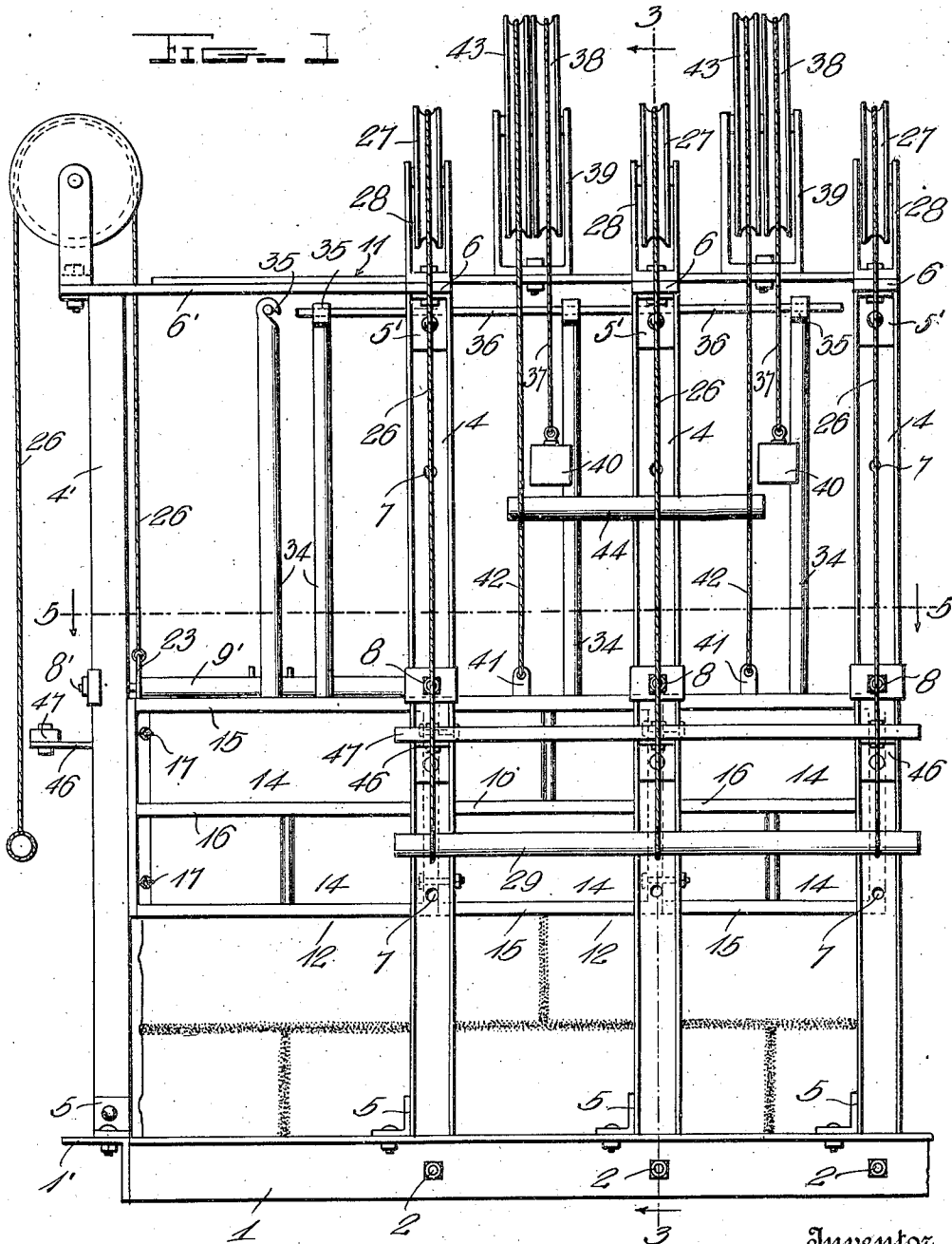


F. H. PACKARD.
HOLLOW CONCRETE WALL MOLD.
APPLICATION FILED JULY 10, 1911.

1,030,480.

Patented June 25, 1912.

