No. 689,841. Patented Dec. 24, 1901.

J. T. ROWLANDS.

MOLDING MACHINE.

(Application filed Oct. 13, 1899.)

(No Model.)

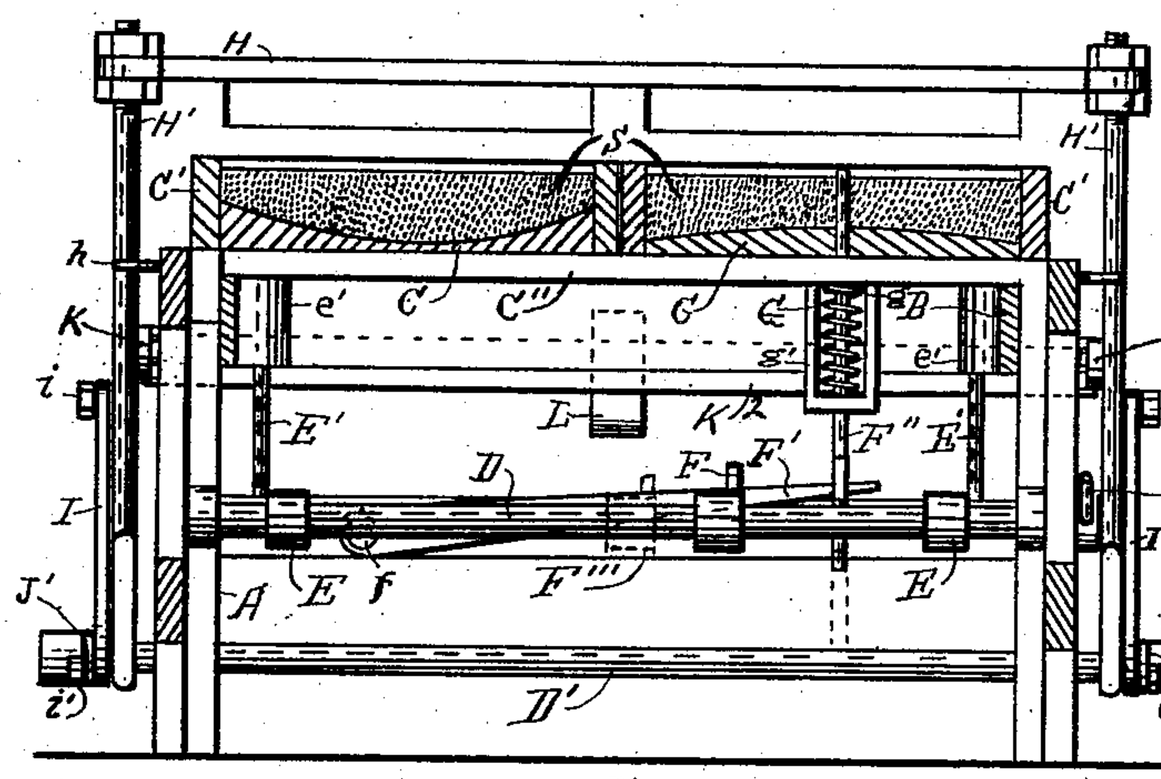

Fig. 1.

