walls independently of the spreading action of the mechanism shown in detail in Fig. 7.

The bar 63, as illustrated in Fig. 1, is supported on members 27 which extend transversely of the mold, and is unattached thereto. As shown in Fig. 15, this bar 63 may be directly connected to the mold sections, so as to be carried thereby and to serve as the support for the transverse bar 55.

In order to prevent any of the concrete falling into the air passages, I may provide my improved wall sections with covers or tops, which will extend over the upper ends of the air passages and prevent any accidental dropping of the concrete therein. In Fig. 1, I have shown one of the inner wall sections provided with a segment-shaped cover 86, which fits beneath the transverse bar 55 and which has a slot therein to receive the part 59. If each and all of the inner wall sections be provided with segment-shaped covers of this character, it is evident that all of the air spaces would be covered and the misplacement of the concrete would be prevented. It is evident that the inner wall sections may be adjusted relatively to each other, so as to vary the size of the vertical air passages within the walls. The abutting ends 38 and 39 of the adjacent inner wall sections may be spaced apart by a filling member, or they may be made comparatively narrow, so as to make wide or narrow air passages, as desired. It might here be stated that the part 51 previously referred to, has not only a hook at the lower end, which catches beneath the flange 22 to lock the plate 46 to the latter, but said member 51 also has a projection thereon opposite to the hook and adapted to engage with the edge of the flange 22 for drawing the inner wall section toward the outer wall.

It is evident that a section of concrete wall when built by the use of my improved mold, will present a zigzag passage extending lengthwise of the wall, said passage being formed by the alternate arrangement of the corrugations or projections upon the inner walls. If the entire mold be lifted vertically a portion at a time and more concrete added, it is evident that there would

be no bond extending across the air space. In practice, therefore at the time the walls are raised I preferably move the inner walls longitudinally of the mold a distance equal to the distance between the center of the projection on one inner wall section and the center of the projection on the next inner wall section, so that the projections on one inner wall will be in vertical alinement with the projections which were previously formed by the other inner wall section, the projections extending more than half way through the wall, so that the upper and lower surfaces of each projection will become bonded to the corresponding lower and upper surfaces of two projections extending outwardly from the opposite side, thus forming what is commonly known in the art, as a "Flemish bond."

In order to bridge over the space between the portions 42 and the opposite portions 38 and 39 of the other inner wall, when said sections are moved vertically, I provide a base plate 73, shown particularly in Fig. 8. This plate has an end 74 adapted to be hinged to the under surface of its inner wall section adjacent the intersection of the portions 39 and 41, while the opposite end presents an upwardly-extending catch 66 detachably secured to the same wall section adjacent the intersection of the portions 38 and 39. This catch 66 extends through an aperture in a pivoted plate 65, which plate normally holds the base plate 73 against a downward movement. The plate 65 may be swung longitudinally about its pivot to release the base plate, and to facilitate this longitudinal movement, I connect it to a rod 64, extending lengthwise of the wall. The rod may be connected to the base flange 44 by a link 67, and a rod 68 may extend upwardly to the upper end of the wall section, and serve as a means for swinging the link and reciprocating the bar 64. The rod 68 may have a handle 69 at its upper end, by means of which it is rotated. The handle, as shown particularly in Fig. 9, has an outwardly-extending gripping portion 70 and a catch 71, which may engage with a pivoted dog 72 and be normally held against displacement. For securing together the abutting ends of the portions 38 and 39 of separate sections, the upper and lower flanges may be provided with suitable apertures and any suitable form of connecting bars may be detachably extended thereacross. The portions 42 may have outwardly-extending lugs 75 also designed for attachment to these connecting bars.

In the front portion of Fig. 1, I have illustrated the two uprights disposed upon opposite sides of the wall and supported by the wall. It is evident that these uprights might constitute posts rigidly supported on

the ground, serving as means for supporting the wall sections of the mold. In the rear portion of Fig. 1, and also in Fig. 10, I have illustrated the post as disposed within one of the vertical passageways in the wall. In this case, the weight of the post may be supported from the bottom of the wall or the post may have the fastening means illustrated particularly in Figs. 11 and 12. This fastening means includes two loops 76, 76, pivoted together and each encircling the post, and secured thereto by a pivot pin 77. A band 78 may encircle the post, and both loops, in order to limit the spreading movement of the latter. As the lower ends of the loops 76 tend to spread apart the upper ends of the same swing away from the post. When the post is bodily raised the upper ends of the loops will swing toward the post and grip the same and the lower ends of the loops will swing toward each other and toward the post. Instead of extending the tie rod 34 directly through the post, as illustrated in the lower portion of Fig. 1, the tie rod may extend along one side of the post and the lower ends of the loops 76, 76 would rest on the tie rod and spread out against the inner opposed surfaces of the concrete below the walls 36 and 37. The tie rod 34 may, if desired, be employed for supporting a bracket 79 outside of the wall and upon the upper end of which may rest planking constituting a platform.

