No. 777,633. PATENTED DEC. 13, 1904.

# W. E. HIBBARD.

## HOLLOW WALL MOLD.

APPLICATION FILED SEPT. 24, 1904.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1

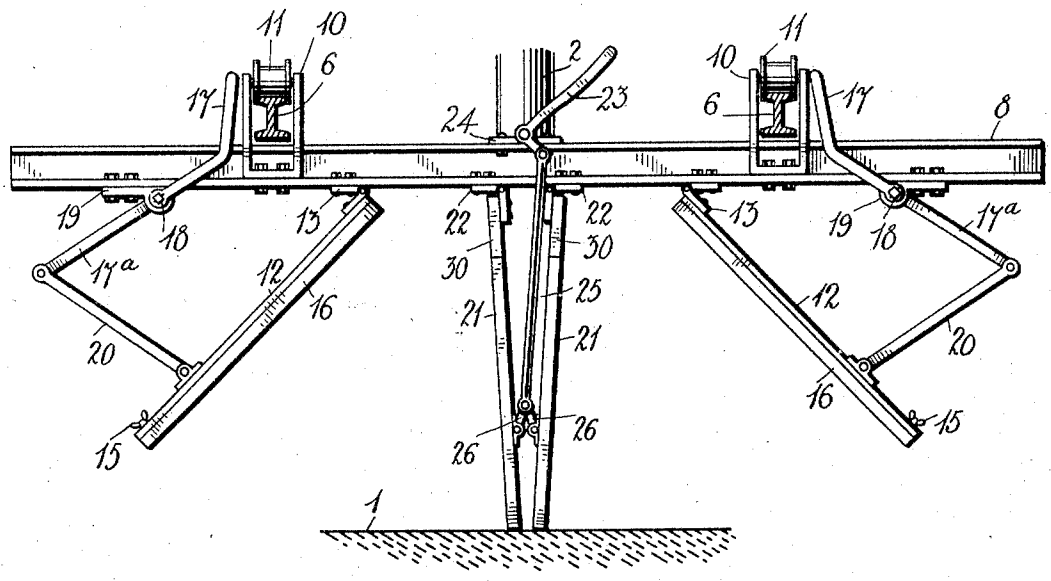
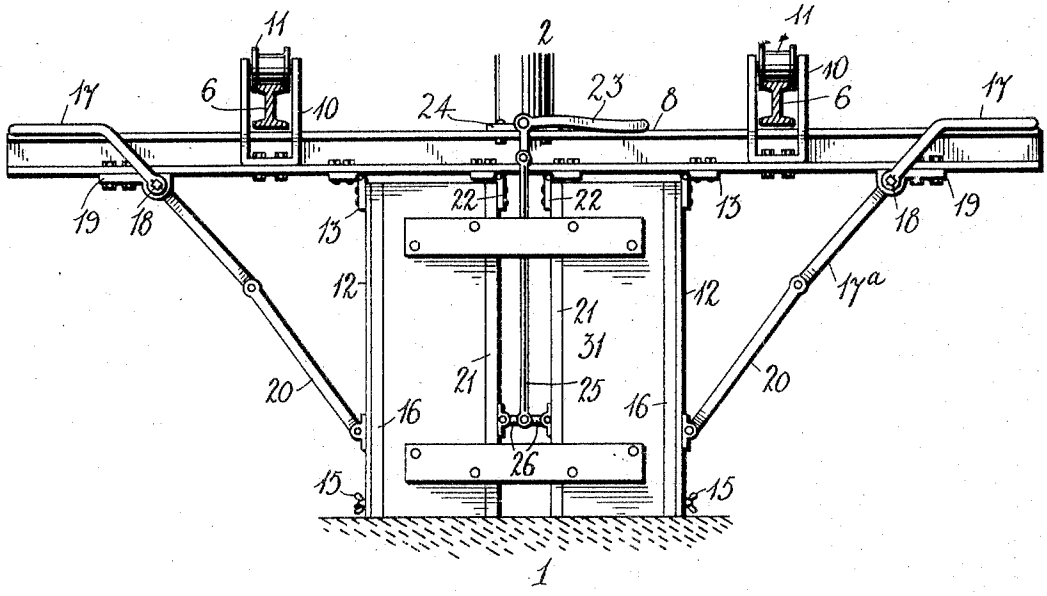