5 SHEETS—SHEET 1.



Witnesses

E. E. E. E. E.
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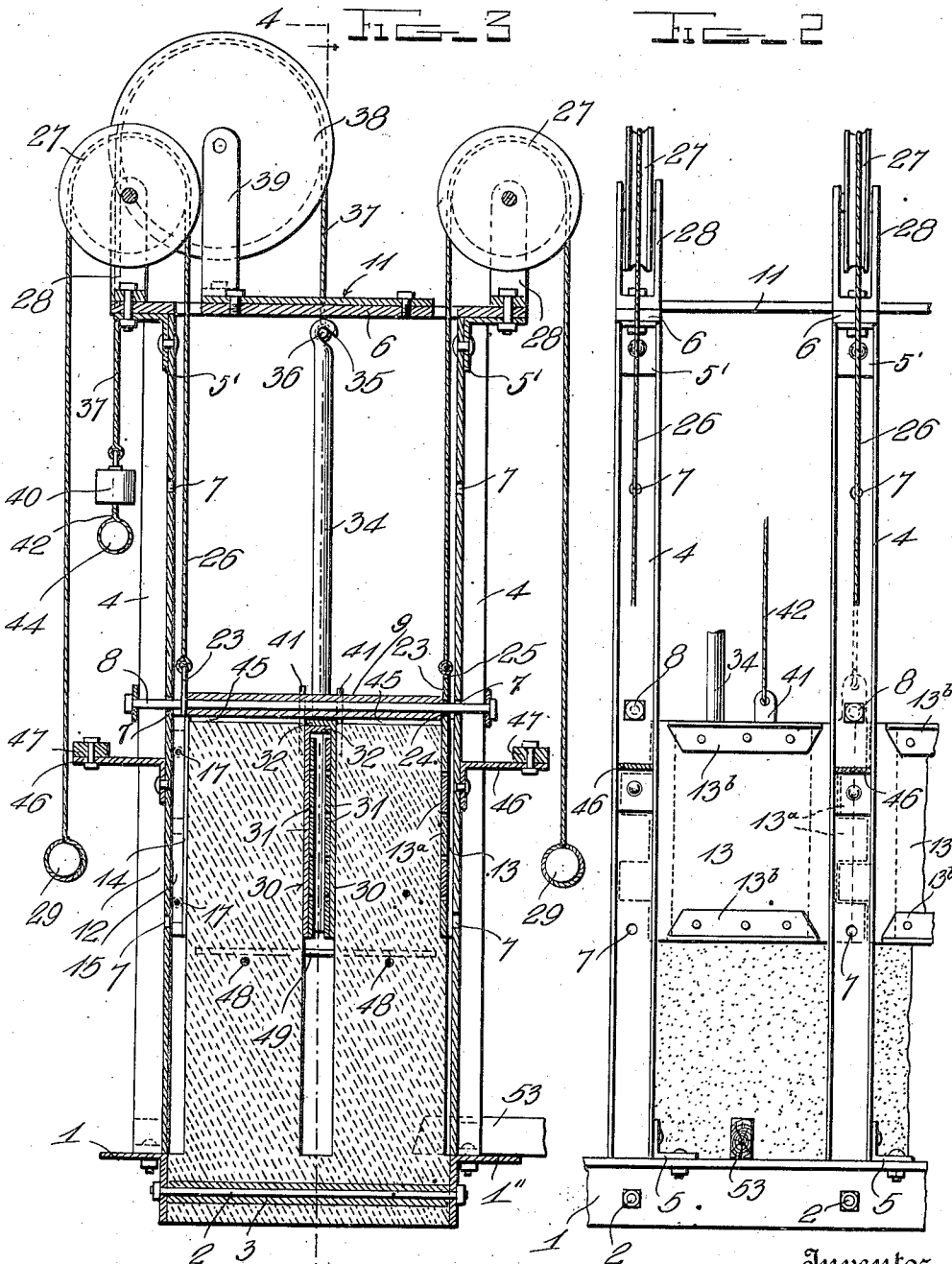
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5 SHEETS-SHEET 2.



