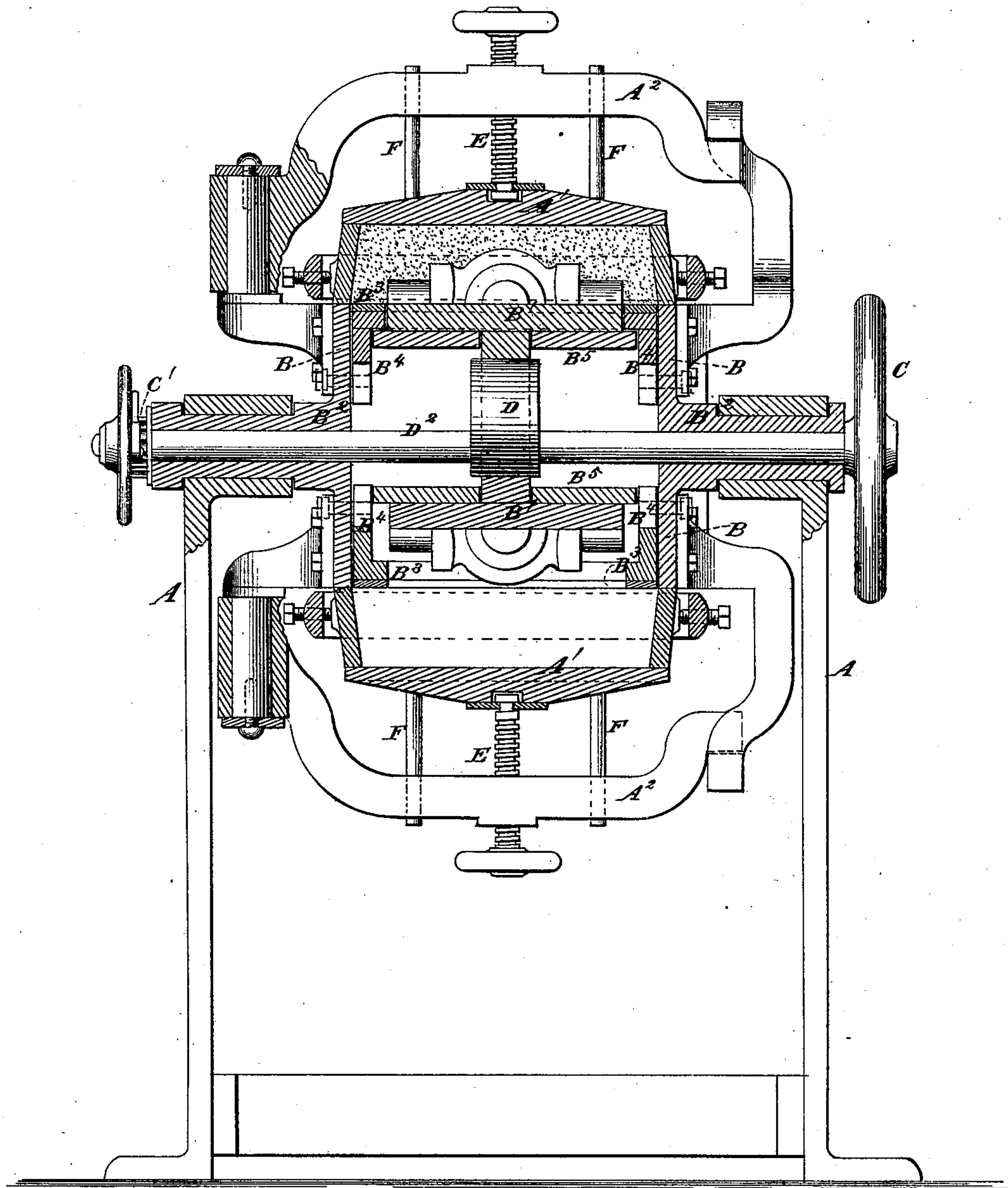


W. AIKIN & W. W. DRUMMOND.  
Sand-Molding Machine.

No. 202,322.

