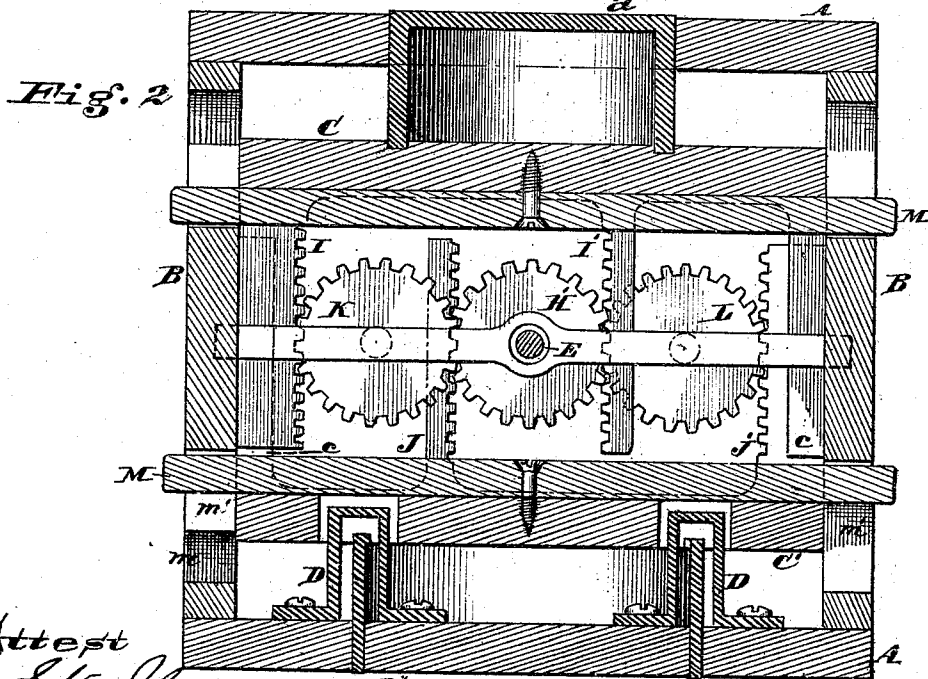
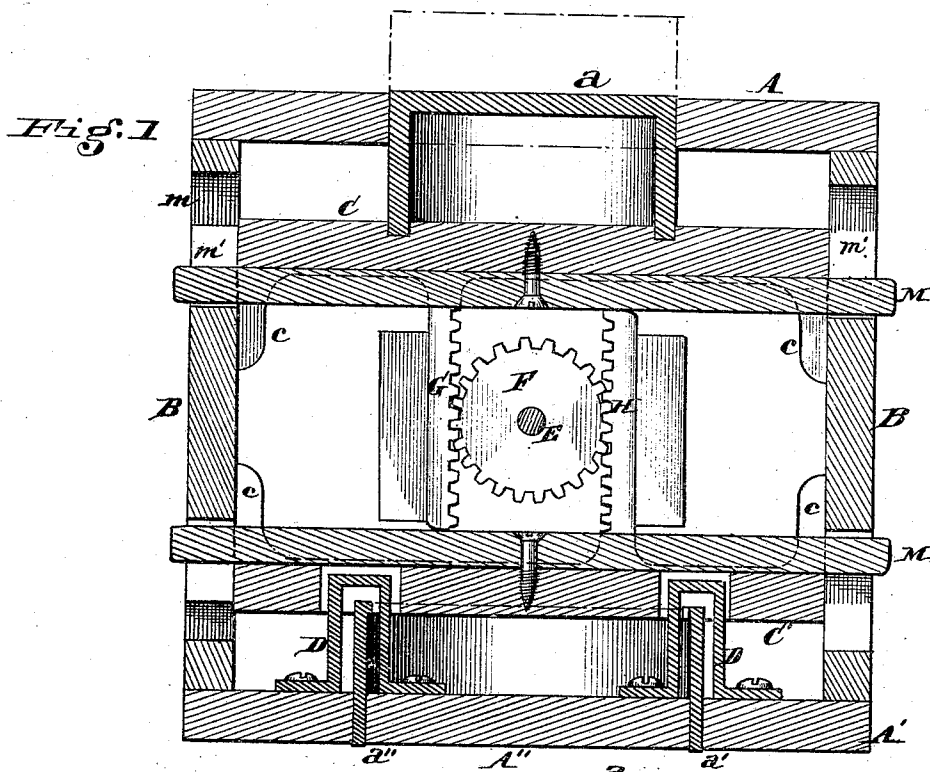