As previously stated, the mold walls instead of being arranged in the manner illustrated in Fig. 1, may be arranged with the straight wall sections 20 and 21 upon the inside, and the two corrugated wall sections 36 and 37 may be outside of the straight sections. In Fig. 15, I have illustrated the parts arranged in this manner, and in Fig. 13, I have illustrated a concrete wall resulting from such arrangement of the wall sections of the mold. The straight and corrugated walls may be arranged alternately, as illustrated in Fig. 16, and there will then be formed a wall which presents one smooth exterior surface and one outer surface with vertical corrugations or ridges, substantially as illustrated in Fig. 14.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A mold for forming concrete walls, comprising plane sections suitably and adjustably spaced opposite each other, supporting means carrying the sections in such position, independent corrugated sections positioned between the plane sections, means engaging each plane section and each corrugated section for holding them in relation to each other, thereby forming air chambers and concrete chambers, together with means carried by the corrugated sec-

tions and extending longitudinally thereof and bridging the corrugations in order to permit the said sections to be moved.

2. In combination with outer sections and inner sections forming a mold for concrete walls, of a bar having a depending arm thereon, rods engaging the inner sections and movable members engaging the depending arm and the rods whereby movement of the arm will bring the rods and the sections together.

3. In combination with outer and inner wall sections forming a mold for concrete, of a member having a depending arm thereon, rods carried on adjacent portions of the inner sections, and members slidably supported at one end on the rods, and a pivotal connection between the said members and the depending arm whereby movement of the members with the arm thereon in one direction will cause the said inner sections to approach each other and be withdrawn from the wall when formed.

4. In combination with inner and outer sections forming a mold for a concrete wall, of a member positioned between adjacent faces of the inner sections and supported by the outer sections, and pivoted diagonals in sliding engagement with the inner sections and in movable engagement with the said member, whereby movement of the said member will cause the inner sections to approach each other and be withdrawn from the wall after it is formed.

5. In combination with inner and outer sections forming a mold for a concrete wall, of a transverse bar carried by the outer sections, an arm depending therefrom and positioned between adjacent faces of the inner sections, diagonal members each having one end in engagement with an inner section, the other end of each diagonal being in sliding engagement with the other section, and a link between one of the diagonals and the said depending arm, whereby upward movement of the arm will bring the inner sections closer together and away from the wall.

6. In combination with inner and outer

sections forming a mold for a concrete wall, of a transverse bar carried by the outer sections, an arm depending therefrom and positioned between adjacent faces of the inner sections, diagonal members each having one end in engagement with an inner section, the other end of each diagonal being in sliding engagement with the other section, the diagonals being in pivotal engagement with each other, and a link between one of the diagonals and the said depending arm, whereby upward movement of the arm will bring the inner sections closer together and away from the wall.

7. A mold for forming concrete walls having two opposed independent wall sections, each having vertical corrugations, the corrugations of one wall section being arranged alternately with the corrugations of the other wall section, and a base plate extending across the corrugations of each wall section adjacent its lower end, said base plate being hinged at one side of the corrugation and detachably secured at the other, to permit of the vertical adjustment of the wall section.

8. A mold for forming concrete walls having two opposed independent wall sections, each having vertical corrugations, the corrugations of one wall section being arranged alternately with the corrugations of the other wall section, a base plate extending across the corrugations of each wall section adjacent its lower end, said base plate being hinged at one side of the corrugations and detachably secured at the other, to permit of the vertical adjustment of the wall section, and means adjacent the upper end of the wall section for releasing said last-mentioned end of the base plate.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWIN A. ISLES.

Witnesses:

CLAIR W. FAIRBANK,
PHILIP D. ROLLHAUS.