Patented April 16, 1878.

*Fig. 1.*



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Fig. 4.

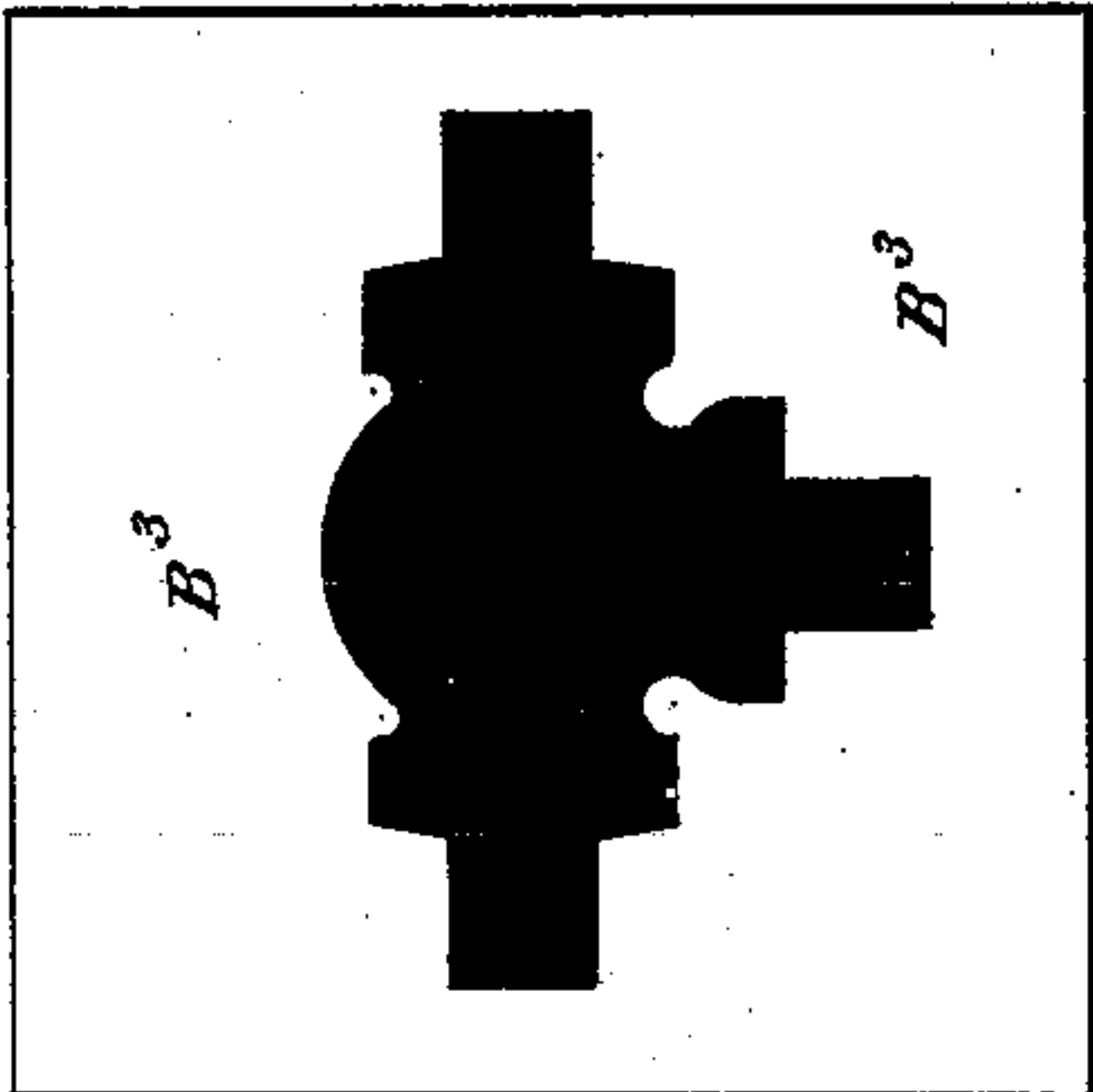


Fig. 3.