Fig. 2




Witnesses

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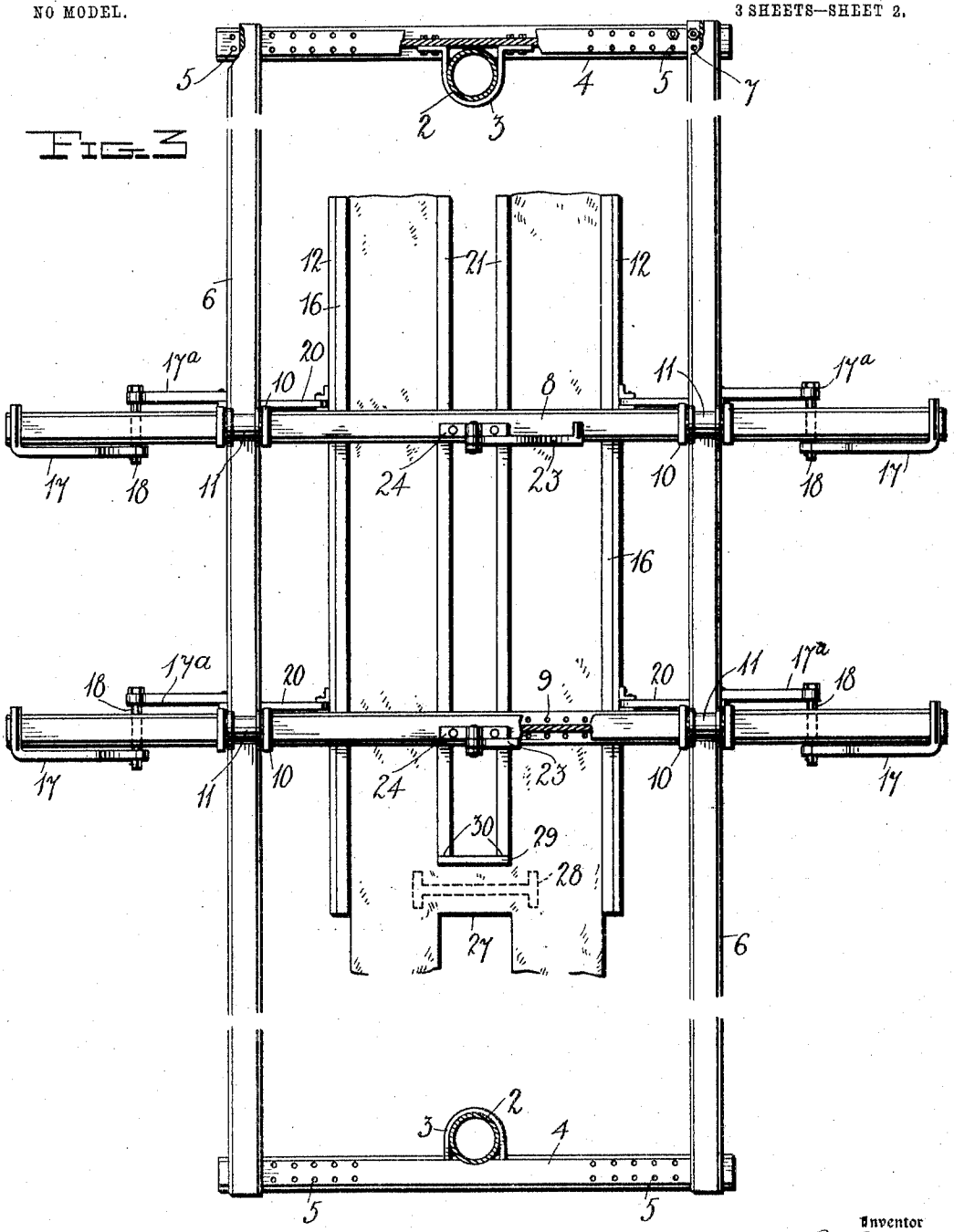
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HOLLOW WALL MOLD.

