C. H. SCHUB.

SECTIONAL MOLD FOR CONCRETE CONSTRUCTION.

APPLICATION FILED MAY 4, 1910. RENEWED MAR. 13, 1917.

1,250,032. Patented Dec. 11, 1917.

3 SHEETS—SHEET 1.

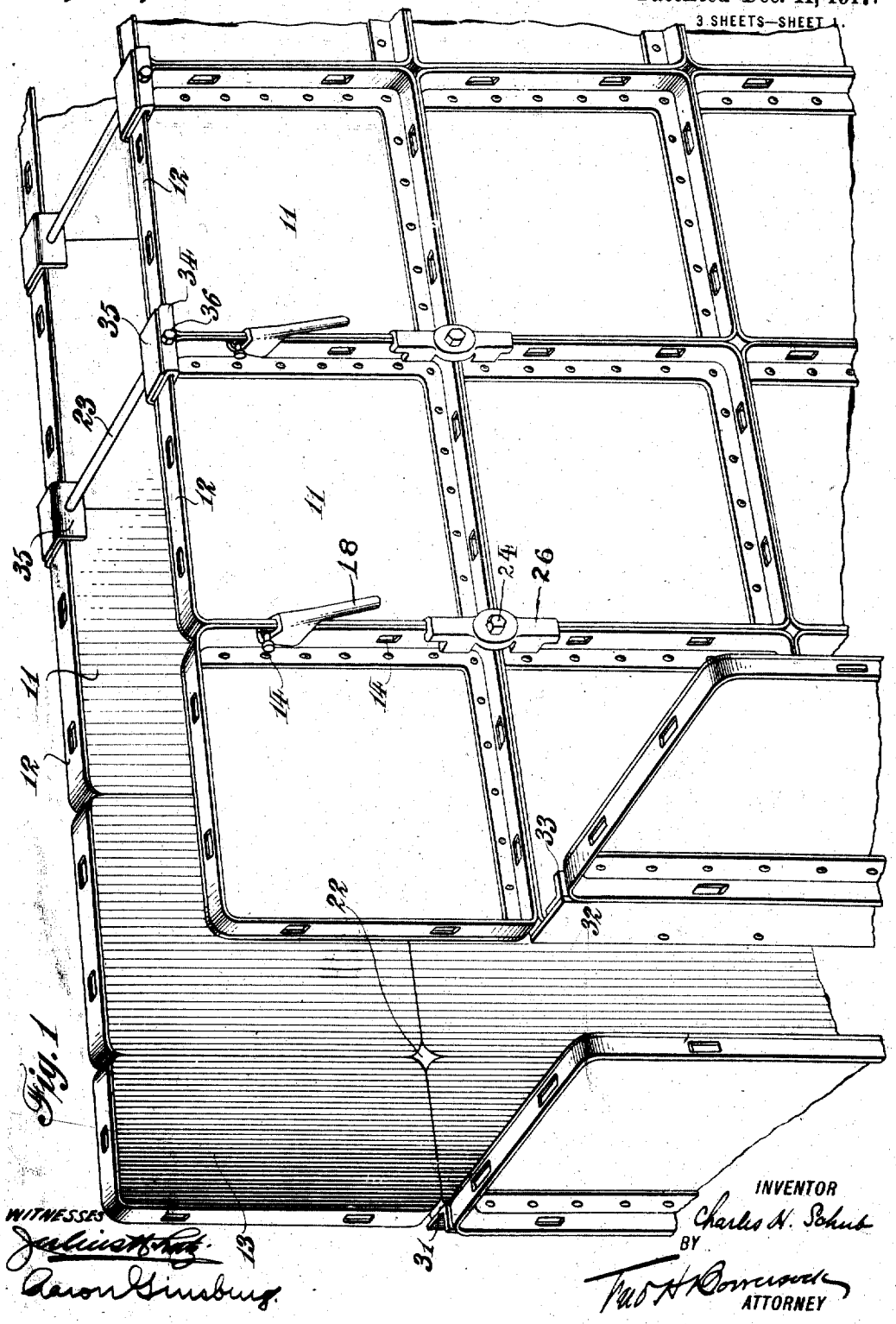


Fig. 1.