R. J. HOWDON.
MACHINE FOR FORMING MOLDS.

No. 172,318.

Patented Jan. 18, 1876.



Attest
Edgar Jones
John D. Jones

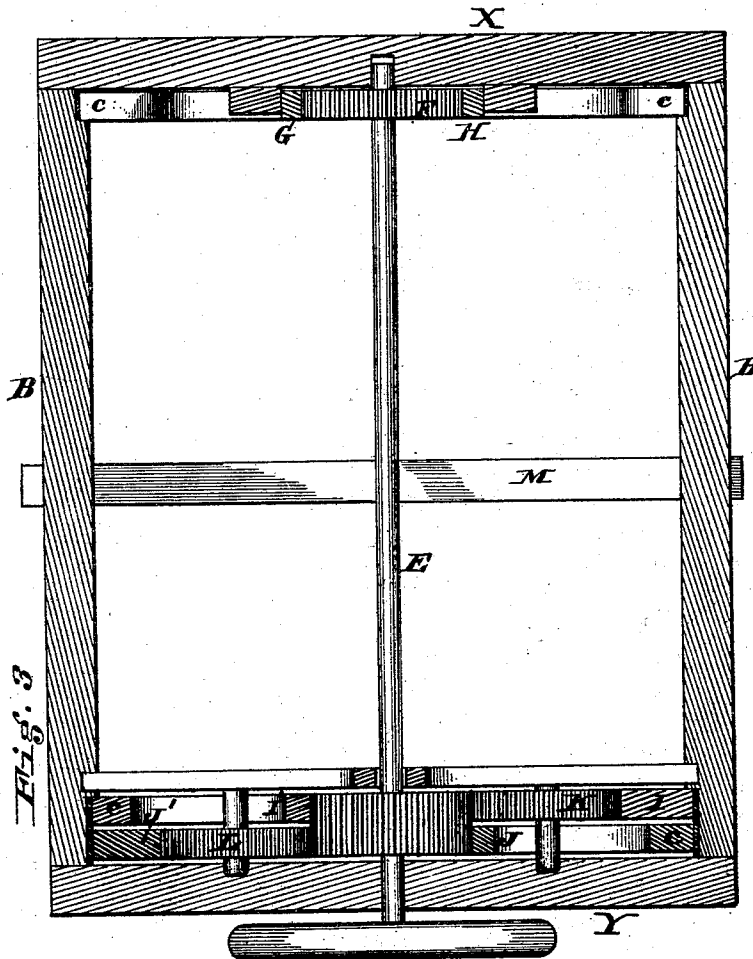
Inventor
Robert J. Howdon
By T. Millward
Attorney

