

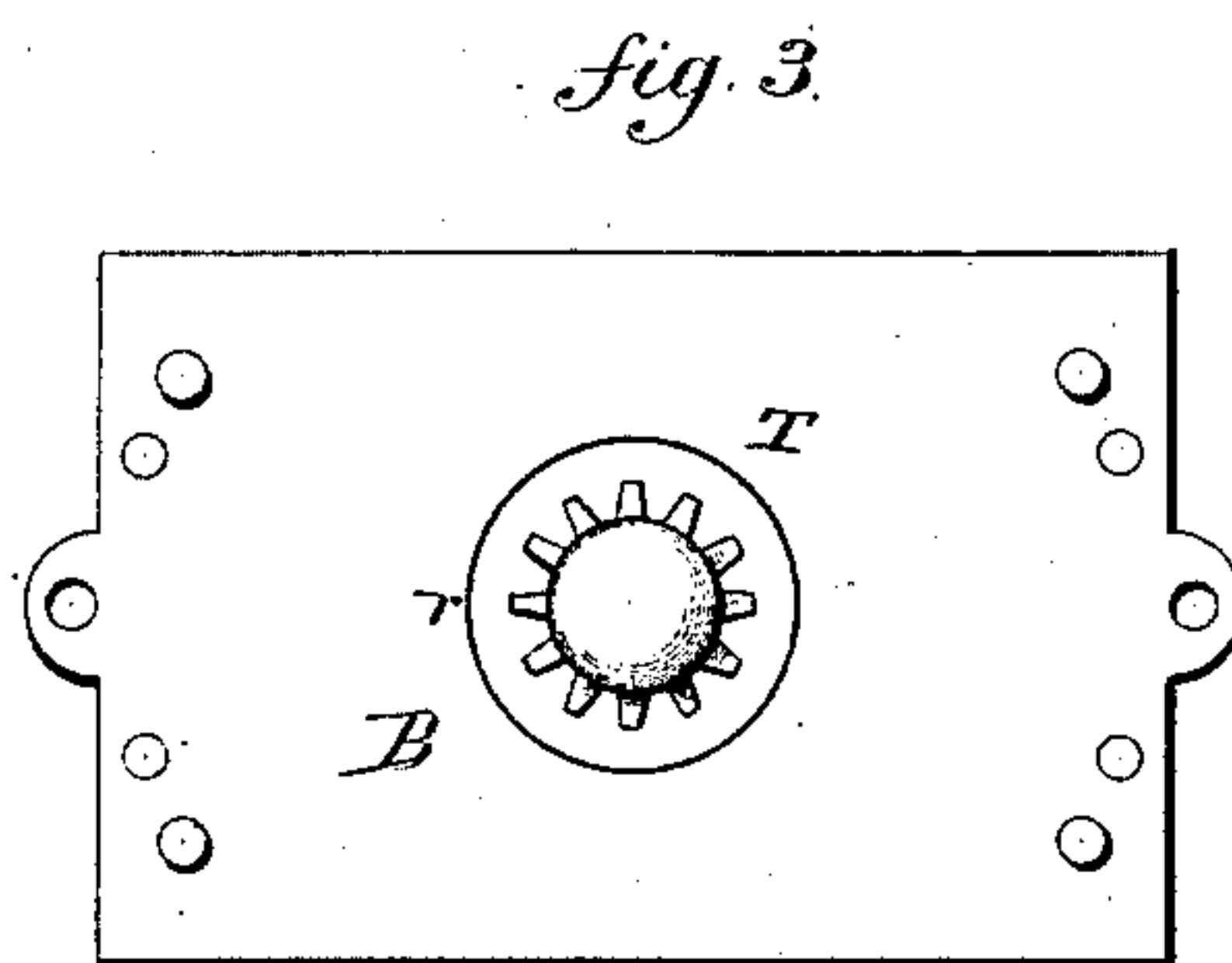