WITNESSES

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Aaron Ginsburg.

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3 SHEETS—SHEET 2.

Fig. 2

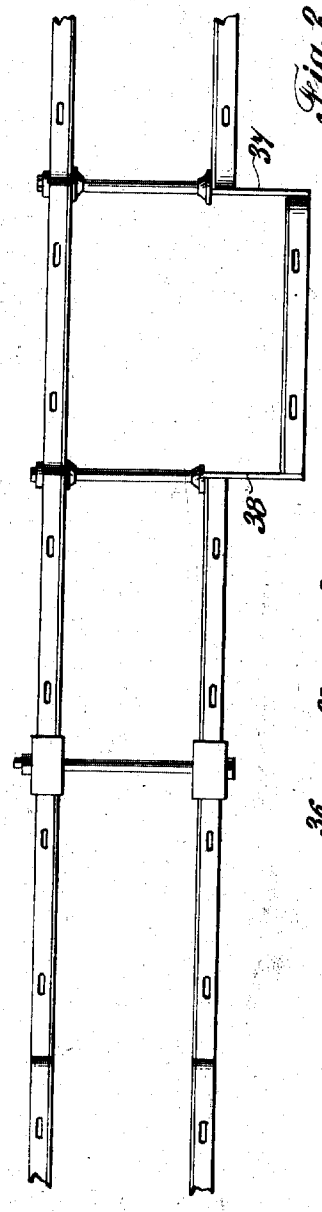
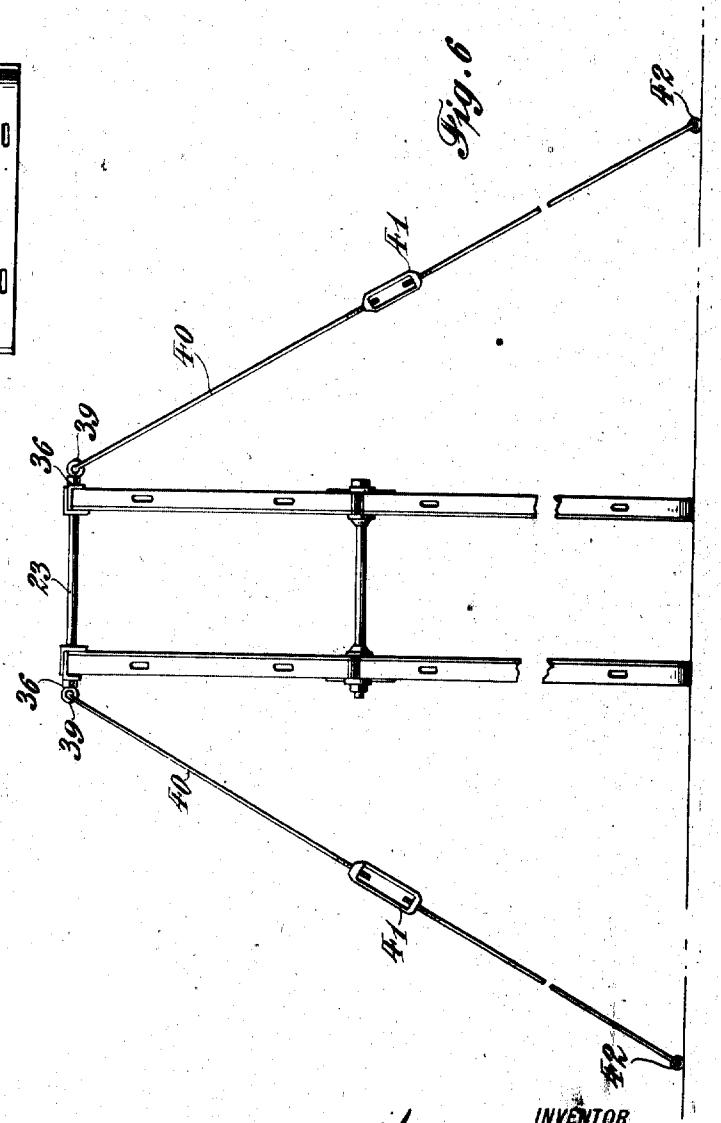


Fig. 6



WITNESSES

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3 SHEETS—SHEET 3.