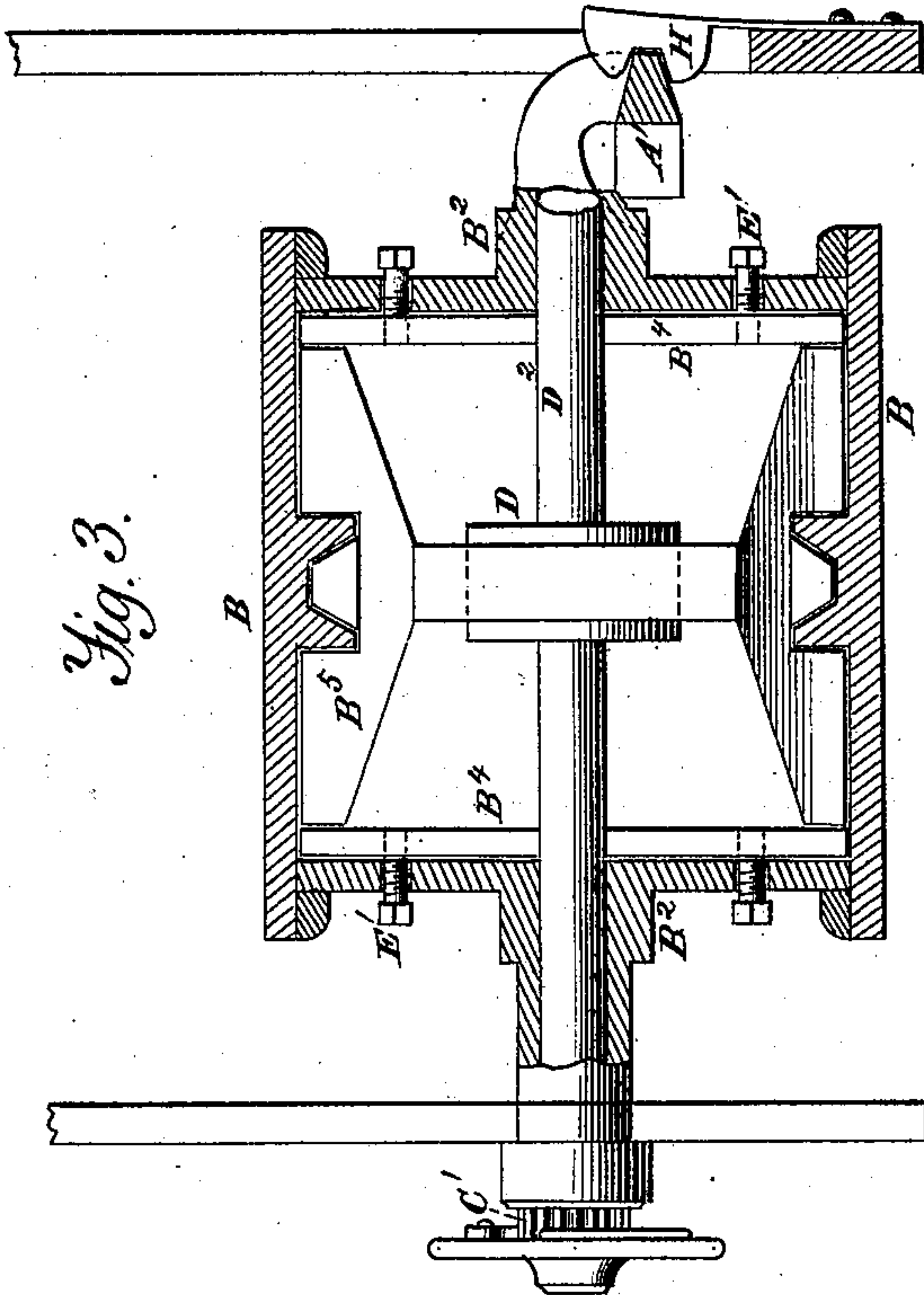
