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MOLD HANDLING AND STABILIZING MACHINE

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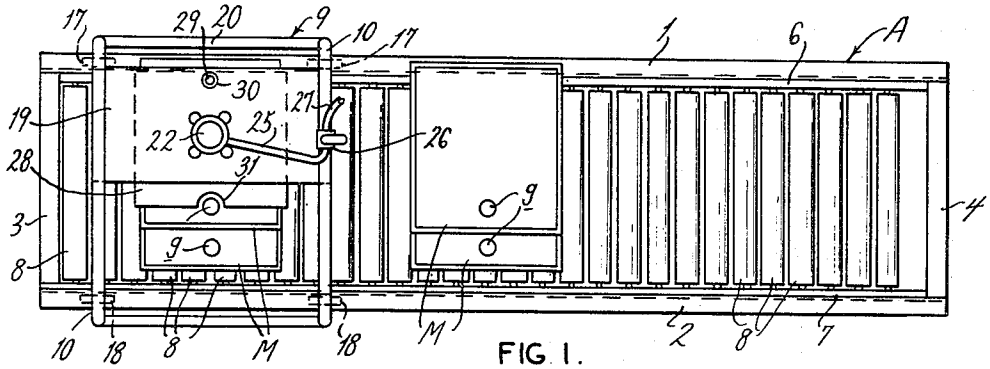


FIG. 1.

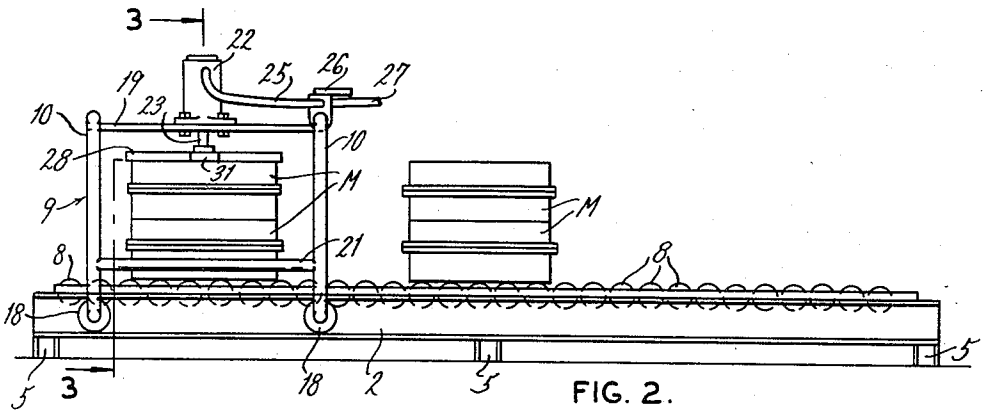


FIG. 2.

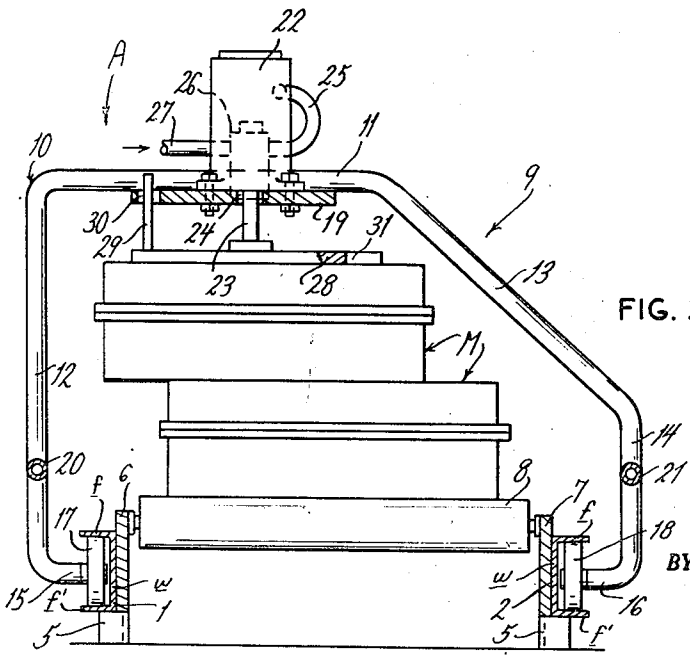


FIG. 3.

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MOLD HANDLING AND STABILIZING MACHINE

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This invention relates in general to certain new and useful improvements in foundry machinery and, more particularly, to a mold-handling machine for holding the mold while the casting is being poured.

It is conventional foundry practice in the casting of metals to form a sand mold around a pattern by using a two-part flask consisting of upper and lower sections, respectively referred to as the cope and drag. The drag is ordinarily placed on a vibratory table and filled with molding sand. The pattern is suitably embedded in the sand and the sand is rammed. Next, the parting-face of the mold is usually treated to insure proper separation of the upper and lower halves of the mold. The cope is then positioned over the drag, filled with sand, and rammed, a suitable gate structure being appropriately installed. Finally, the cope and drag are temporarily separated to permit removal of the pattern and, if necessary, the placement of chaplets, cores, or other internal elements, depending on the type of casting being fabricated. The cope and drag are then put back together. In the method of casting usually referred to as "green sand" casting, molten metal is poured directly into the mold without baking, drying, or other further processing, and, consequently, there is a tendency for the molten metal to force the cope and drag apart, particularly where the volume of molten metal is large and the hydraulic pressure resulting therefrom is correspondingly great.

It is, therefore, the primary object of the present invention to provide a mold-handling machine which will hold the cope and drag securely together during pouring operations and prevent the mold from being disrupted or separated by the hydraulic pressure or other forces set up within the interior of the mold by the molten metal.