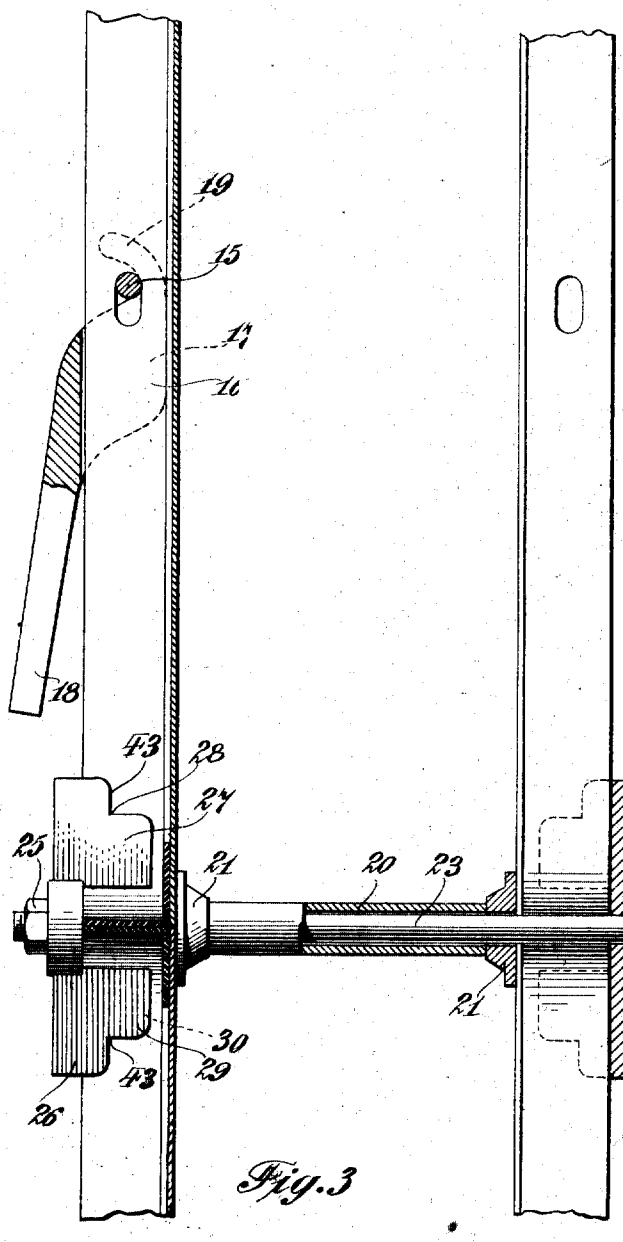
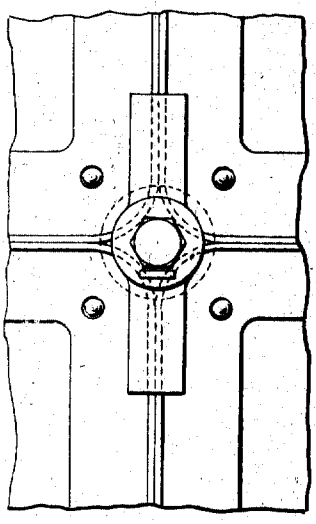


Fig. 3

Fig. 4



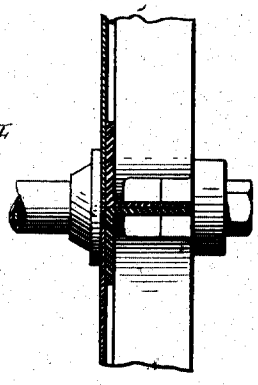


Fig. 5

WITNESSES

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UNITED STATES PATENT OFFICE.