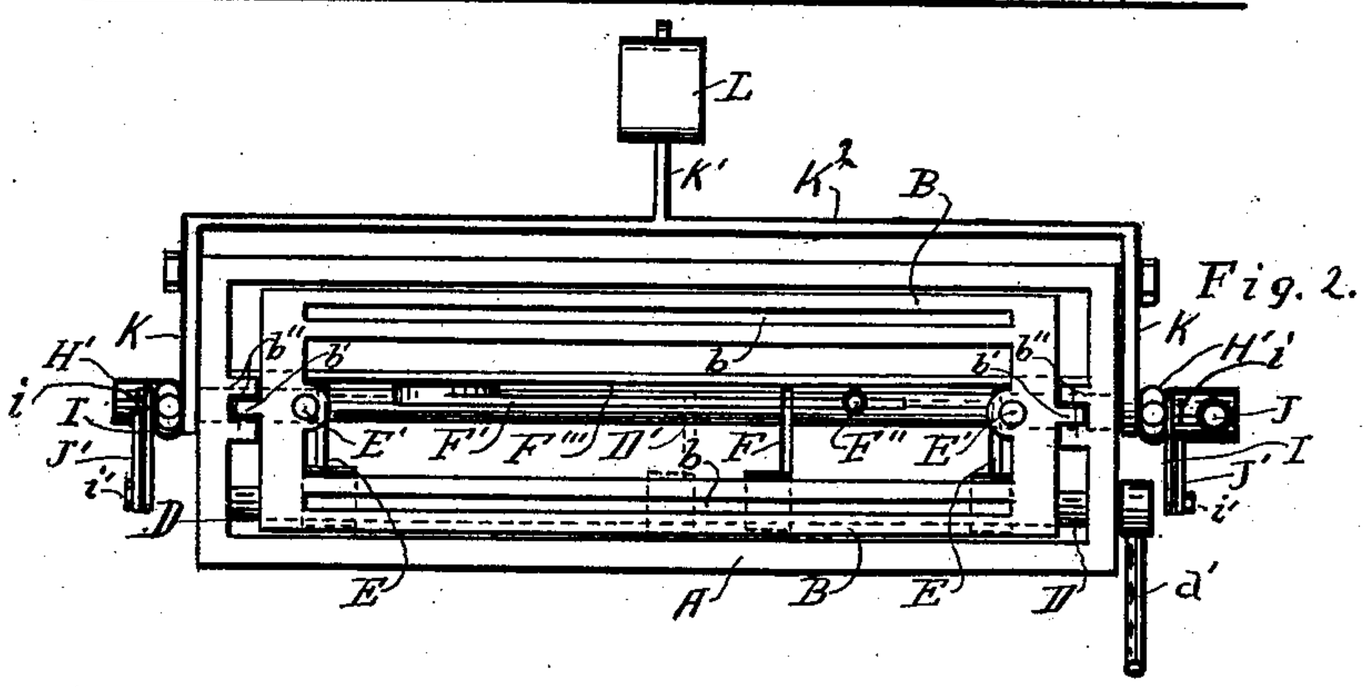

Fig. 2.

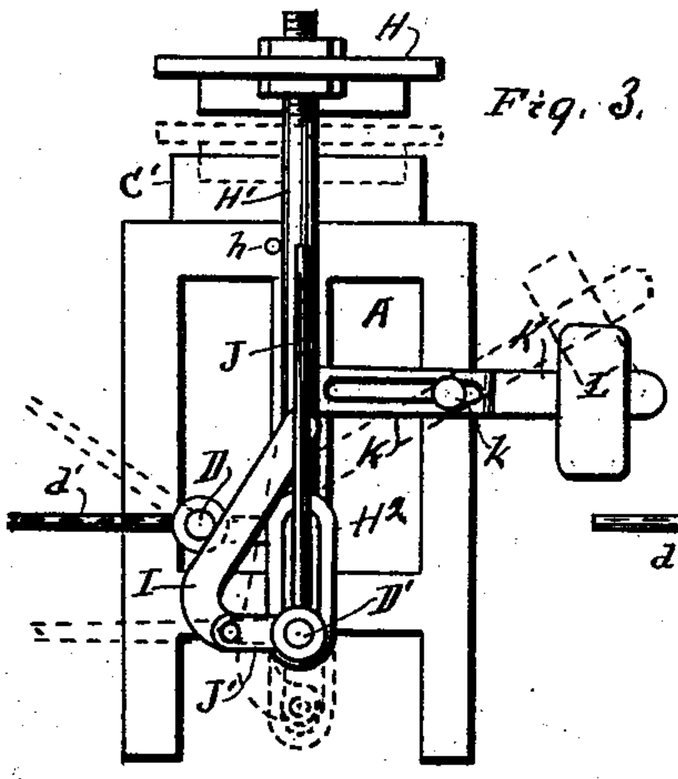

Fig. 3.