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NO MODEL. 3 SHEETS—SHEET 2.

FIG. 3




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NO MODEL. 3 SHEETS—SHEET 3.

FIG. 4

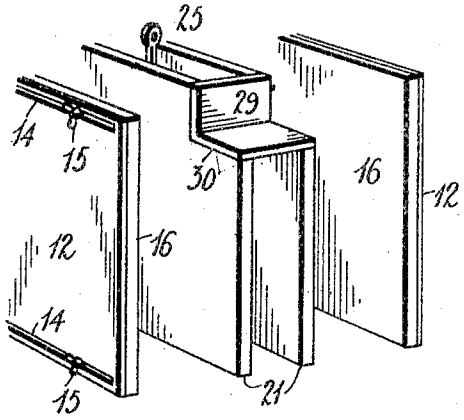



FIG. 5

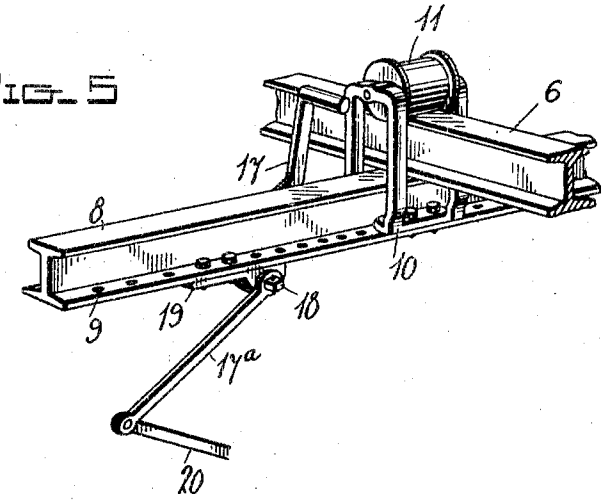
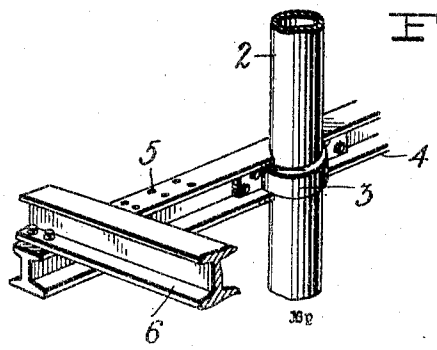



FIG. 6




Witnesses

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No. 777,633. Patented December 13, 1904

# UNITED STATES PATENT OFFICE.

WILLIAM E. HIBBARD, OF CHICAGO, ILLINOIS.

## HOLLOW-WALL MOLD.

SPECIFICATION forming part of Letters Patent No. 777,633, dated December 13, 1904.

Application filed September 24, 1904. Serial No. 225,796. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM E. HIBBARD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Hollow-Wall Molds, of which the following is a specification.

My invention relates to hollow-wall molds. It falls in the general class including apparatus for building concrete walls piece by piece, such apparatus being in the nature of bottomless receptacles provided with removable or pivoted sides, between which concrete is received, formed, and held until set and a portion of the wall of predetermined extent thus constructed. The apparatus is then detached from the molded wall sufficiently to be moved to an adjacent position, whereupon another similar and contiguous portion of the wall is molded. For convenience in moving the apparatus a track or guides are sometimes introduced.