CHARLES H. SCHUB, OF NEW YORK, N. Y.

SECTIONAL MOLD FOR CONCRETE CONSTRUCTION.

1,250,032. Specification of Letters Patent. Patented Dec. 11, 1917.

Application filed May 4, 1910, Serial No. 559,299. Renewed March 13, 1917. Serial No. 154,593.

To all whom it may concern:

Be it known that I, CHARLES H. SCHUB, a citizen of the United States, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Sectional Molds for Concrete Construction, of which the following is a specification.

This invention relates to apparatus for molding walls, partitions and other parts of what are known as cement or concrete buildings. As is well known in this art, these concrete walls are generally constructed by first setting up a reinforcement, usually consisting of suitable horizontal and vertical steel or other metal rods, sometimes fastened or secured together, and then providing on both sides thereof suitable temporary forms or retaining walls which make up a mold into which is poured the cement concrete or other plastic and self-hardening material, in its semi-fluid state, which, upon hardening, forms the desired wall or the like, which may or may not be provided with a reinforcement as aforesaid. After the cement or concrete has hardened, the temporary partitions referred to are removed and the wall smoothed or otherwise finished.

As a rule, these temporary forms constituting the mold-walls are built up to the height of one story, and after the molding operation and the hardening of the cement or concrete, they are, upon being removed, again adjusted for the molding of the wall of the next succeeding story.

So far as I am aware, ordinary wooden frames are most generally employed for this purpose, these frames being made of a plurality of planks or boards which are cleated, clamped or otherwise secured together in any suitable temporary manner, whereby they may be removed and again set up in another location.

The principal object of the present invention is the provision of a sectional mold, comprising a plurality of metal units in the form of plates, said units being provided with means to facilitate their being readily assembled to form the side walls of the molds to which I have referred, and suitably secured together, said means also insuring the desired configuration and alinement of the mold as a whole. Different sizes of units may be provided in order to adapt the completed mold for any desired length and height of concrete wall-section, and a further object of the invention is to provide units of such a character that through the employment of simple auxiliary plates corners may be turned, the wall may be widened or narrowed either horizontally or vertically, pilasters or columns may be provided for, and the system otherwise made to substantially perfectly provide for all the requirements of the construction of walls of this character.

My invention will be more readily understood by reference to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a perspective view of a sectional mold embodying my invention with the parts thereof assembled and some of them clamped or locked together;

Fig. 2 is a top plan view on a slightly reduced scale, showing the manner in which a wall may be horizontally widened or narrowed, and a pilaster or other projection or depression provided for;

Fig. 3 is an enlarged vertical section of a portion thereof, showing the clamping or locking means for securing the sections together;

Fig. 4 is an enlarged side elevation, showing the corner locking device;

Fig. 5 is a sectional top plan view of Fig. 4, and

Fig. 6 is a view of the preferred means for bracing the entire mold as a unit.

As hereinbefore suggested, my mold comprises a plurality of sections of different sizes but corresponding in at least one dimension, the sections of the same size being identical in all respects. Each side wall of the mold is most largely made up of a plurality of sections which I prefer should be about two feet square. These sections are best shown in Fig. 1, and a detailed description of one thereof will suffice for all.

Each of these sections is made up of a comparatively thin metal plate 11, having deformed corners, preferably rounded, and which is provided around its entire edge with the rectangular flange 12. Where iron or steel is employed for the plate 11, these flanges 12 are preferably provided by suitably securing angle bars to the edge of the plate and this at the present time is my preferred construction, but it will be apparent that if other metal is employed the plate 11 may be integrally flanged.

It is of great importance that these flanges be rectangularly disposed with reference to the body of the plate and be as nearly true as possible. These plates are designed to be placed edge to edge, and when the abutting flanges of two or more plates are tightly clamped together, the plates should lie in a right plane.