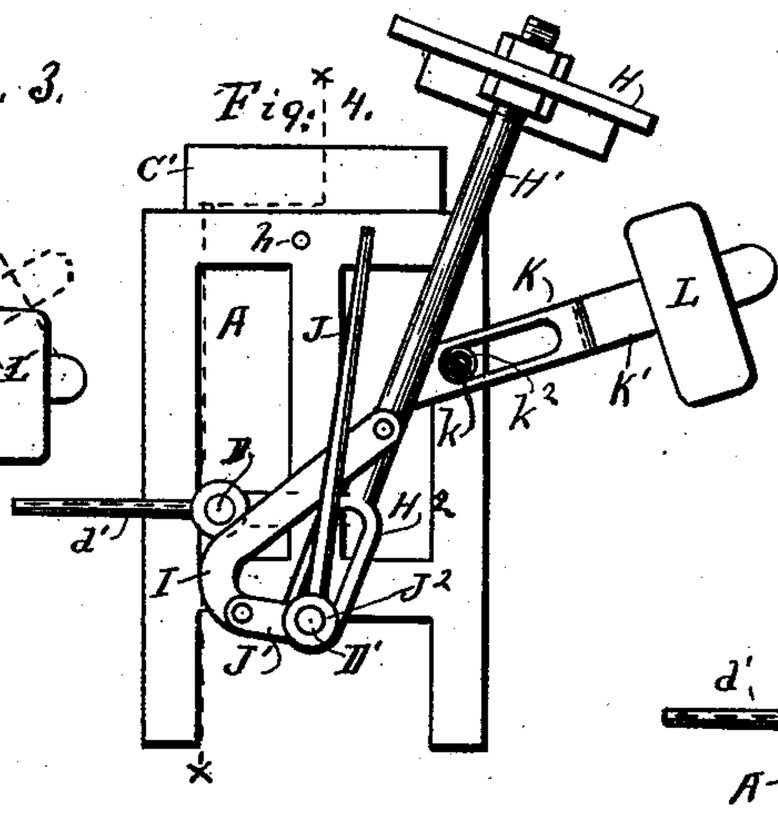

Fig. 4.

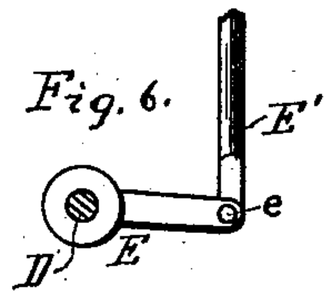

Fig. 6.

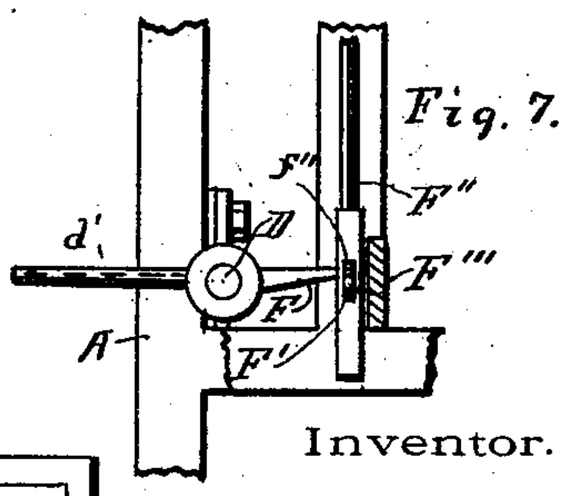

Fig. 7.

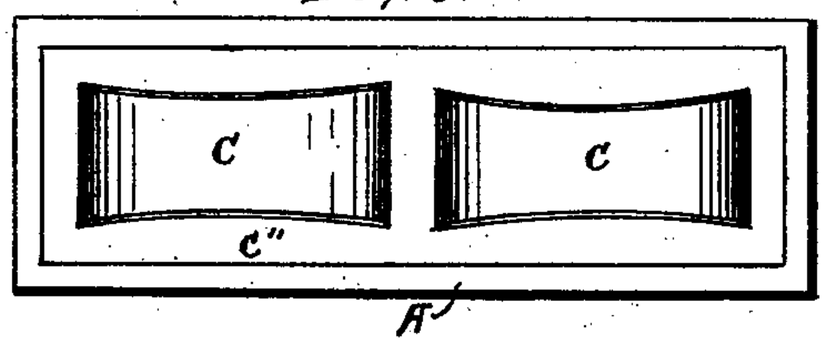

Fig. 5.

Witnesses.

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UNITED STATES PATENT OFFICE.

JOHN T. ROWLANDS, OF GRAND RAPIDS, MICHIGAN.

MOLDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 689,841, dated December 24, 1901.

Application filed October 13, 1899. Serial No. 733,546. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. ROWLANDS, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Molding-Machines, of which the following is a specification.