Witnesses

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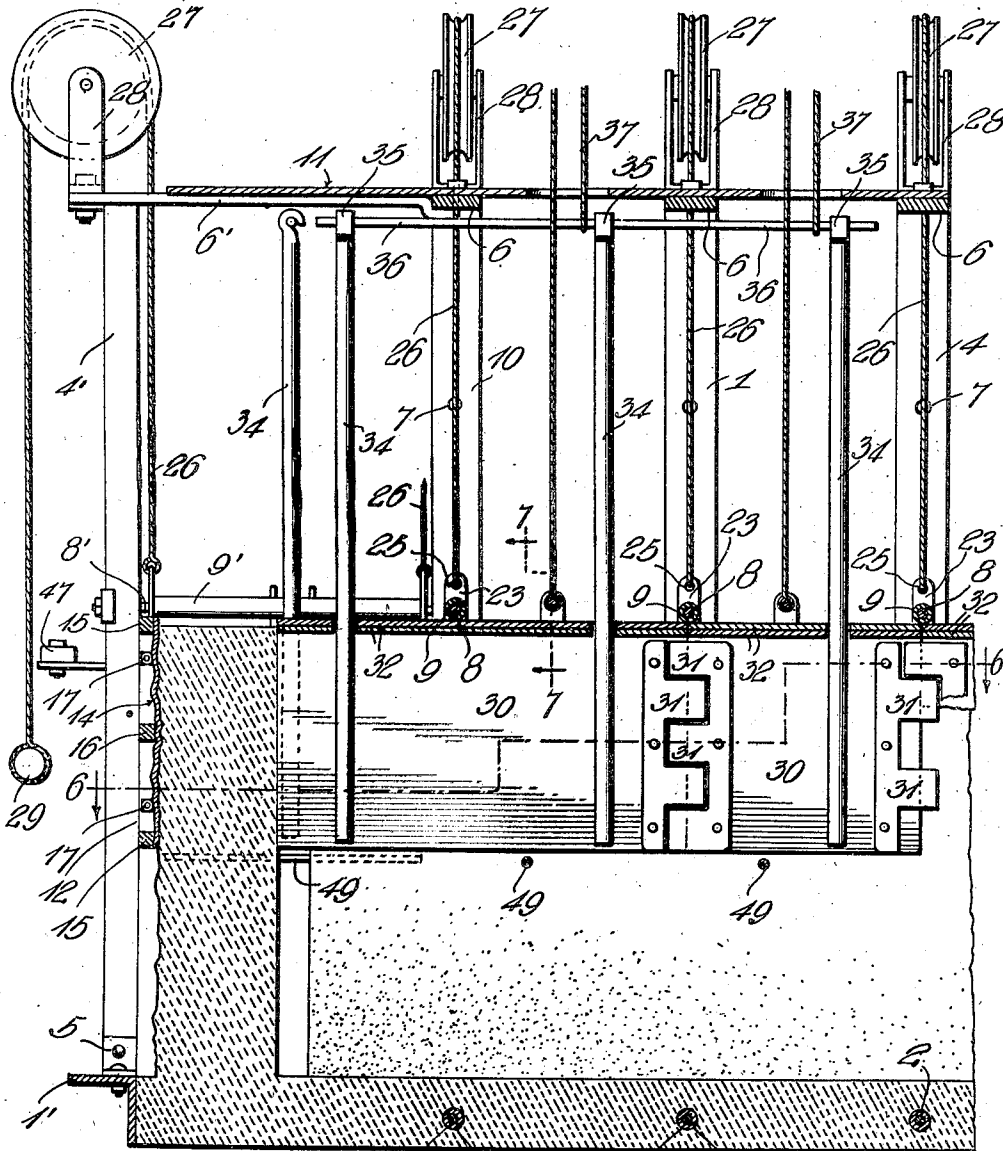
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5 SHEETS—SHEET 3.