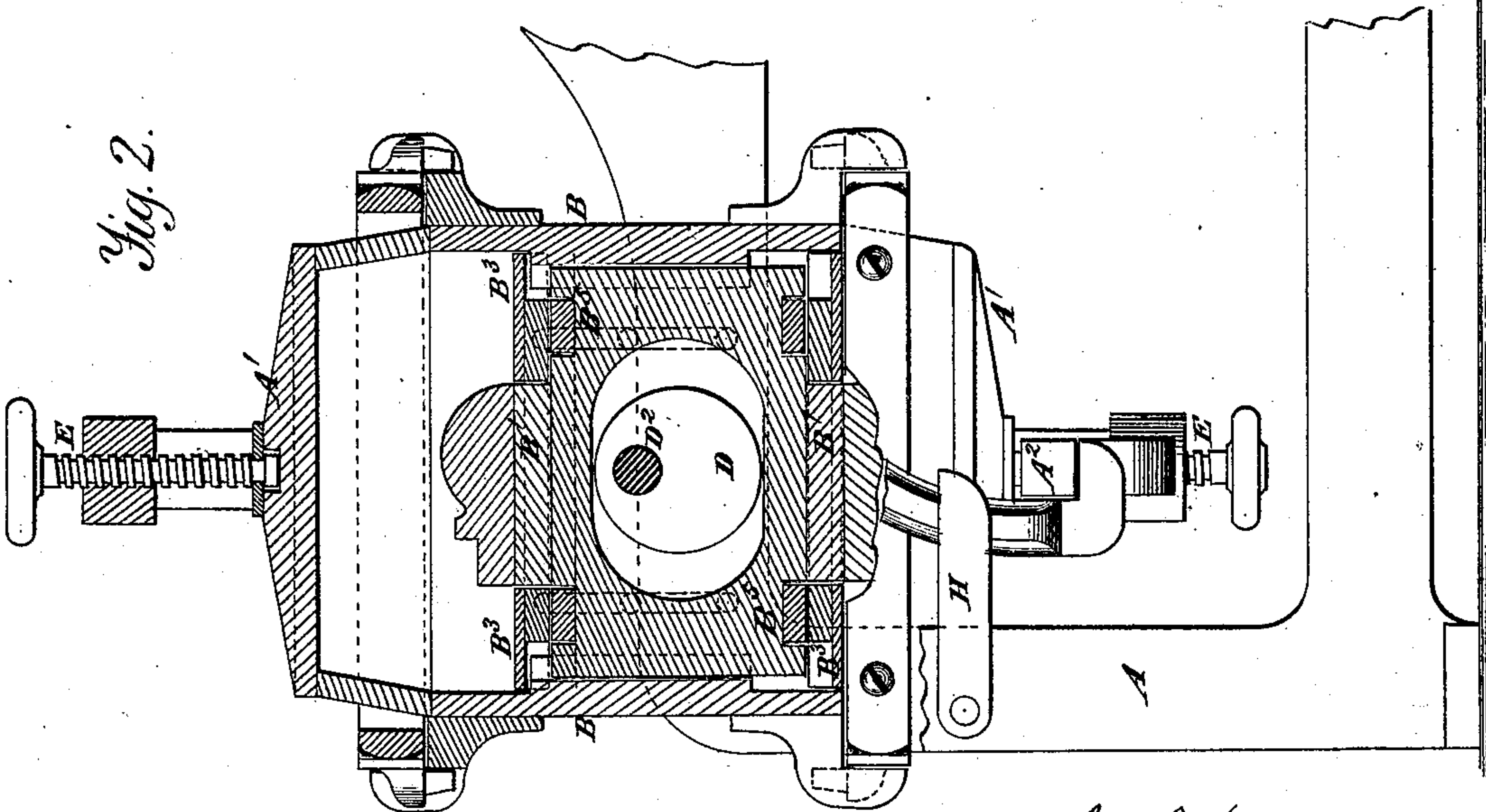