It is well known, of course, that the dimensions of walls as to length and height differ materially, and it will be apparent that in order to provide a mold for a wall of any given dimensions, a plurality of square sections, such as the plates 11, will either prove too short or too long for the desired purpose. I therefore provide a plurality of sections of the same height, but of less width, such as the section 13, so that I may thus provide a mold of practically any given length. It will be apparent that these narrower sections, such as the section 13, may, by turning the same upon their sides, be employed to vary the height as well as the length of the desired wall section.

Primarily for the purpose of temporarily securing two or more of these sections together during the process of assembling the same, I provide in each side flange of each section preferably two holes 14, one located near each end thereof and these holes being adapted to register with corresponding holes in the flange of another section when two sections are placed edge to edge. Through any pair of registering holes I insert a pin 15, the ends of which project to each side of the two juxtaposed flanges. I then employ a temporary or preliminary clamping device (best shown in Figs. 1 and 3) which comprises a pair of wings 16 and 17, slightly inclined or V-shaped with reference to each other, these wings being preferably integrally mounted upon the handle-lever 18 and each thereof provided with the hook 19 at its extremity. These wings 16 and 17 are so disposed with reference to each other as to permit the hooks 19 to pass on the sides of the two juxtaposed flanges and around the projecting ends of the pin 15, which pin provides a fulcrum for the use of this clamping device as a lever, the handle 18 being forced toward the plates to tightly and firmly wedge the two flanges between the inclined inner faces of the wings 16 and 17. In this manner, the two juxtaposed flanges are tightly clamped together in an insured proper position, and, as suggested, the plates 11 brought into a right plane. Obviously, as many of these clamping devices may be employed as may be necessary or desirable to build up or assemble the wall.

While I have referred to these clamping devices as being "temporary or preliminary," it will be apparent that they may be left upon the completed structure if desired, to give additional strength and rigidity. For many apparent reasons, however, additional means should be provided to give rigidity to the structure and, furthermore, means must be provided to retain the two walls at a fixed and the desired distance from each other. Where tie-rods are employed, which pass across the interior of the mold for the purpose of securing the forms or side walls at a fixed distance from each other, it will be apparent, first, that some provision must be made for the removal of at least a portion of such rods, in order that the sides of the hardened concrete may be finished and no projections of metal or other substances remain; second, that such bracing or supporting means must be to the smallest possible extent interferent with the employment of these temporary forms as opposite walls of a mold—in other words, that each side of the mold should be as nearly as possible a plane flat surface, without undesirable depressions or projections; third, that such bracing or retaining means should be capable of ready and easy adjustment and equally ready and easy removal when the mold is to be dismantled; fourth, that such bracing and retaining means should also tend to augment the rigidity of the entire structure through providing more dependable means for clamping the sections together, through their flanges, as well as bracing the two walls with reference to each other.

To accomplish the above, I provide a metal tube or sleeve 20, slightly less in length than the desired width of wall, to which, if desired, may be fastened or secured the vertical or the horizontal—or both—members of the rods or bars which make up the reinforcement to which I have hereinbefore referred. Therefore, this tube or sleeve 20 is designed to remain in the concrete when the latter hardens, and forms a part of said reinforcement, said tube or sleeve being completely embodied in the concrete.

At each end of said tube I provide the partly tapering or cone-shaped washer 21 which, when placed, at each end of said tube or sleeve, increases the length of the latter to the exact width of wall desired, and, therefore, to the exact distance between the opposite sectional forms.

I have already referred to the fact that each of the sections which are joined to provide the mold, has deformed and preferably rounded corners. This not only augments the strength of the plate, but it will be apparent that when two pairs of said plates are placed edge to edge, there will be an opening at the one common corner (as shown in Fig. 1 and designated by the numeral 22), through which may be passed any desired form of tie-rod or tie-bolt. While I have shown these plates provided with rounded corners, it will be apparent that while possibly not to so great an extent augmenting the strength of the plate, each of these corners may be diagonal, or, if rounded, a curve be reëntrant or otherwise deformed, the essential idea being to provide an orifice at each common corner of the assembled sections. The tube or sleeve 20, with its abutting washer 21, is so located with respect to the plates, that the tie rod or bolt 23 may be passed through the orifice provided at a common corner of the assembled plates and through said washers and the tube or sleeve. One end of this rod 23 is provided with the usual head 24, and the other end screw-threaded for the reception of the nut 25.