FIG. 4



Witnesses

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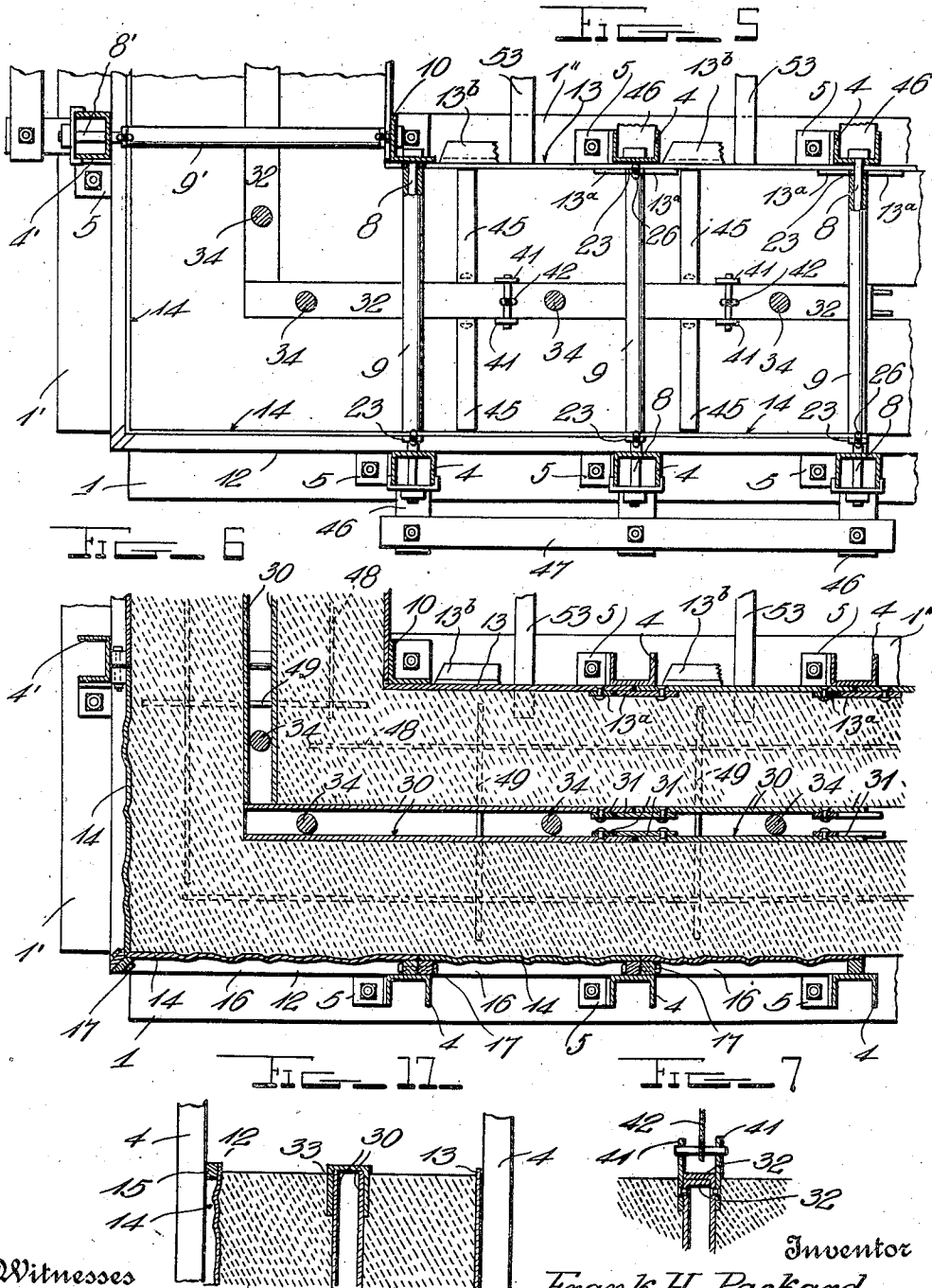
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5 SHEETS-SHEET 4.