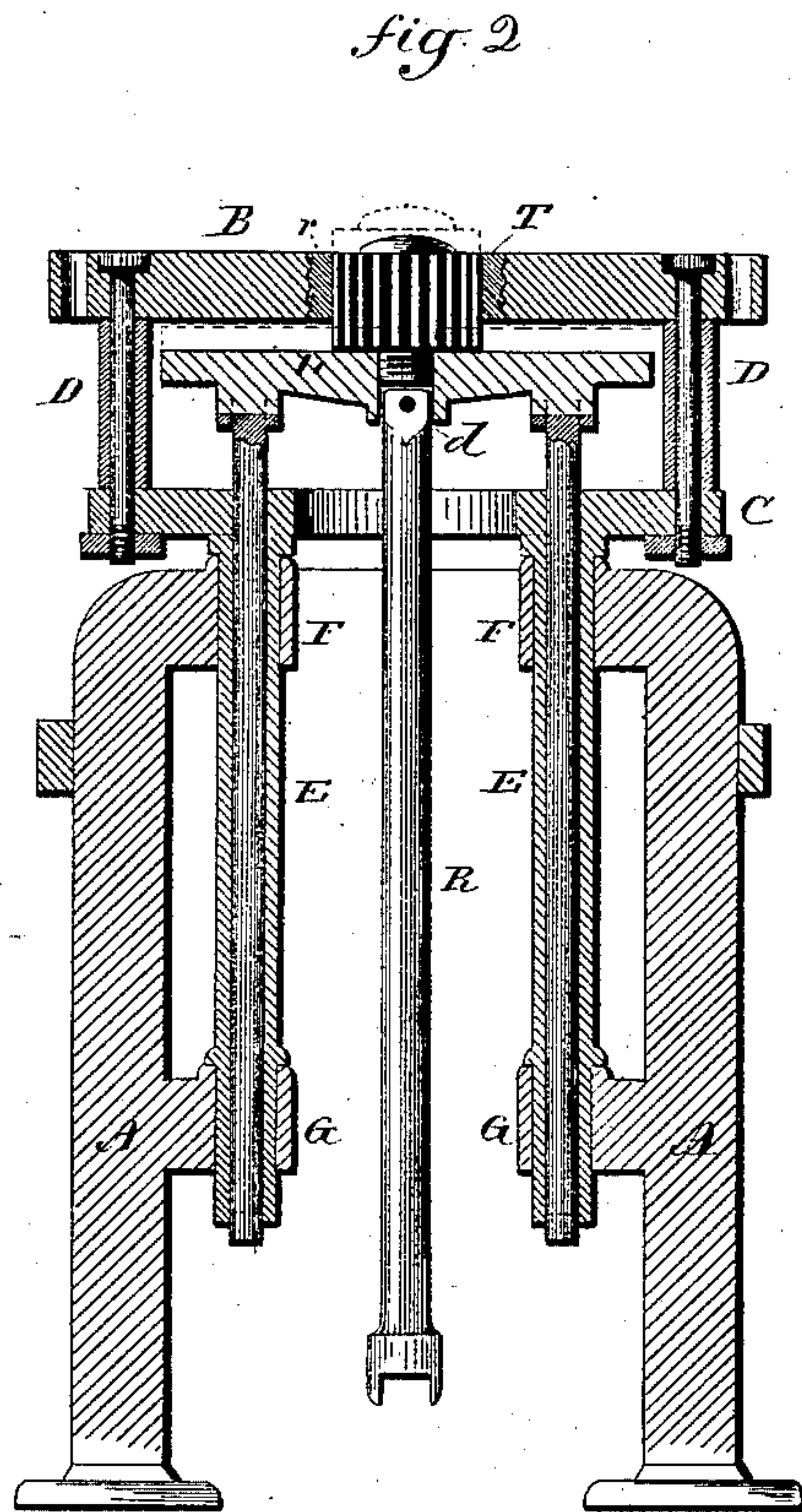
