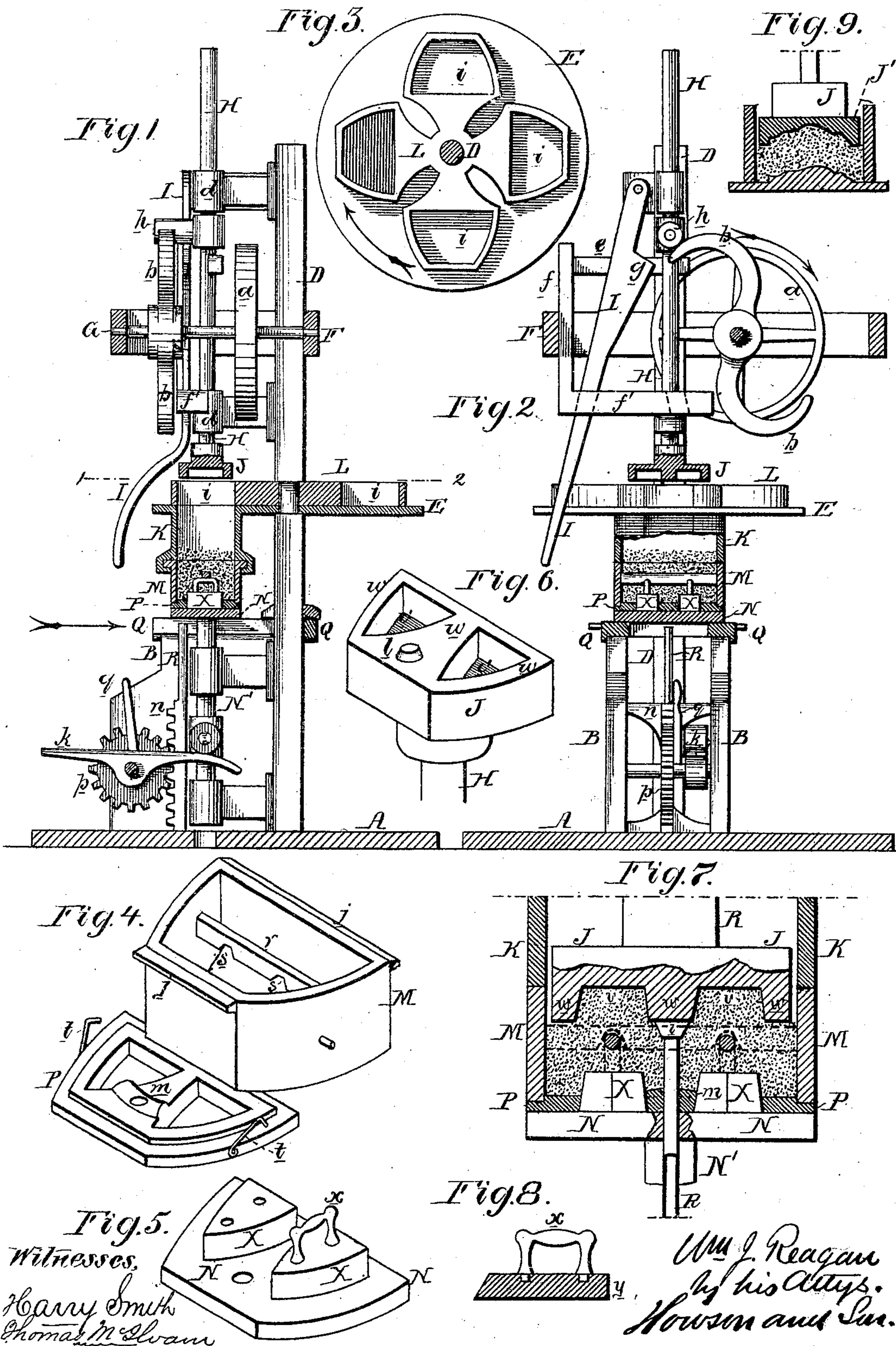


W. J. REAGAN.

Machines for Forming Sand-Molds.

No. 150,079.

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UNITED STATES PATENT OFFICE.

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ROYER'S FORD IRON-FOUNDRY, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR FORMING SAND-MOLDS.