Witnesses

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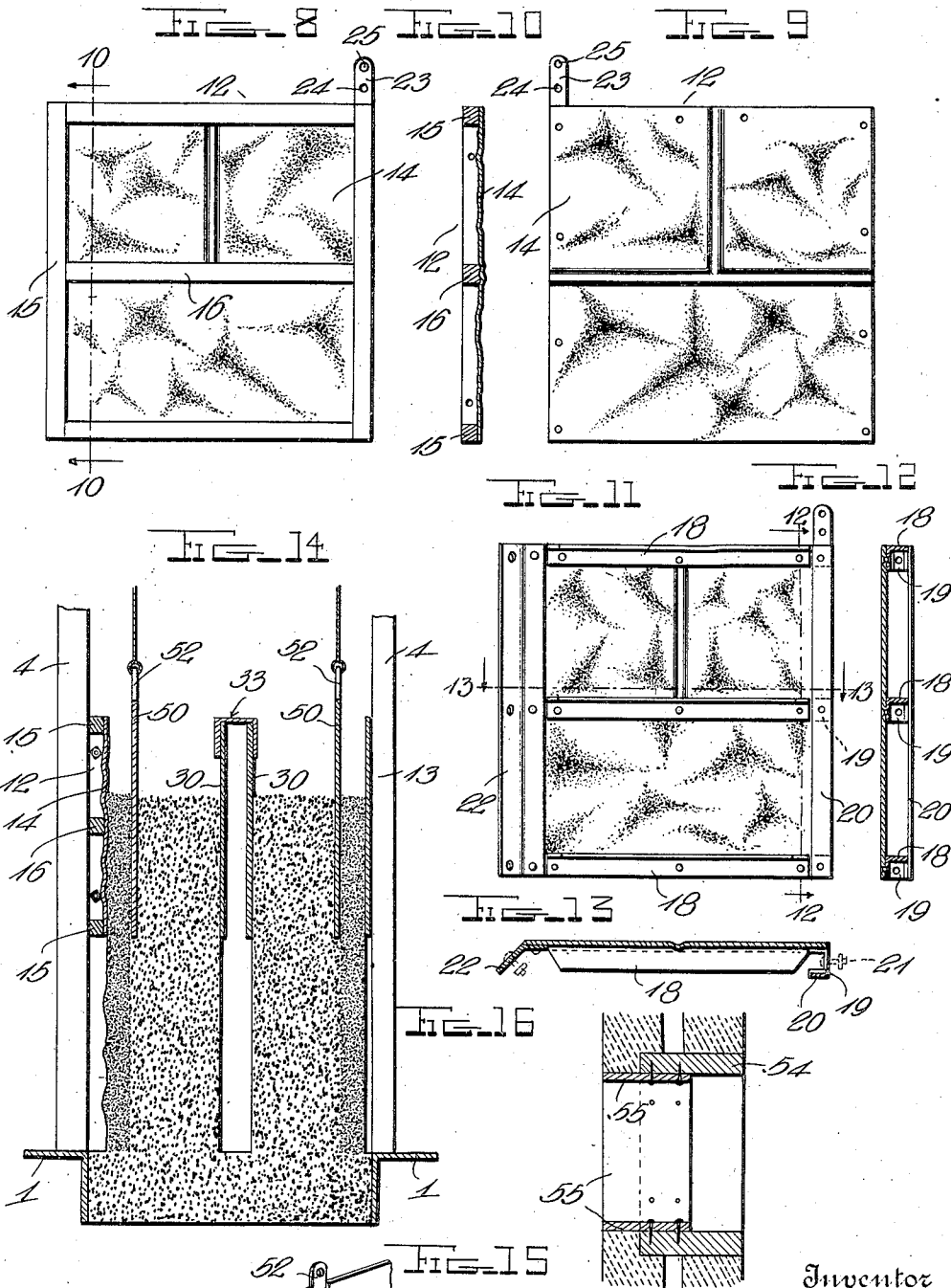
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5 SHEETS—SHEET 5.



Witnesses

L. O. Hilton

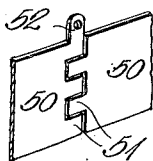


FIG. 15

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UNITED STATES PATENT OFFICE.

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HOLLOW-CONCRETE-WALL MOLD.

1,030,480.

Specification of Letters Patent. Patented June 25, 1912.

Application filed July 10, 1911. Serial No. 637,806.

To all whom it may concern:

Be it known that I, FRANK H. PACKARD, a citizen of the United States, residing at Ceylon, in the county of Martin and State of Minnesota, have invented certain new and useful Improvements in Hollow-Concrete-Wall Molds; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in molds for forming hollow concrete walls.

The object of the invention is to generally improve the construction of such devices.

With this object in view, the invention consists of certain novel features of construction, combination and arrangement of parts as will be more fully described and claimed.

In the accompanying drawings: Figure 1 is a front or outer side view of my improved mold; Fig. 2 is an inner side view of a part thereof; Fig. 3 is a vertical cross sectional view on the line 3—3 of Fig. 1; Fig. 4 is a vertical longitudinal section on the line 4—4 of Fig. 3; Fig. 5 is a horizontal sectional view on the line 5—5 of Fig. 1; Fig. 6 is a similar view on the line 6—6 of Fig. 4; Fig. 7 is a detail fragmentary sectional view through the upper ends of the mold plates for forming the dead air space in the wall on the line 7—7 of Fig. 4 showing one means for closing said space while the wall is being formed; Fig. 8 is a detail outer side view of one form of mold for forming the outer surface of the wall; Fig. 9 is a similar view of the inner or working side of the mold shown in Fig. 8; Fig. 10 is a vertical sectional view of the same on the line 10—10 of Fig. 8; Fig. 11 is a view similar to Fig. 8 showing a modified construction of the outer mold; Fig. 12 is a vertical sectional view on the line 12—12 of Fig. 11; Fig. 13 is a horizontal sectional view on the line 13—13 of Fig. 11; Fig. 14 is a detail sectional view through a portion of the wall and molds showing the arrangement of the separating plates whereby the outer surface of the walls may be formed of different material from the main or inner portion of the wall; Fig. 15 is a detail perspective view of a portion of two of the separating plates shown in Fig. 14 and illustrating the interlocking connection between the adjoining

edges of said plates; Fig. 16 is a detail sectional view through a portion of the wall showing the manner in which the door and window frames are arranged therein and the concrete formed around the outer edges of the frames; Fig. 17 is a detail sectional view through a portion of the wall and mold plates for forming the dead air space of the wall showing a modified means for closing said space while the walls are being formed.