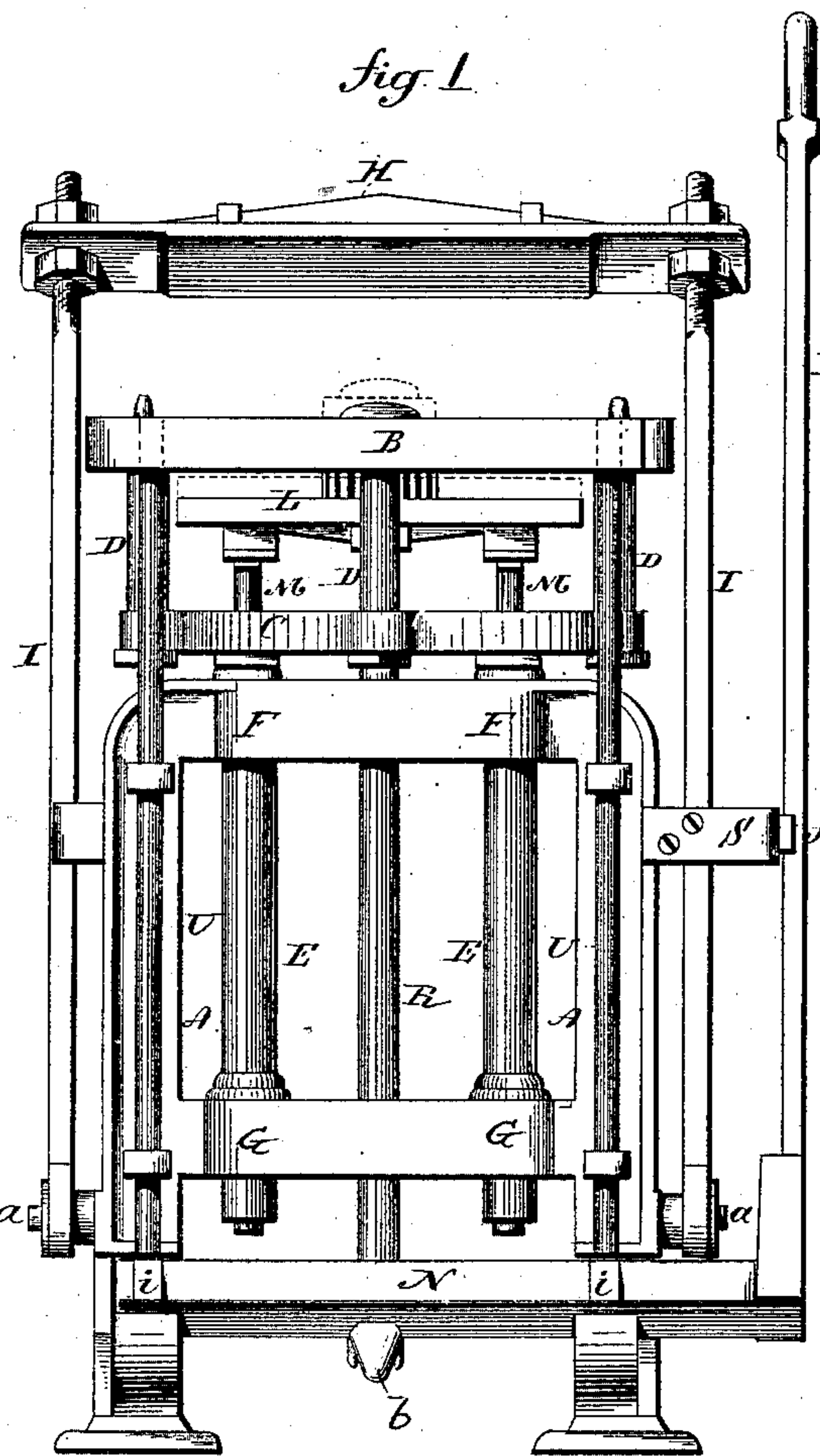
(No Model.)