Fig. 2.



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WILLIAM AIKIN AND WILLIAM W. DRUMMOND, OF LOUISVILLE, KENTUCKY.

## IMPROVEMENT IN SAND-MOLDING MACHINES.

Specification forming part of Letters Patent No. 202,322, dated April 16, 1878; application filed June 20, 1877.

*To all whom it may concern:*

Be it known that we, WM. AIKIN and WILLIAM W. DRUMMOND, of Louisville, in the county of Jefferson and State of Kentucky, have invented a new and useful Improvement in Machines for Molding in Sand, of which the following is a specification:

In former applications for Letters Patent we have shown and described molding mechanisms employed for making molds in flasks filled with sand by compression around the patterns, the quantity of sand requisite for supplying the reduction, by compression, of the sand in the flask being supplied from a box adjusted to contain the requisite quantity. The pattern and follower-plates fill the bottom of the box and lift the sand by their simultaneous movements; then the mechanism withdraws the pattern from the sand, leaving the sectional follower-plates to support the sand until the pattern is withdrawn, leaving its or their impression in the sand; then the follower-plates are withdrawn, leaving so much of the mold complete in the sand contained in a half-flask.

In our present invention our object is to apply the same mode of molding in a machine so constructed that when one mold has been formed in a half-flask the operative parts may be turned over, bringing the flask below the machine, when another half-flask, being placed on the box (which in this case is open at both ends, top and bottom) and filled with sand, as before, another mold may be formed by the upward movement of another pattern and follower, the follower-plates and half-patterns being so connected that the same movement of the parts which raises the follower and pattern to form the mold in the upper flask will serve to withdraw the pattern and follower from the lower flask, which may then be removed, the box again reversed, and the operation repeated as before.

In the annexed drawing, making a part of this specification, Figure 1 is a transverse vertical section of the machine. Fig. 2 is a longitudinal vertical section of the same. Fig. 3 is a horizontal section of the same. Fig. 4 is a plan view of the follower.

The same letters are employed in all the figures in the indication of identical parts.

A is a frame, which supports the operative mechanism, supported by trunnions in boxes on the frame A. B is a box, designed to serve as a guide for the double pattern and follower heads, also to contain the amount of sand requisite to supply the reduction by compression, and to support the half-flasks in which the molds are formed. It is therefore open at both ends, and of sufficient length to contain a pattern and follower head in each end, and the necessary intermediate operative mechanism for controlling the movements of the plungers, the general molding mechanism, as well as the devices for attaching the half-flasks, being similar to those described in said application for the single machine, need not be particularly described herein, reference being made to the specification of said single machine for such parts.

The binder-plate A<sup>1</sup> is attached to a swinging arm, A<sup>2</sup>, which swivels on a pin fastened to the box B on one side, the free end swinging under a permanent catch attached to said box on the opposite side.

E is a screw, lever, toggle-joint, or equivalent device, passing through the swinging arm A<sup>2</sup>, by means of which the binder-plate A<sup>1</sup> may be forced against the end of the half-flask, to sustain the pressure of the sand when compressed by the action of plungers. The rods F F hold the binder-plate in its proper position. They are made to slide in the arm A<sup>2</sup>, thus allowing the plate to be either raised or lowered by the action of the screw E.

The double follower and pattern heads are formed in sections B<sup>1</sup> and B<sup>3</sup>, the former having the patterns fitted and fastened to both ends.

The patterns shown in the drawing are the halves of a globe-valve; but any other patterns may be used the form of which is adapted to make a mold, or part of one, by compression in the sand.