In the embodiment of the invention I provide lower supporting sills or base bars 1 which may be formed of any suitable material and which are here shown and are preferably of angle iron construction. The sills or bars 1 are secured together by bolts 2 on which are arranged sleeves 3 whereby said sills or bars are spaced apart to the proper distance for forming walls of the desired thickness. Secured to the bars or sills 1 are a series of vertically disposed channel iron uprights 4 4' any desired number of which may be employed, said bars being spaced at suitable distances apart for holding the mold sections in place and for supporting the lifting and counterbalancing mechanism for the molds as hereinafter described. The uprights 4 are connected at their lower ends to the bars or sills 1 by angle iron corner brackets 5 and are connected at their upper ends by similar brackets 5' to upper cross bars 6. In the inner sides of the channel iron uprights 4 are formed series of apertures 7 with which are adapted to be engaged the ends of upper tie and mold supporting bolts 8 on which are arranged spacing sleeves 9 whereby the upper portion of the uprights are firmly held in position. Also bolted or otherwise firmly secured at its lower end to the inner sill or base bar 1' is an inner angle iron corner upright 10 which is connected at its upper end to one of the cross bars 6 and also to the inner end of a cross bar 6' the outer end of which is connected to the upper end of the first upright 4' of the end wall of the structure. The corner upright 10 is also secured to said end wall upright by a tie bolt 8' corresponding to the tie bolts 8 and having arranged thereon a sleeve 9' corresponding to the sleeves 9. The lower end of the end uprights 4' are secured to end sills 1' corresponding to the sills 1 of the side walls of the structure. The cross bars 6 and 6' of the side and end wall uprights have secured thereto connecting plates

11 which also serve as supporting means for a mold counter-balancing mechanism hereinafter described.

Supported and held in position by the
 5 uprights 4 and 4' are a series of outer wall molds 12 and inner wall molds 13. The molds 12 and 13 are preferably constructed of a series of sections of suitable size and shape. The outer wall mold sections comprise
 10 sheet metal plates 14 which are secured at their edges to a supporting frame 15 which in the preferred construction herein shown is formed of wooden strips and has arranged therethrough centrally disposed
 15 brace bars 16. One end of the frame of each mold section at the outer corners of the wall is arranged at an angle of forty-five degrees so that when the mold sections for forming the corners of the wall are brought together
 20 they will be disposed at right angles to each other and may be secured together by bolts 17 or other suitable fastening devices. The sheet metal plates of the mold sections 12 are creased or provided with properly arranged
 25 longitudinal and transversely disposed narrow grooves between which the metal is indented in an irregular manner. By forming the grooves and indentations in the sheet metal plates of the outer mold sections the
 30 outer surfaces of the wall formed by said mold sections will present the appearance of being built of roughly finished stone.

As hereinbefore stated the sheet metal plates are secured to frames 15 constructed
 35 of wooden strips. If desired, however, I may construct the frames of the sections from metal bars as shown in Figs. 11, 12 and 13. In these figures it will be seen that the frame comprises a series of angle iron
 40 cross bars 18 which are riveted to the metal sheets of the molds. To the vertical edges of the sheets are secured channel iron connecting brackets 19 the outer portions of which are secured together by a vertically
 45 disposed brace bar 20. In the outer engaging parts of the brackets 20 are formed bolt holes through which are inserted section attaching bolts 21 whereby the mold sections are connected together to form the side
 50 of the wall.

The sections of the inner mold 13 for forming the outer surfaces of the inner section of the wall are preferably in the form of flat sheet metal plates having on their
 55 engaging edges interlocking fingers 13^a and having secured to their outer sides angle iron brace bars 13^b which impart the necessary rigidity to the plates for resisting the pressure of the material when tamped to
 60 form the wall. On the edge of the end mold sections where the same join the sections of the molds for forming the corners of the wall are secured connecting bars 22 which are bent at the proper angle for forming the
 35 corner, said bars 22 of the corner mold sec-