My invention belongs immediately to that type of molds in the general class mentioned by means of which hollow walls are erected, often in imitation exteriorly of cut-stone work; and the object of my invention is the production of specially constructed and arranged adjustable operating-lever contrivances for actuating the corresponding exterior and interior wings; and it is also an object of my invention to provide an adjustable guide or track along which my invention is movable and by which it is supported.

I accomplish the objects set forth by fashioning and associating mechanical elements as illustrated in the accompanying drawings, of which—

Figure 1 represents an end view showing the outer wings thrown outwardly and the core-wings drawn inwardly, in which positions the wings are detached from the molded portion of the wall, also indicated in this figure. Fig. 2 is an end view showing all the wings in their vertical positions and the end wall of the mold in place ready for the molding operation. Fig. 3 is a top plan view. Fig. 4 is a perspective view of a portion of the ends of the outer wings and of the core-wings in their vertical positions and shows in the recessed corners of the core-wings the angle-former for the concrete bonds connecting the walls interiorly at intervals. Fig. 5 is an enlarged perspective view of one of the cross-beams and shows the manner in which the wing-actuating levers are adjustably supported by the cross-beams. Fig. 6 is a perspective view showing one of the vertical standards and the clamping devices by which the weight of the rails and of the entire apparatus is carried by the standards and by which the whole may be vertically adjusted.

Like numbers are used to refer to the same parts throughout the drawings.

Upon any suitable foundation-wall or the level bottom 1 of a trench I erect the vertical standards 2 at any chosen distance apart. By means of the clamp 3 the transverse end beams 4 may be secured to the standards at any height. Parallel series of bolt-holes 5 are provided through the flanges of the end beams, and the track-rails 6 by means of like bolt-holes 7 through their flanges may be bolted to the end beams at any distance apart and parallel with each other. While I-beams are illustrated in this application as constituting the horizontal straight members, I do not limit myself to that form, which is not essential.

The working parts of my invention are directly supported by the twin cross-beams 8. These have parallel series of bolt-holes 9 through their lower flanges, (see Fig. 3,) and the hangers 10, bearing rollers 11, running on the rails, are bolted to the cross-beams through these holes. It will be understood here that hangers 10 may be fixed nearer together or separated more widely than illustrated if for any reason the space between the rails is changed. It is also thought to be clear that the parts suspended from the cross-beams may be moved along the rails with the beams.

The outer swinging wings or plates are designated by number 12. They are supported pivotally by the adjustable connection of their hinges 13 with the cross-beams 8. Thus it will be seen the outer wings may be adjusted toward or from each other when thinner or heavier walls are to be molded.

Slots 14 are formed through the wings 12 near their edges, (see Fig. 4,) and thumb-screws 15 pass through these slots and enter and secure moldboards 16 upon the innermost faces of the wings 12 when any particular configuration of the external molded surface is to be made.

To swing the wings into and outwardly from their normal vertical attitudes, I provide the hand-levers 17, that are rigidly secured to the pivots 18 in blocks 19, adjustably bolted to the cross-beams, as shown. At the opposite end of each pivot 18 is rigidly secured a crank-arm $17^a$, and the outer end of this arm is pivotally connected with a rod 20, the remaining extremity of which is pivotally joined to the wing. By working the levers, therefore, the wings are swung into and from their vertical positions, and it is my practice to bend the outermost ends of the levers 17, primarily to constitute convenient handles and incidentally to act as stops by their contact with the cross-beams, which occurs when the wings and moldboards are exactly vertical.

In this description I have termed the inner wings 21 the "core-wings," as they act to form the hollow of the molded wall. They are pivotally connected with the cross-beams 8 by hinges 22, which are bolted in position and may be adjusted toward and from each other as explained for the hinges of the outer wings. In other words, all the wings are adjustable toward and from each other, and a wall of any given width or thickness may be constructed within the limits of the apparatus.