Specification forming part of Letters Patent No. **150,079**, dated April 21, 1874; application filed
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To all whom it may concern:

Be it known that I, WILLIAM J. REAGAN, of Royer's Ford, Montgomery county, Pennsylvania, have invented an Improved Molding Apparatus, of which the following is a specification:

The object of my invention is to facilitate the preparation of molds for sad-irons and other objects, by the machine which I will now proceed to describe, reference being had to the accompanying drawing, in which—

Figure 1 is a sectional elevation of the machine; Fig. 2, a front elevation, partly in section; Fig. 3, a sectional-plan view on the line 1 2, Fig. 1; Figs. 4, 5 and 6, perspective views of parts of the machine, drawn to an enlarged scale; Fig. 7, an enlarged sectional view of part of the machine; and Fig. 8, a sectional view of the sad-iron, to the preparation of molds for which the machine is, in the present instance, especially adapted.

The fixed portion of the machine consists of a bed-plate, A, a frame, B, and vertical post, D, secured to the said bed-plate, and a horizontal circular table, E, and rectangular frame, F, secured to the post. A shaft, G, provided with a driving-pulley, *a*, and with two curved arms or cams, *b b*, turns in suitable bearings in the frame F, the said cams, as the shaft revolves, being arranged to alternately raise and release a rod, H, adapted to bearings *d d*, secured to the post D, and carrying at its lower end a rammer, J, which will be more particularly referred to hereafter. The sliding rod H is prevented from turning in its bearings by its arm *e*, adapted to a fixed guide, *f*, for which other devices for effecting the same purpose may be substituted. The rammer J, when elevated by the cams *b*, may be prevented from descending by a lever, I, hung to the fixed frame, and having an inclined projection, *g*, which, when extended beneath the roller *h* on the rod H, supports and slightly raises the same above the influence of the cams. The lever I is maintained in either of its two extreme positions by notches in a slotted guide, *f'*, to which its lower end is adapted. (See Fig. 2.) From the under side of the table E projects a short tube, K, the internal shape of which corresponds to the external shape of the rammer,

which can slide freely in said tube; and resting upon the top of the table, and turning upon the post D as a pivot, is a plate, L, in which are formed four or other convenient number of sand-receptacles, *i*, admitting of being brought successively above and coincident with the tube, and beneath the rammer. (See Figs. 1 and 3.) The molding-flask M (best observed in the perspective view, Fig. 4) has flanges *j j* at the top, by means of which it is suspended from the lower end of the tube K, and the patterns X X are secured to the top of a plate, N, Fig. 5, which can be raised, so as to introduce the patterns into the flask, by the action of a treadle-lever, *k*, on the guided bar N', to which the said plate is attached. (See Fig. 1.) A loose follow-board, P, having openings of the same shape and size as the patterns, is interposed between the bottom of the flask and the plate N, for a purpose explained hereafter; and the said plate N is maintained in its elevated position by two connected sliding bars, Q, which are interposed between the same and the top of the frame B. The "gate" and "runner" are formed in the sand in the flask partly by a projection, *l*, on the under face of the rammer, partly by a projection, *m*, on the upper surface of the follow-board P, and partly by a tube, R, adapted to openings in the said follow-board and plate N, and secured to or forming part of a rack, *n*, to which a vertical sliding movement can be imparted by a pinion, *p*, provided with an operating-arm, *q*. (See Figs. 1 and 7.)

The machine, as constructed in the present instance, is adapted to the formation of molds for the casting of sad-irons, such as illustrated in Fig. 8, the handles *x* of which are completed separately, and are united to the body *y* in the operation of casting. In the top of each of the patterns X, Fig. 5, there are two holes for the reception of the ends of the above-mentioned handles *x*, which must be introduced into the mold with the patterns; and as the handles are necessarily fitted somewhat loosely to the patterns, and are apt, therefore, to become inclined laterally in one direction or the other, each flask M is provided with a cross-bar, *r*, having V-shaped notches *s s* in its under edge, into which the said handles are thrust when

the patterns are elevated, and are thus brought to and maintained in the required perpendicular position. (See Figs. 4 and 7.)