tions being secured together by bolts or other suitable fastening devices. On the upper edge of the mold sections preferably adjacent to one end thereof are formed upwardly extending supporting lugs 23 in
 70 which adjacent to the upper edges of the mold sections are formed passages 24 with which are engaged the ends of the tie bolts 8 and 8' whereby said mold sections are supported at the proper elevation and are securely connected to the uprights 4 and 4'.
 75 In the lugs 23 are also formed apertures 25 with which are connected the lower ends of raising and counter-balancing cables 26 which pass upwardly through suitable apertures in the cross bars 6 and 6' and from
 80 thence pass over grooved guiding and supporting pulleys 27 which are revolvably mounted in suitable bearing brackets 28 secured to the outer ends of the cross bars 6 and 6'. To the outer ends of the cables 26 are secured counter-balancing weights 29 which are adapted to assist in raising the mold sections for forming the additions to the walls and for holding said mold sections
 90 in place until the tie bolts 8 and 8' have been engaged therewith and said sections thus secured to the uprights.

As hereinbefore stated the wall is of hollow construction or formed in inner and
 95 outer sections separated a suitable distance apart to form between the inner surfaces thereof a dead air space which positively prevents any dampness from passing through the wall. In order to form the
 100 dead air space between the sections of the wall, I provide dead air space molds which are preferably constructed of flat sheet metal plates 30 having on their engaging edges interlocking fingers 31. The upper
 105 edges of the plates are preferably bent inwardly to form overlapping stop flanges 32 which close the space between the plates and thus prevent the concrete from falling into the space between the plates, while the walls
 110 are being formed. Instead of forming overlapping flanges 32 on the upper edges of the plates 30, I may, if desired, provide suitable channel iron caps 33 which are adapted to be engaged with the upper edges
 115 of the plates and thus close the space between the same. In order to space the plates 30 a suitable distance apart for forming the dead air space and to hold the same in this position while the walls are being formed,
 120 I provide spacing pins or rods 34 which are inserted through suitable apertures formed in the flanges 32 or caps 33 on the upper edges of the plates and extend down between the latter thus holding the same in
 125 spaced relation. On the upper ends of the pins or rods 34 are formed eyes or hooks 35 with which are engaged pin lifting bars 36 to which are connected the inner ends of pin lifting cables 37. The cables 37 pass
 130

upwardly through suitable apertures in the connecting plates 11 and are engaged with guide pulleys 38 revolubly mounted in suitable supporting brackets 39 secured to said
5 connecting plates 11 as shown.

The outer ends of the cables 37 are connected to counter-balancing weights 40 which assist in raising the pins 34 and in holding the same in an elevated position.
10 By providing the lifting bars 36 the pins may be lifted or raised in unison by the cables 37. To the plates 30 are also connected plate lifting or raising lugs 41 to which are connected plate lifting and
15 counter-balancing cables 42, said cables also passing upwardly through the openings in the plates 11 and extending over guide pulleys 43 mounted in the brackets 39 on said plates 11. The outer ends of the cables
20 42 are connected to counter-balancing weights 44 which assist in raising the mold plates 30 and in supporting the same in position. The plates 30 are spaced from the outer and inner mold sections 12 and 13
25 by spacing members 45 which are secured at their inner ends to the plates 30 and have their outer ends engaged with the inner sides of the inner and outer mold sections 12 and 13 as shown.

Secured to the channel iron uprights 4 and 4' are right angular outwardly projecting brackets 46 to which are secured longitudinally disposed upright shifting bars 47 by means of which the uprights may be
35 swung sidewise or tilted thus permitting the mold sections to be raised or adjusted for forming the successive layers or additions to the walls. As the inner and outer sections of the wall are being formed in
40 the manner described, reinforcing rods 48 and tie rods 49 may be embedded in the cement thus reinforcing and tying the sections of the wall together as the same is constructed.

In order to permit a different kind of material to be employed for forming the outer surfaces of either of the sections of the wall, I provide separating plates 50 having on their engaging edges interlocking
50 fingers 51, said plates being adapted to be placed in position a suitable distance from the mold sections 12 and 13. When thus arranged the material for forming the main body of the wall is placed between
55 said plates and the dead air space mold plates 30, while the finer or harder material is placed between said plates and the outer and inner mold sections 12 and 13. After the material has thus been placed in between
60 the plates, the separating plates are removed in any suitable manner and the material then tamped. The separating plates 50 are preferably provided on their upper edges with apertured lugs 52 to which may
65 be connected raising cables (not shown) but

which would be arranged in a similar manner as described in connection with the raising cables for the mold sections and would be provided with similar counter-balancing weights.