My invention relates to improvements in molding-machines for use in iron, brass, and other metal molding in sand; and its objects are, first, to provide a molding-machine with which the supporting-table and patterns may be drawn down from the mold, and thus insure the drawing of the pattern from the mold without breaking the edges of the mold at the line of parting; second, to provide a molding-machine with which the sprue-rod will automatically adjust itself to the vertical position of the press-plate and so arranged that the downward motion of the sprue-rod will be sufficiently greater than that of the table to insure the drawing of the rod entirely clear of the mold regardless of the thickness of the sand above the pattern, and, third, to provide for properly counterbalancing the press-plate, so that it may be easily and conveniently manipulated both vertically and laterally. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a sectional elevation of the machine on the line *x x* of Fig. 4. Fig. 2 is a plan of the machine with the patterns removed. Fig. 3 is an end elevation of the same, showing in outline two positions of the press-plate. Fig. 4 is the same, showing the press-plate thrown back, so that sand may be easily placed in the flasks. Fig. 5 is a plan of the frame of the machine, showing the relative position of the patterns and the stripping-plate. Fig. 6 shows the arm and connecting-rod for actuating the table and the manner of connecting them; and Fig. 7 is an end view of a section of the frame, showing the levers, &c., for actuating the sprue-rod.

Similar letters refer to similar parts throughout the several views.

A represents the frame of the machine.

B represents the vertically-reciprocating table.

C represents the pattern, and D and D′ represent the actuating-shafts.

The table is designed to be worked up and down freely in the slides or guides *b′ b″* in the frame, as indicated in Figs. 2 and 3, so that the patterns may be raised to or dropped from the mold or molding-flask, as desired. I accomplish this by the use of the shaft D, the arms E, and the lever *d′*, as follows: The connecting-rods E′ are attached at one end to the table in such a manner as to have a slight lateral motion to meet the motion of the arms as actuated by the revolving of the shaft and are pivoted at the other end to the ends of the arms E, as at *e*, so that when the lever *d′* is carried to the position indicated by the solid lines in Fig. 3 the table is carried up to the proper position to hold the patterns in the flasks to receive the molding-sand, and when the lever is carried back to the position indicated by the dotted lines the table, and with it patterns, is drawn down away from the flasks, so that the flasks containing the molds may be removed and pairs put together for casting without danger of crumbling or chipping off the edges of the mold. The table is provided with a slot *b* at each side, through which bolts may be passed with which to secure the patterns to the table.

The sprue-rod F″ is designed to pass through and above the pattern, as shown in Fig. 1, and is held to position by a spring, as G, in a depending frame *g′*, that presses against the collar *g* on the rod, so that when the press-plate H is drawn down to pack the sand in the mold the sprue-rod will be carried down with it, but when the plate is raised the sprue-rod will follow to a sufficient distance to allow of properly forming the top of the sand around the rod to insure the pouring of the melted metal without danger of dropping small pieces of detached sand into the mold. The lower end of this rod may be provided with a slot, as shown at *f″* in Fig. 7, for the reception of the end of the arm F′, which passes through the lower end of the rod. The opposite end of this arm is pivoted to the girth F‴, so that it may work freely on the bolt *f*.

It is evident that as the sprue-rod must extend above the molding-sand some distance and as the thickness of the sand above the pattern is likely to be greater than the distance that the pattern must be dropped to clear it from the mold the sprue-rod must move con-

siderably more than the table and the patterns, and to provide for this extra movement I pivot the arm F′ at one end to the girth F‴ and bring the arm F to bear upon it at any point between the pivot-point and the point of connection with the sprue-rod, as indicated by the solid lines and the dotted lines representing the position of this arm, as the movement of the sprue-rod may require. Thus the sprue-rod would be moved much farther with the arm at the position indicated by the dotted lines than if it was placed in the position of the solid lines, and a corresponding change of motion will be induced as the arm is placed at any point intermediate these two.

It will be seen that the arms E, that actuate the table and patterns, are supported on the same shaft as the arm F, and the same motion of the lever *d′* moves both, but moves the sprue-rod faster than it does the table, in consequence of the increased movement of the arm F′, as hereinbefore explained.