2 Sheets—Sheet 1.

H. REYNOLDS.  
MOLDING MACHINE.

No. 281,926.

Patented July 24, 1883.



Witnesses.  
*John H. Murray*  
*John C. Earle*

*Henry Reynolds*  
Inventor.  
By Atty.  
*John C. Earle*

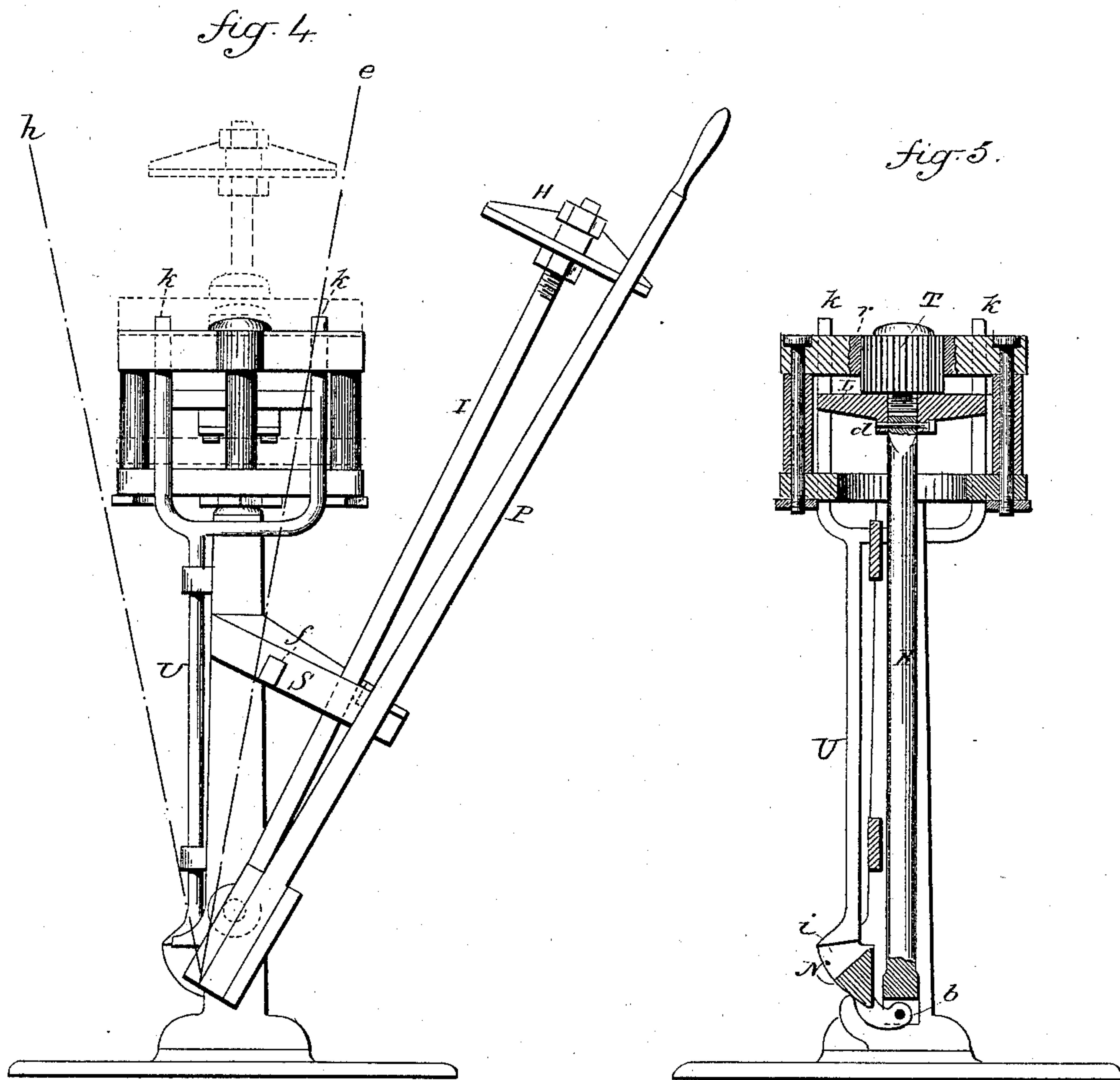
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MOLDING MACHINE.

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Witnesses.  
J. R. Channing  
J. C. Earle

Henry Reynolds  
Inventor  
J. C. Earle



# UNITED STATES PATENT OFFICE.

HENRY REYNOLDS, OF NEW HAVEN; CONNECTICUT, ASSIGNOR TO  
REYNOLDS & CO., OF SAME PLACE.

## MOLDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 281,926, dated July 24, 1883.

Application filed May 31, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY REYNOLDS, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Molding-Machines; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a front view; Fig. 2, a vertical central section; Fig. 3, a top view; Fig. 4, a side view; Fig. 5, a transverse central section.

This invention relates to an improvement in machines for molding small articles in sand preparatory to casting, and particularly to that class in which the patterns are constructed to be drawn down through the mold-board, the object of the invention being to simplify the machine, and whereby a single movement of the one operating-lever will compress the sand and withdraw the pattern; and the invention consists in the construction, as hereinafter described, and more particularly recited in the claims.