The forms of the pattern-heads B<sup>1</sup> B<sup>1</sup> being adapted to the outlines of the patterns, they are fitted with thickness pieces the exact shape of the largest part of the pattern, and make, with the pattern-plates, a perfect match. The sections B<sup>3</sup> B<sup>3</sup> are formed to close the spaces between the sections B<sup>1</sup> B<sup>1</sup> and between the latter and the sides of the box. These



sections  $B^1 B^1$  and  $B^3 B^3$  form a double head or plunger for compressing the sand in the flask, being moved simultaneously for the compression of the sand in forming the mold. The sections  $B^3 B^3$  are attached to cross-head  $B^4$ , arranged so as to support them independently of the supports of sections  $B^1 B^1$ . They are actuated by the eccentric  $D$ , working between the double heads and turning with the shaft  $D^2$ , which is operated by a wheel,  $C$ , on the outside of the frame, and is furnished with a pawl and ratchet,  $C'$ , which prevents the revolution of the shaft and eccentric except in one direction. The operation of the eccentric on the double plungers is such that an opposite movement is communicated to the sections of the plungers on opposite sides of the eccentric. Sections  $B^1 B^1$ , carrying the patterns, are attached to an independent cross-head,  $B^5$ , so as to permit the patterns to be withdrawn from the sand after compression in the flask, while the sections  $B^3 B^3$  of the follower remain in position to protect the edges of the molded sand.

$B^2 B^2$  are the trunnions attached to the box  $B$ , revolving in the bearings  $G G$  attached to the frame  $A$ .

A spring-catch,  $H$ , is attached to the frame, and made to engage the box and hold it stationary until it is detached, in order to reverse the position of the box.

$E E'$  are set-screws for regulating the position of the cross-heads  $B^4$ , supporting the sections  $B^3$ .

The operation of the machine is as follows: The proper patterns having been attached to each end of the double heads  $B^1$ , a half-flask is placed on top of the box  $B$  and filled loosely with sand to the level of the top. The binder-plate  $A^1$  is then swung over the flask and tightened on it by the screw  $E$ , or equivalent device. The wheel  $C$  is then turned, and the eccentric lifts the plungers, forcing the patterns into the damp sand in the flask, and forms a mold therein by compression. The spring-catch  $H$  is then withdrawn, and the box, with the flask and sand, in its then compressed condition, is turned in the trunnions so as to reverse its position. Another half-flask is then placed on the box and filled with sand, its binder-plate

is attached, and the wheel  $C$  again turned, so as to lift the plunger and form the mold therein by compression, in the same manner as before. This movement of the eccentric lifts the patterns out of the lower half-flask, thus completing the mold in the half-flask first operated upon. The screw  $E$ , or other device supporting the lower flask, is then released, the flask descending with the binder-plate, freeing it from the box. The binder-plate and flask resting on it are then swung to one side on the pivot of the arm  $A^2$ , and the flask is then removed. The spring-catch  $H$  is then released, the box reversed, and the operation repeated, thus forming successively the half-molds, which are afterward connected, and the operation of casting performed as in other cases.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination, in a machine for molding in sand, of the box  $B$  and double plungers, for forming a mold by compression of sand about the patterns in a half-flask on one end of the box at the same time that the mold is being completed in another half-flask on the opposite end of the box by the withdrawal of the patterns and follower, substantially in the manner set forth.

2. The combination of the wheel  $C$ , shaft  $D^2$ , eccentric  $D$ , and double-plunger sections  $B^1 B^3$ , arranged so that one pattern-section shall be drawn from the sand at the same time that the other pattern-section of the double plunger is forcing the sand into another flask to form the mold by compression, substantially as set forth.

3. In a machine for molding in sand, the sand-box  $B$ , hung, substantially as set forth, so as to permit the box to be reversed and the mold made partly in one half-flask and partly in the other half-flask.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WILLIAM AIKIN.

WILLIAM W. DRUMMOND.

Witnesses:

N. N. LUDWIG,

WILLIAM WOERNER.