The operation of the machine is as follows: A flask, M, is first adjusted to the tube K, the latter having grooves for the reception of the ribs *j* on the said flask, and the plate N, patterns, and follow-board P are then elevated to the position shown in Figs. 1, 2 and 7, by depressing the treadle *k*, the latter being released after the bars Q have been drawn forward, as shown, so as to support the said plate N, and parts connected thereto. The follow-board P is next attached to the flask by means of hooks *t*, Fig. 4, with which it is provided at its opposite ends. One of the receptacles *i*, which has previously received a supply of sand of the exact bulk required for the mold, is now brought above the tube K by a partial rotation of the plate L, and its contents fall through the latter into the flask, immediately after which the retaining-lever I is drawn back to the position shown in Fig. 2, and the roller *h* drops onto one of the cams *b* of the shaft F, which is slowly rotating in the direction of the arrow. The instant the end of the cam *b* passes the roller *h* the rammer J is released and falls through the receptacle *i* into the tube K, and packs the sand around and upon the patterns in the flask M. This blow may be repeated one or more times, but I have generally found two strokes sufficient. The projection *l* of the rammer makes a conical indentation in the sand, as shown in Fig. 7, and while the rammer is still resting upon the sand the tube R is suddenly elevated, and then withdrawn, so as to form a passage through the sand, communicating with the indentation made by the rammer, and forming a gate or runner for the passage of the molten metal, which runner is continued to the patterns by the projection *m* of the follow-board P.

It is a fact well known to molders that unless the sand be forced into the spaces between and around the patterns, as well as directly upon the same, it will be packed more densely above than at the sides, thus producing imperfect molds and castings. Hence the sand is always introduced in small quantities into the flask at first, and packed carefully around the patterns, instead of being forced down bodily by a blunt rammer.

In order to properly ram the sand in my improved machine, I make the face of the rammer conform to the shape of the pattern or patterns around and upon which the sand is to be packed; in other words, I form depressions, *v*, of a shape corresponding to that of the patterns directly above the latter, and corresponding projections, *w*, directly above the spaces between the said patterns, so that the sand may be forced as compactly into the spaces as upon the patterns. (See Figs. 6 and 7.) This I consider an important feature of my invention, and it is applicable to the molding of a variety of objects as well as sad-irons.

In some cases it may be desirable to use a separate plate, J', having projections and recesses, the shape of which are determined by the pattern, the rammer having a plain surface for acting on the plate by pressure or impact. (See sectional view, Fig. 9.) After the packing of the sand has been completed the rammer is raised, and is maintained in its elevated position by adjusting the lever I beneath its roller *h*. The sliding bars Q are next drawn back by a movement in the direction of the arrow, Fig. 1, and the plate N falls until it rests upon the frame B, thus drawing the patterns without disturbing the sand, which is sustained by the follow-board P during the withdrawing operation. The handles *x*, it will be understood, are held in the molds by the sand. The follow-board is next unhooked from the flask, and falls to its former position on the depressed plate N, and the flask is then drawn laterally from the guides of the tube K, and is replaced by an empty one, with which the same operation is repeated.

I propose to attach a blade to the fixed post D for scraping off the tops of the receptacles *i*, for it is important that these receptacles should contain just sufficient sand wherewith to complete the mold. The said receptacles may be filled by hand, or from a hopper or otherwise. The tube R, in conjunction with the projection *l* on the rammer and the rib *m* on the plate P, forms a clear passage for the molten metal to the vacancies left in the sand by the patterns.

I propose in some instances to so combine a hinged leaf or table with the rising and falling pattern-plate N that it can be turned to a position directly over the latter after the patterns have been depressed, thus preventing any particles of sand which may become disengaged in detaching the flask from falling on the said patterns.

I claim as my invention—

1. The combination of the table E, its tube K, and flask M with the plate L, its receptacles *i*, and the rammer J.
2. The combination, substantially as described, of the cams *b b* and lever I with the rod H, carrying the rammer.
3. The flask M and its flanges *j j*, in combination with the tube K and its guides.
4. The flask M, constructed substantially as described, with a cross-bar, *r*, having notches *s* in its under edge, for the purpose specified.
5. The combination of the supporting-frame B, the pattern-plate, and the interposed sliding bars Q.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WM. J. REAGAN.

Witnesses:

WM. A. STEEL,
HARRY SMITH.