I also provide, loosely placed over each end of the rod, a locking or clamping washer which comprises a plate 26 which is provided with four lugs, in the form of two pairs of diverging wings 27 28 and 29 30. The wings 27 28 are spaced from the wings 29 30 a distance sufficient to accommodate the ends of the horizontally disposed flanges which pass therebetween, while each pair of wings, 27 28 and 29 30, embrace the juxtaposed vertical flanges and through their inclination with reference to each other serve to tightly clamp two or more plates at the common corner thereof when the nut 25 is turned to draw these clamps or washers toward each other.

I have shown each of the wings of the locking or clamping device 26 provided with a notch 43 at the inner corner thereof, which is provided in order to facilitate the removal of this locking device after the concrete wall has hardened and it is desired to remove the mold. It will be apparent that the end edges of these wings are located so close to the plate 11 that it would be difficult to insert a wedge or lever in order to pry the device from the flanges. With the corners notched as shown, however, any suitable form of lever may be employed, and I find particularly desirable for this purpose one of the clamping levers 18, the hooks 19 at the end of which may readily be inserted in this notch and the locking device 26 readily pried off.

After the concrete has been poured into the mold, and has hardened to form the wall, the nut 25 is unscrewed and the bolt or rod 23 removed, after which the washer 26 may be easily detached and the mold dismantled. There now remains in the wall the sleeve or tube 20 and the washers 21 at each end thereof. The tapering configuration of each of these washers permits its being easily pried out of its socket by any suitable implement, after which said socket may be filled with concrete, flush with the face of the wall, which has then an unbroken appearance, the sleeve or tube 20 being left permanently within the same as part of its reinforcement. Furthermore, the interior ends of these tubes 20 may be filled with material which will permit of the insertion and retention of some form of fastening means for picture moldings, shelving and the like.

It will be apparent that in this manner I have provided means for uniformly and rigidly spacing apart to any desired extent and bracing the walls of my mold, which at the same time serves to facilitate making rigid the entire structure through the clamping washers 26, and which may be easily removed when desired and the wall readily given a smooth and finished appearance. The temporary clamps 18 may be either removed or permitted to remain after the sidewalls have been assembled and the permanent clamps 26 set.

To adapt my sectional mold for the construction of corners, I provide the outside wall thereof with an angle iron or bar 31, one leg or wing of which is bolted to the flange of the plates running in one direction and the other leg or wing similarly bolted to the flange of a plate running in the other direction. In this manner, a sharp and true outside corner may be provided, the edges of the plates coming together to render unnecessary the interposition of any auxiliary sections or members. For the inside corner, I provide a plate 32, to one edge of which is suitably secured a wing of the angle bar 33. The other edge of this plate 32 is similarly bolted to the flange of a plate, while the other leg or wing of the angle bar 33 is similarly bolted or otherwise suitably secured to the flange of a plate running in the other direction. Obviously, an integral angle bar with one wide leg or wing would suffice for the two-piece construction which I have just described. In this manner, it will be apparent that through the employement of my mold corners may be constructed without difficulty.

I have explained the manner in which I space the walls of my molds apart and simultaneously clamp the sections together at the common corner of each set of four plates. Somewhat similar means are preferably employed to space the plates apart at the top edges of the walls, such means comprising a U-shaped clamping plate 34 (see Fig. 1)

with one wing longer than the other and the shorter wing provided with a suitable notch or recess to receive the vertical flanges. The top and longer wing of said clamping plate 34 is held down snugly against the top flanges 12 of two of the plates 11 by means of the superposed leg or wing of the angle bar 35, the other wing of which is held against the interior wall of two of the plates 11. Through the vertical wing of the angle bar 35 and through the U-shaped clamping plate, which are suitably apertured therefor, is inserted one of the tie-rods 23, having nuts 36 at the ends thereof by means of which not only may the two top flanges of the plates which are being clamped be brought into proper alinement and firmly and rigidly secured together, but the top edges of the two forms are spaced and braced at a proper distance from each other.