As the walls are built up in the manner
70 described and the levels of the successive floors of the building reached, the floor joists 53 have their ends engaged with and embedded in the inner section of the wall
75 as shown. Also embedded at the desired locations in the walls are door and window frames 54, said frames being of less width than the combined thickness of the inner and outer wall sections so that the outer
80 edges of the frames terminate some distance in from the outer surface of the wall and are thus protected by the projecting parts of the wall forming the inner surface of the opening in which the frame is set. In order
85 to provide a smooth even surface for the projecting part of the wall around the outer edge of the window or door frame and to make the surface of said projecting surface of the wall flush with said inner sides of
90 the frame, I provide temporary mold boards 55 which are tacked to the inner surface of the frame and project beyond the outer edge thereof to the outer surface of the wall and thus permit the cement to be filled in around
95 and over the outer edge of the edges of the frame as shown. The part of the wall when thus formed over the outer edge of the window or door frame closes any space or crack which may occur between the window
100 or door frame and the adjacent part of the wall, thus preventing the entrance of wind or water between the frame and adjacent parts of the wall. After the cement has set around the frame the mold boards removed thus leaving the surface of the projecting part of the wall smooth and flush
105 with the inner sides of the frame. When it is desired to build a wall higher than the uprights 4, extra uprights may be placed on and secured to the upper ends of the first series of uprights or the entire apparatus may be raised and suitably fastened to the finished part of the wall and the latter
110 thus built onto or increased in length. My improved molding apparatus while here shown and described as being formed of metal may for the most part if desired be also constructed of wood. The molds may be formed to produce an imitation of brick,
115 stone or wood siding or to produce any other effect or appearance. The molds may also be constructed if desired of common steel siding and the molds are preferably about one-half inch wider than each layer
120 of concrete. The tie rods are arranged by laying the same straight or diagonally across the top of each layer of concrete and with the projecting inner ends of the tie rods are engaged the inner or dead-air space
130

mold plates. By means of my improved molding apparatus a continuous dead air space is formed between the inner and outer sections of the wall.

5 From the foregoing description taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

10 Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention claimed.

15 Having thus described my invention, what I claim is:

1. In a hollow wall mold, a series of sills spaced apart and secured together in proper position to form the base members of the mold, a plurality of uprights secured at their lower ends to said sills and adapted to form supports for the sections of the mold, cross bars connected to the upper ends of said uprights whereby said upper ends are spaced apart and secured together, connecting plates secured to said cross bars, a series of mold supporting tie bars secured at their outer ends to said uprights, spacing sleeves arranged on said rods, a series of inner and outer mold sections adapted to be secured together at their engaging edges, supporting lugs secured to said sections and adapted to receive the ends of said tie rods whereby said sections are secured to and supported by said uprights, dead air space molds arranged between said mold sections whereby the wall is divided into inner and outer sections and a dead air space formed between said sections, means to support said dead air space molds, and counter balancing weights secured to said inner and outer mold sections whereby the same are raised and held in position while being adjusted to form the successive layers of the wall.

45 2. In a hollow concrete wall mold, inner and outer series of suitably supported uprights, a series of outer mold sections adjustably secured to said uprights, a series of

inner mold sections, said sections comprising flat metal plates having secured thereto a series of brace bars, interlocking fingers formed on the engaging edges of said plates whereby the latter are connected together to form an unbroken surface, means to adjustably secure said mold sections to the inner series of uprights, and shifting bars secured to said uprights whereby the latter when released may be shifted to permit the mold sections to be adjusted for forming the successive layers of the wall.

3. A hollow concrete wall mold comprising inner and outer series of suitably supported uprights, a series of outer mold sections, a series of inner mold sections, means to adjustably secure said sections to said uprights whereby said mold sections may be adjusted to form the successive layers of the wall, a series of dead air space mold sections, said sections comprising pairs of plates arranged between said inner and outer mold sections, means to space said plates apart to form an air space in the wall, means to close the space between the upper edges of said plates whereby the material is prevented from entering said space, spacing pins adapted to be engaged between said plates whereby the latter are spaced apart, lifting lugs secured to said plates, spacing members secured thereto and adapted to engage said inner and outer mold sections, raising cables connected to the lugs on said mold plates, guiding and supporting pulleys adapted to receive said cables, counter balancing weights secured to the outer ends of the cables whereby the mold plates are held in position, and lifting and supporting plates and cables connected to the spacing pins between said mold plates.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRANK H. PACKARD.

Witnesses:

C. A. PUGSLEY,
SIMON L. DOTSON.