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Edgar Cross
for the witness

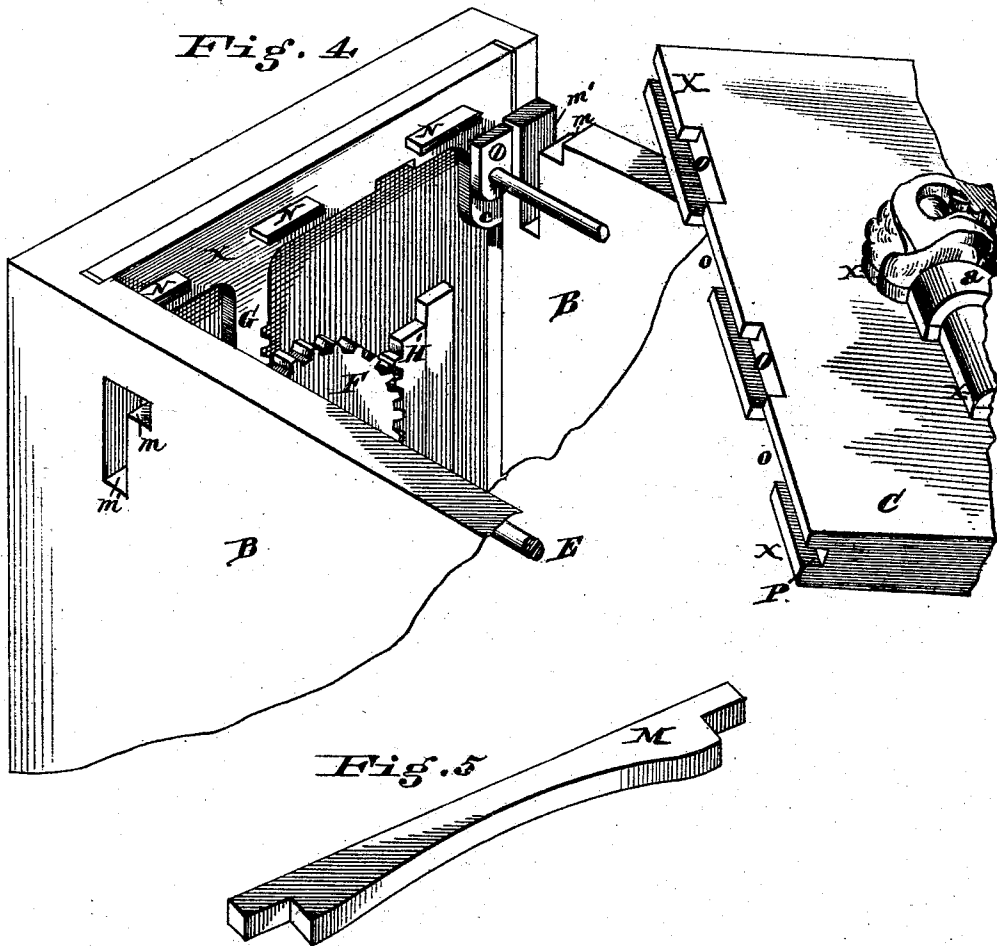
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UNITED STATES PATENT OFFICE.

ROBERT J. HOWDON, OF CINCINNATI, OHIO, ASSIGNOR OF ONE-EIGHTH
HIS RIGHT TO JOHN D. VANCE, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR FORMING MOLDS.

Specification forming part of Letters Patent No. **172,318**, dated January 18, 1876; application filed
May 31, 1875.

To all whom it may concern:

Be it known that I, ROBERT J. HOWDON, of Cincinnati, Hamilton county, State of Ohio, have invented an Improvement in Molding-Machines, of which the following is a specification:

My invention relates to a class of molding-machines which operate by drawing the patterns attached to a match-plate through a follower-board; and consists, first, in connection with the follower-board or pattern-frame, of certain peculiar devices, which secure the match-plate reversibly and rigidly, and permit its efficient operation in drawing; the object being to furnish a machine that will perform a large variety of work by the use of different match-plates, and that can draw the counterparts of the same pattern by providing for the reversing of the plate.

My invention consists in the second part, in connection with a suitable retaining-frame, of certain peculiar devices, concerted in action and working in contrary directions by one and the same power, for the purpose of drawing the counterparts of a single pattern from the two parts of a flask, so that the parts of the flask and their inclosed "impressions" will perfectly coincide when put together; or this double-acting device may be used to draw entirely different patterns.

My invention consists in the third part, in connection with aforesaid retaining-frame, of peculiar reciprocating devices for securing the patterns in position while being rammed.

My invention consists in the fourth part, in connection with carrying projections on the racks which move the match-plate, of a peculiar construction of match-plate to permit reversibility.