A A represent the supporting-frame; B, the mold-board, supported from a cross-head, C, by posts D. The cross-head C is supported on vertical tubular guides E E, so that the mold-board may be moved up and down, the guides E E serving to maintain it in its horizontal plane, the guides working through bearings F F at the top and G G at the bottom. The upper end of the bearings forms a stop or rest for the mold-board when in its lowest position.

H is the swinging platen, hung by a rod, I I, extending each side down to a pivot, a, near the bottom of the machine, and so that the platen may be turned over the mold-board, as seen in broken lines, when compression of the sand is to be produced, and turned from it, as seen in Fig. 4, for the preparation of the flask.

L is the pattern-plate, arranged below and parallel with the mold-board B. It is supported on vertical guide-rods M M, which extend down through the tubular guide-rods E, as seen in Fig. 2, but so as to have a vertical

movement independent of the mold-board, and between the mold-board and the cross-head.

N is a rock-shaft arranged in the bottom of the machine, which is operated by a hand-lever, P, as in the usual molding-machines of this class. On the rock-shaft N is an arm, b, extending rearward and hung to one end of a connecting-rod, R, the other end of the rod being hung to the pattern-plate L, as at d, Fig. 2. The pattern-plate standing a little below the mold-board, as seen in Fig. 2, the action of the first forward movement of the lever to the position indicated in broken lines e, Fig. 4, is to raise the pattern-plate independent of the mold-board until the pattern-plate strikes the mold-board B; then the lever engages a shoulder, f, on an arm, S, on the side of the frame; then a still further forward movement of the lever, as into the position seen in broken lines h, Fig. 4, will raise the pattern-plate and mold-board together, and this is the compressing movement usual in this class of machines. It will be understood that the hand-lever P is sufficiently elastic to permit it to be sprung to the right to escape the shoulder f in either the forward or back movement, as may be required, its natural path, however, being in line with the shoulder. On the pattern-plate the pattern T is arranged in suitable position—here represented as a pattern for a pinion, and arranged in the center of the pattern-plate. Through the mold-board is an opening corresponding to the pattern, and fitting it closely, but so that the pattern will move freely up and down through the mold-board, the extent of the projection of the pattern above the mold-board corresponding to the depth of the mold to be made in one part of the flask.

The operation of the machine is as follows: The parts standing as represented in the drawings, the operator draws the lever P forward until the pattern is raised through the mold-board, as seen in broken lines, Figs. 1 and 2. This brings the pattern-plate, or something in connection with it, hard upon the mold-board, and so that the two are firmly supported, leaving the pattern above the mold-board to the required extent. The operator then places the one part of the flask upon the mold-board,



fills it with sand, and places the board upon the sand in the usual manner, draws the platen A over the flask, and then pulls the lever P forward, carrying the pattern-plate, mold-board, and flask upward to properly compress the sand. This done, he turns the lever P backward, which brings the mold-board, pattern-plate, and flask down from the platen until the mold-board is arrested by its bearing on the frame of the machine, and then continuing the rear movement of the lever P the pattern-plate descends, drawing the pattern down through the mold-board and from the sand. Then that part of the flask may be removed and a duplicate filled in the same manner, the two parts forming a complete mold corresponding to the pinion-pattern or any pattern which may be upon the pattern-plate. By thus combining the pattern-plate and mold-board, communicating the movement to the mold-board through the connection between the rock-shaft and pattern-plate, I simplify the construction of the machine to a considerable extent—that is, avoid independent levers or mechanism for imparting the requisite movement to the pattern-plate to properly present it above the mold-board and withdraw it from the sand.

While I prefer to make the guides for the mold-board tubular and arrange the guide-rods of the pattern-plate through the said tubular guides, they may be otherwise arranged, it only being essential that the mold-board and pattern-plate shall be so arranged that the first upward movement of the pattern-plate presents the pattern above the mold-board, and then the continued upward movement of the pattern-plate carries with it the mold-board.