Core-wings 21 are operated by the hand-levers 23, which have fulcrums upon the top of the cross-beams. It is now apparent that the levers 23 must be suitably connected with the cross-beams. Therefore they are pivoted in blocks 24 or the like to constitute bearing-points upon the beams. Each lever is coupled with a connecting-rod 25, that passes downwardly between core-wings 21 and is pivotally joined to the spreader-links 26 near the bottom of the space between the core-wings. The links being connected to the wings, when the free ends of hand-levers 23 are raised the links draw the lower edges of the core-wings toward each other and pull those wings from any concrete packed between them and the outer wings in order that the mold may be transported along the rails into the next position. Besides drawing the core-wings together, as explained, the links 26 perform another office. When the free ends of the hand-levers 23 are forced downwardly, their movements are brought to a halt by the contact of the upper bent ends of the hand-levers and the tops of the cross-beams. Upon the occurrence of such contacts the links occupy the positions shown in Fig. 2—that is, upon the "dead-center." Now if concrete be packed ever so thoroughly between the core and outer wings the core-wings cannot be displaced from their vertical positions, all inward pressure resulting merely in pressure upon links 26. In the same way the bends above the true alinement of crank-arms 19 and rods 20 prevent the pressure of the concrete from forcing the outer wings 12 apart. Sufficient play is ordinarily present among the jointed connections to enable them to be drawn back over their alined positions.

It is preferred to secure the two wall-divisions one to the other for the purpose of strengthening the construction. I accomplish this by means of a bond of concrete 27, in which is embedded the metal tie-plate 28, all as indicated in Fig. 3. To form the bond, the sheet-metal angle-former 29 (illustrated in Fig. 4) is used. It consists of a plate or rectangle of metal bent at right angles. It is placed in the recesses 30, formed in the upper corners of the core-wings, as shown, and when the end wall 31 is placed in position the concrete is packed in the former, as well as between the wings.

By forming the wall piece by piece before the concrete hardens the successively-molded portions may be plastically united one with the other and the whole integrated in the customary way.

I am aware that hollow-wall molds have been constructed having outer and core wings movable as explained herein, but by different mechanical means, and I do not claim that feature broadly.

Having thus described my invention and the manner of its operation, what I claim is—

1. In a hollow-wall mold, the combination with vertical supports, of end beams adjustable vertically on said supports, track-rails borne by the end beams and adjustable laterally thereon, cross-beams and hangers whereby the cross-beams are suspended from said rails movably, wings pivotally attached to said cross-beams, means for actuating the wings, and an end wall, substantially as described.

2. In a hollow-wall mold, the combination with vertical supports, of end beams adjustable vertically on said supports, track-rails borne by the end beams and adjustable laterally thereon, cross-beams and hangers whereby the cross-beams are suspended from said rails movably, outer wings and core-wings pivotally and adjustably attached to said cross-beams, means for actuating the wings, and an end wall, substantially as described.

3. The combination with a hollow-wall mold having outer and inner associated members whereby divisions of concrete wall are formed with a space between them, of bond-forming devices constructed and arranged to form a concrete bond joining and integral with the said wall-divisions.

4. In a hollow-wall mold, the combination with the outer wings, of the inner or core

wings having recesses in their corners, of a bond-former engaging the said recesses whereby a concrete bond may be formed joining and integral with the sides of the wall, substantially as described.

5. In a hollow-wall mold, the combination with the cross-beams, of outer and core wings pivotally and adjustably attached to said cross-beams, wing-actuating means whereby said outer wings are swung into and from their normal positions and the pressure of the concrete resisted, and wing-actuating means whereby the core-wings are swung into and from their normal positions and the pressure of the concrete resisted, substantially as described.

6. In a hollow-wall mold, the combination with the cross-beams, of outer and core wings pivotally and adjustably attached to said cross-beams, pivotally-connected levers and rods whereby said outer wings are swung into and from their normal positions and the pressure of the concrete resisted, and pivotally-connected levers, rods and links whereby the core-wings are swung into and from their normal positions and the pressure of the concrete resisted, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM E. HIBBARD.

Witnesses:
JOSEPH E. MYERS,
ETHEL T. CHASE.