The press-plate is supported upon the rods H′. These rods are or may be divided at the lower end, as at H^2, so that one arm may pass down each side of the shaft D′ to form a guide to regulate the vertical reciprocation of the rods, and a pivot upon which they may turn when throwing the plate back, as indicated in Fig. 4, to carry it from over the mold, so that the flasks may be removed from or inserted into the machine. The dotted lines in Fig. 3 represent the position of the press-plate when drawn down to pack the sand in the molds or flasks (indicated at C′) for the purpose of packing the sand firmly upon the patterns. This plate is raised and lowered as follows: The lever J and the arm J′ each are constructed integral with the hub J^2, which is securely attached to the shaft D′, and the arm J′ is connected with the supports H′ by means of the connecting-rods I, one end of which is pivoted to the supports, as at *i*, and the other end is pivoted to the arm J′, as at *i′*, said connecting-rods being preferably bent at the lower end, so that the arm J′ may be carried by the vertical center line of the supports and the shaft, thereby effecting a double purpose—first, to exercise the greatest possible leverage on the standards as the plate approaches the flasks, and, second, to be in position so that the pressure will not be lessened upon the sand when the lever is left down or until a sufficient amount of effort is exerted upon the lever to carry the arm back beyond the center of the shaft.

For the purpose of facilitating the manipulation of the press-plate I attach a lever, as K, at one end to each standard or support H′ to the frame, as at *k*, and place a counterpoising-weight L upon the opposite end, so arranged that it will practically balance the weight of the plate and its supports, so that no great exertion will be necessary to raise the plate from the flasks after the sand has been properly packed. I find that the most convenient way of constructing these levers is to connect the levers at the ends of the frame by means of a bar, as K^2, that extends the entire length of the frame and has an arm extending back, as indicated at K′, upon which to place the weight L. This form insures a uniform action upon the standards, while with two separate levers and weights the exertion might be made sooner upon one standard than upon the other, or it might be that one standard would move easier than the other and cramp and prevent the plate from being raised, and thus cause great inconvenience and waste of time. I provide for the lateral movement of the press-plate by forming slots, as shown at *k′* in Fig. 3, in the arms H of the lever that supports the counterpoise, and, if desired, a small anti-friction wheel or idler k^2 may be placed on the bolt *k* to reduce the friction, and I sometimes place pins *h* in position to stop the standards and save strain on the bolt *k* when the plate is brought up to place.

The patterns C pass up through the stripping-plate C″ (see Fig. 5) in the usual manner, when the flasks C′ may be placed upon the stripping-plate and sand S placed therein to be pressed to form the molds by the press-plate H, as hereinbefore stated.

I prefer the use of the slot at the lower end of the standards to the connections in ordinary use, as by its use all danger of sand collecting and interfering with the operation of the standards is averted.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a molding-machine, a frame, a vertically-reciprocating press-plate mounted upon standards and supported on a frame, a lever connected with said standards and slidingly fulcrumed to the frame, a weight on said lever, a shaft secured to the frame, a lever and arms attached to said shaft, and connecting-rods connecting said arms with the standards, substantially as and for the purpose set forth.

2. In a molding-machine, a frame, a vertically-reciprocating press-plate, a table, a vertically-reciprocating sprue-rod passing through said table, a revoluble shaft having an arm projecting therefrom, a lever pivoted at one end to the frame and the other end connected with the sprue-rod, said lever being in position to be actuated by the movement of the arm upon said shaft, and a lever on said shaft, substantially as and for the purpose set forth.

3. In a molding-machine, a frame, a vertically-reciprocating and laterally-oscillating press-plate, a vertically-reciprocating table, a sprue-rod passing through said table, a revoluble shaft, arms secured to said shaft and connecting-rods connecting said arms with the table and the sprue-rod, an actuating-spring on said sprue-rod, and a lever on said shaft, substantially as and for the purpose set forth.

4. In a molding-machine, a frame, a press-plate supported upon vertically-reciprocating standards on said frame, a revoluble shaft having an actuating-lever, and arms on said shaft, said arms connected with the standards to reciprocate them, a lever connected to the standards, slidingly fulcrumed to the frame and provided with a weight counterbalancing the press-plate and standards, a vertically-reciprocating table, a vertically-reciprocating sprue-rod passing through said table, an actuating-spring with said sprue-rod, a lever pivoted at one end to the frame and connected at the other end with the sprue-rod, a revoluble shaft, arms upon said shaft, connecting-rods connecting said arms with the table, an arm on said shaft in actuating contact with the sprue-rod lever, and a lever upon said shaft, substantially as and for the purpose set forth.

Signed at Grand Rapids, Michigan, October 1, 1899.

JOHN T. ROWLANDS.

In presence of—
A. A. LYTLE,
I. J. CILLEY.