In removing the part of the flask in which the mold has been made from the mold-board it is essential that it should be raised evenly therefrom. This is usually done by hand by the molder; but to start the flask mechanically I arrange vertical slides U, one at each side and in suitable guides on the frame, as seen in Figs. 1 and 4. These extend up and carry at their upper end two vertical followers, *k*, which extend up through the mold-board, and in a position beneath the frame of the flask when on the mold-board, the followers being free for vertical movement independent of the mold-board. On the front side of the shaft N a cam, *i*, is arranged beneath each of the vertical slides U, as seen in Figs. 1 and 4. As the lever is turned forward to the position *e* in Fig. 4, to present the pattern above the mold-board, the cams *i* permit the followers *k* to drop flush, or below the upper surface of the mold-board, so that part of the flask may be readily set upon the mold-board. Then after the sand has been compressed, as before described, and the lever, in returning, has arrived at the position *e*, Fig. 3—that is, where the pattern-plate begins to descend—the cams *i* begin to act upon the vertical slides U, and raise those slides, forcing the followers *k* up through the mold-board against the flask, and the lever continuing its rear

movement to the position seen in Fig. 3, the followers pass up through the mold-board and raise the flask, as indicated in broken lines, Fig. 4. Then when the lever is returned to the position *e* the followers *k* return as the pattern ascends. This lifting device insures the proper starting of the flask from the mold-board, and avoids much of the care which is necessary on the part of the molder in starting his flask from the mold-board.

It is necessary in this class of molding-machines that the pattern shall fit closely in the mold-board, but yet have perfect freedom of movement up and down. To make such a fit for an irregular-shaped pattern—as, for instance, a pinion—by cutting a hole in the mold-board of that particular shape is quite expensive, and in case of such fitted patterns the mold-board is useless for any other shaped pattern—that is, when it is desired to change the pattern a new mold-board having the pattern fitted to it must be made—and if it happen that no more castings from that particular pattern are required the mold-board is a total loss. To avoid this expense of fitting and also save the mold-board, I make an opening through the mold-board considerably larger than the pattern, then lay the pattern into that opening and pour around it a melted composition of metal to fill the space, as at *r*, Fig. 3. This composition must be of such a nature that it will not shrink to any considerable extent in cooling. The composition best adapted to this use is two and one-half pounds lead to ten pounds type-metal. These are melted together, and when poured into the opening around the pattern the composition flows freely and makes the most perfect fit around it, does not shrink, yet will permit the pattern to move freely up and down through it. When all the castings shall have been made from a particular pattern thus fitted, the metal may be removed from the opening in the mold-board, another pattern introduced, and the metal poured around it in like manner. Thus the mold-board will be saved, which, but for the introduction of this composition to fit the pattern, would have been lost.

The surface of the opening through the mold-board may be of irregular shape, so that the metal poured into the opening will interlock with the mold-board and be secured in place. In introducing the metal the better plan is to lay the mold-board, face downward, upon a flat bed, with the pattern in its place, then pour in the metal, the flat bed making a flush and even surface upon the face side; or it may be cast in and then the surface of the metal filling dressed off flush with the face of the mold-board.

I claim—

1. In a sand molding machine, the combination of the mold-board B, arranged on vertical guides, the pattern-plate L, arranged below the mold-board, also on vertical guides, the pattern on the plate L, extending up through a corresponding opening in the mold-



board, a rock-shaft, N, a hand-lever, P, with connection R between said rock-shaft and pattern-plate, whereby the first upward movement of the pattern-plate presents the pattern above the mold-board, and then, in its continued upward movement, correspondingly raises the mold-board, and on the return of the rock-shaft the mold-board and pattern-plate descend together to a bearing-point for the mold-board, and the continued movement of the rock-shaft will draw the pattern-plate and its pattern downward from and independent of the mold-board, substantially as described.

2. The mold-board B, supported on tubular guide-rods E, the pattern-plate L, supported on rods *m*, through said tubular guide-rods, the rock-shaft N, hand-lever P, and rod R, which connects the pattern-plate with the said rock-shaft, whereby the first upward move-

ment of the pattern-plate presents the pattern above the surface of the mold-board, and then, in its continued movement, raises the mold-board, and on the return of the rock-shaft the mold-board and pattern-plate descend together to a bearing-point for the mold-board, and the continued movement of the rock-shaft will draw the pattern-plate and its pattern downward from and independent of the mold-board, substantially as described.

3. In a molding-machine, the follower *k*, extending up through the mold-board, combined with the cam *i* on the rock-shaft N, substantially as described.

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Witnesses:

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