Projections in the wall, for ornamental purposes or in order, for instance, to build the same around a pilaster or column which is wider than the desired width of wall throughout the major portion of its length, are provided for in much the same manner as that for turning a corner. By reference to Fig. 2, it will be seen that a plate 37 may be bolted at one end to the vertical flange of one of the plates and at the other end to the vertical flange of a plate which is offset from the plane of this side of the wall. Similarly, a corresponding plate 38 may be secured in the same manner to the flanges at the other side of the space which is desired for the projection referred to.

To brace my mold as a unit and hold the same in a proper vertical position, I prefer to employ the tension rods 40, each of which is divided and provided with a turn-buckle 41, threaded into right and left screws on the sections of the rods 40 in the usual manner. The lower ends of these rods 40 are provided with hooks adapted to engage suitable rings or hooks 42 which may be provided in the temporary flooring or in any other rigid support. The upper ends of each of the rods 40 is provided with a loop 39, adapted to lie flat against the vertical portion of the U-plate 34, and through which the tie-rod 23 is passed. This tie-rod, as hereinbefore set forth, is provided with screw threads at its ends whereby the loop or eye 39 at the end of each rod 40 may be tightly clamped by the nut 36, and thus not only rigidly secure the upper end of the tension rod 40, but provide a substantially continuous brace extending both sides of the mold. It will be apparent that the rods on either side of the mold may be individually tightened or loosened, in order to bring the mold as a unit into proper position and suitably brace the same in such position. Furthermore, great nicety of adjustment is possible inasmuch as these braces perform their functions through tension instead of compression.

In the construction of concrete residences or other smaller buildings, the walls are usually of the same width from one end to the other, but in warehouses, factories and the taller and heavier buildings an entirely different type of construction is employed. These heavy buildings are usually put up in concrete in skeleton form the same as steel structures. Columns, beams and girders are run up, and afterward what are known as "curtain walls" are filled in which are much thinner than the columns. Inasmuch as it is desirable to have a concrete structure molded to form substantially one solid integral body throughout, it will be apparent that with my system the necessary increase or decrease in the thickness of the wall may be readily made, so that in heavy construction I can run up the thin walls and the heavy columns simultaneously, producing what is purely monolithic construction. It is thought that because this would be almost impossible with the wooden molds now employed, that this is the reason why heavy buildings are run up in skeleton form.

From the above description it will be apparent that I have provided a sectional mold for the purpose set forth which is not only well adapted to provide a solid and fairly completely finished wall, and which may be quickly and easily set up and removed, but which may be adapted to an almost endless variety of conditions which confront the builder of walls and partitions of this character.

Many modifications of minor details of my improved sectional mold will doubtless readily suggest themselves to those skilled in the art to which it appertains, particularly modifications in the manner of arranging the sections to change the configuration of the mold, and I therefore do not desire to limit my invention to the specific construction and arrangement of parts or the whole of the device as herein shown and described.

I claim as new and desire to secure by Letters Patent:

1. A mold for concrete wall construction comprising a plurality of separable sections, means for preliminarily clamping said sections together during the process of assembling the same, and means for properly spacing the side walls of said mold from each other, said spacing means being provided with removable means for rigidly clamping said sections together, and said last-mentioned means also insuring the proper alinement of said sections and supporting and bracing each sectional wall as a whole.

2. A mold for concrete wall construction comprising a plurality of sections, said sec-

tions consisting of flat plates having rectangular flanges along the edges thereof, means for preliminarily clamping said sections together during the process of assembling the same, and means for spacing apart the side walls of said mold, said spacing means being provided with removable means for engaging said flanges at the corners of said sections and clamping said sections together and by the same operation insuring proper alinement thereof.