Figure 1 is a cross-section of a molding-machine embodying my device looking toward X, Fig. 3. Fig. 2 is a cross-section of the machine looking toward Y, Fig. 3. Fig. 3 is a sectional plan of the machine. Fig. 4 is a perspective view of a modification of my device adapted for reversal. Fig. 5 is a perspective view of the stop for the modification shown in Fig. 4.

The Figs. 1, 2, and 3 of drawing represent a double machine—that is, one adapted to

draw both halves of the same pattern, or two different patterns at the same time, and description will be embodied hereafter of the modified construction adapted for operating upon a single part of the mold.

A A' represent two follow-boards, upon which the separate halves of the flask are to be received. Between these follow-boards a frame, B, into which the patterns are drawn, is provided, secured in proper relation to the follow-boards by dowel-pins, or other means of security. The two halves, or separate parts, *a a'*, of the pattern, are secured to the sliding frames or match-plates C C' moving within the frame B, and correspond in size to the apertures in the follow-boards. In the drawing two forms of patterns are shown, one, *a*, having no interior formation, and the other such as is used for pulleys having an annular shape, which leaves a central portion of sand. In order to properly support this sand I prefer to have a follow-board, A'', for the center, supported from the board A' by connecting-pieces D, which bridge, as shown, over the pattern. The operation of a shaft, E, journaled in the frame B, suffices to draw both patterns, *a a'*, inward to a position wholly inside of the frame B, and in the act of thus drawing inward the pattern is preserved in line, and the sand fully supported upon the follow-boards A A' A'', so that it cannot be displaced by the friction occasioned by the withdrawal of the pattern. Two modifications of the gearing, by which the shaft is made to operate upon the patterns, are shown by Figs. 1 and 2. In Fig. 1 a pinion, F, is secured to the shaft, and on one side meshes into a rack, G, attached to the pattern-frame C, and on the other side meshes into a rack, H, which is attached to the other pattern-frame C', so that said frames are made by the rotation of said shaft to move in opposite directions. In this modification the strain upon the frames C C' is communicated through single racks, so that reliance has to be placed upon the side guide *c* of these frames to preserve them horizontal.

In order to assist in preserving horizontality I prefer to use double racks I I' to the pattern-frame C, and racks J J' to the pattern-

frame C', and the rack I' gearing into pinion H' and the rack I gearing into the pinion K, which meshes into wheel H'. The rack J meshes into the wheel H', and the rack J' into the wheel L. To the pattern-frames, or match-plates C C', stops M are pivoted, as shown, which, by swiveling, when the patterns are fully exposed above the follow-boards, are adapted to move into notches *m* in the frame B, and support the patterns against the force of ramming.

By relieving the stops from the notches the patterns may be drawn inward in the manner described, the ends of the stops moving in the slots *m'*. In the modification, Figs. 4 and 5, the three important parts are necessary: the follow-board, through which the pattern moves, (not shown,) the match-plate or pattern-frame C, and the stop M, the latter having the same notches and slots *m m'*, as are shown in the other figures; but the stop itself is not pivoted to the frame C, for the reason that the latter is reversible and does not permit of the fastening of the stop to the frame C. In this modification the plate C is reversible, and if the pattern (both halves of which are secured to the plate, one on each side) is irregular the follow-board also is reversible. By means of

the projections N, notches O, and groove P, the plate C, by dropping and sliding to fasten, is rendered reversible, and is securely held by the projections N when in place, so as to move with the racks. A sufficient thickness of material, same shape as pattern, must be left, as at *x x*, Fig. 4, for the thickness of the follow-board.

I claim—

1. The combination of follow-board A, pattern or match plate C, and stop M, operating in slots *m m'* of the main frame, substantially as and for the purpose specified.

2. The combination, substantially as specified, of the two follow-boards, the corresponding two reciprocating pattern-frames or match-plates, and the racks and pinions gearing for simultaneously operating said match-plates.

3. In combination with carrying-projections N the reversible plate C O P, operating substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

ROBERT J. HOWDON.

Witnesses:

EDGAR J. GROSS,
J. L. WARTMANN.