3. A mold for concrete construction comprising walls made up of a plurality of separable sections, means for preliminarily clamping said sections together during the process of assembling the same, a plurality of spacers between the side walls thereof, and a clamping device coöperating with each spacer to clamp together at the corners thereof a plurality of sections as a unit, said clamping device being removable from said walls and from said spacer and including means for insuring the proper alinement of said sections and by the same operation supporting and bracing each sectional wall as a whole.

4. A mold for concrete construction comprising walls made up of a plurality of separable sections, said sections consisting of flat plates having rectangular flanges along the edges thereof, means for preliminarily clamping said sections together during the process of assembling the same, a plurality of spacers between the side walls thereof, and a clamping device coöperating with each spacer to clamp a plurality of sections together at the corners and between the flanges thereof, said clamping device being removable from said walls and from said spacer and including means for insuring the proper alinement of said sections and by the same operation supporting and bracing each sectional wall as a whole.

5. A mold each side wall of which comprises a plurality of separable flanged sections, means for preliminarily clamping said sections together during the process of assembling the same, and a spacing and clamping device which includes a tube, a tie-rod projecting through said tube, and removable clamps at the ends of said tie-rod coöperating with the ends of said tube and with the flanges to clamp together a plurality of sections, insure proper alinement thereof and give rigidity to the entire sectional structure.

6. A wall comprising a plurality of separable flanged sections, each section having a configuration substantially rectilinear with corners cut away, whereby an aperture is provided at the common corner when a plurality of sections are assembled, means for preliminarily clamping said sections together during the process of assembling the same, and means operable through said aperture to clamp said sections together through the flanges, by the same operation insuring proper alinement thereof and giving rigidity to the entire sectional structure.

7. In a mold for concrete wall construction, a plurality of separable flanged sections each having a configuration substantially rectilinear with rounded corners, whereby an aperture is provided at a common corner when a plurality of sections are assembled, means operating through said apertures to properly space and aline the side-walls of the mold, and removable clamping washers on said spacing means engaging flanges of adjoining sections in each of said side-walls to clamp the same together and by the same operation insure proper alinement thereof and give rigidity to the entire sectional structure.

8. A mold for concrete construction each side-wall of which comprises a plurality of separable flanged sections each having a configuration substantially rectilinear with rounded corners, whereby an aperture is provided at a common corner when a plurality of sections are assembled, means for preliminarily clamping said sections together through the flanges thereof during the process of assembling said sections, means operating through said corner apertures to properly space and aline the side-walls of the mold, and clamping washers on said spacing means engaging flanges of adjoining sections in each of said side-walls to clamp the same together and by the same operation insure proper alinement thereof and give rigidity to the entire sectional structure.

9. In a mold for concrete construction, the combination, with a plurality of flanged sections adapted to be placed edge to edge to form a wall, each section having a configuration substantially rectilinear with corners cut away, whereby an aperture is provided at each common corner when said sections are assembled, of means for preliminarily clamping said sections together, said means comprising a pin passing through registering apertures and a clamping lever fulcrumed against said pin and having a head provided with a V-shaped groove passing over and engaging contiguous flanges to bind the same together, means operating through said apertures at the common corners to properly space and aline the side-walls of the mold, and clamp washers on said spacing means engaging flanges of adjoining sections in each of said side-walls to clamp same together.

10. In a mold for concrete construction, the combination, with a plurality of flanged sections adapted to be placed edge to edge to form a wall, of means for preliminarily clamping said sections together through the flanges thereof, said means comprising a

pin passing through registering apertures in adjoining flanges and a clamping lever fulcrumed against said pin on both of the projecting ends thereof, said lever having a head provided with a V-shaped groove passing over and engaging the contiguous flanges to bind the same together.

In testimony of the foregoing, I have hereunto set my hand in the presence of two witnesses.

CHARLES H. SCHUB.

Witnesses:
EUGENE V. FEGAN,
P. FRANK SONNEK.