It is another object of the present invention to provide a mold-handling machine by which it is possible to pour a series of successive molds in rapid succession in a simple, time-consuming, and labor-saving manner without loss of molds or the production of defective castings due to disruption or separation of the mold by the molten metal being poured therein.

It is another object of the present invention to provide a machine of the type stated which is simple and economical in construction and requires very little maintenance or servicing.

With the above and other objects in view, my invention resides in the novel features of form, construction, arrangement, and combination of parts presently described and pointed out in the claims.

In the accompanying drawing—

Figure 1 is a top plan view of a mold-handling machine constructed in accordance with and embodying the present invention;

Figure 2 is a front elevational view of a mold-handling machine; and

Figure 3 is a fragmentary vertical sectional view taken along line 3—3 of Figure 2.

Referring now in more detail and by reference characters to the drawing, which illustrates a preferred embodiment of the present invention, A designates a mold-handling machine comprising a base frame consisting of a pair of elongated beams **1**, **2**, transversely connected at their opposite ends by cross beams **3**, **4**, and supported in upwardly spaced horizontal relation a short distance above the floor by means of a plurality of short legs **5**. The beams **1**, **2**, are preferably formed of channel iron having vertical webs *w* and upper and lower flanges *f*, *f'*, extending, more or less, horizontally outwardly from the web *w* so that the channels are, in effect, the outwardly opening sections, so to speak, as may be seen by reference to Figure 3.

Welded upon the inwardly presented vertical faces of the webs *w* of each of the beams **1**, **2**, are elongated plates **6**, **7**, projecting marginally upwardly beyond the flanges *f*, *f'*, of the beams **1**, **2**, for rotatably supporting the ends of a plurality of uniformly spaced parallel horizontal rollers **8**, which are of sufficient diametral size to project upwardly a substantial distance above the plane of the upper horizontal margins of the elongated plates **6**, **7**, all as best seen in Figure 2.

Provided for cooperation with the base frame is a shiftable carriage **9** comprising two identical tubular side frames **10**, each integrally including a top bar **11**, a vertical back leg **12**, an oblique front bar **13**, and a short vertical front leg **14**, the legs **12**, **14**, being, at their lower extremities, bent horizontally inwardly in the formation of axial spindles **15**, **16**, respectively, for operatively receiving roller wheels **17**, **18**, the latter being sized for operatively fitting between the flanges *f*, *f'*, of the beams **1**, **2**, and riding smoothly therein. Welded, or otherwise rigidly mounted at its ends upon and extending horizontally between the top bars **11** of the two side frames **10** and holding them rigidly in spaced parallel relation, is a heavy bridge plate **19**. Also welded at their ends to and extending horizontally between the back legs **12** is a tubular rear brace **20** and similarly welded to and extending horizontally between the front legs **14** is a tubular front brace **21**. It will be apparent that the two side frames **10** are thus rigidly held together as a unit in forming the carriage **9** which thus bridges the base frame and rolls freely upon the upwardly presented faces of the base frame beams **1**, **2**.

Bolted, or otherwise rigidly secured upon the upper face of the bridge plate **19**, is a pneumatic cylinder **22** having a downwardly projecting push rod or ram **23** which extends loosely through a relatively large aperture **24** formed in the bridge plate **19**. The pneumatic cylinder **22** is connected through an air line **25** to a manual control valve **26**, which is, in turn, connected through an air line **27** to a suitable source of air pressure (not shown).

Rigidly mounted upon the lower end of the ram **23** is a heavy, rugged, pressure plate **28** provided adjacent its rearward margin with an upwardly projecting stabilizer rod **29**, which extends loosely upwardly through a guide-aperture **30**, formed in the bridge plate **19**. The pressure plate **28** is also provided, preferably centrally of its forward margin, with a U-shaped clearance recess **31**, as best seen in Figures 1 and 3 and for purposes presently more fully appearing.

In use, a pair of flasks or molds M, ready to be poured, are placed upon the rolls **8** in superposed relation and vertically staggered so that the gates *g* will both be presented to the front and readily accessible so that the foundry workmen can pour a stream of molten metal directly therein. A whole series of such vertically superposed pairs of molds M may be arranged in side-by-side relation so that the carriage **9** may be rolled along the base frame and stopped in line with any one of the several stacked pairs of molds M. Thereupon, the control valve **26** is suitably manipulated admitting air into the

cylinder 22 and forcing the pressure plate 28 down upon the upwardly presented face of the uppermost mold. It should be noted in this connection that the pressure plate 28 should be of such size and area that it will cover substantially the entire upper face of the mold M and rest securely upon the lateral edges of the flask, thus, in setting up the stacked pairs of molds M, the workmen must position the molds M so that the gate *g* of the uppermost mold M will lie within the clearance space of the recess 31. In this manner, any tendency for the copes of the molds M to float up under the hydraulic force of the molten metal is effectively prevented and, furthermore, any tendency of the sand in the mold to become weakened or blown upwardly is also effectively prevented. The cylinder 22 is preferably of the slow acting type, so that, when air is admitted thereto, it will move the pressure plate 28 downwardly smoothly and without excessive speed and the molds M will thus be placed under a "squeeze" rather than sharply jarred or impacted.

After molten metal has been poured into the molds M through the gates *g*, the workmen need only wait a few seconds to allow the metal to take on an initial chill, whereupon there will be no further danger of disrupting the mold. The valve 26 is then shifted to initial position, releasing the pressure from the cylinder 22 and causing the ram 23, with its associated pressure plate, to shift upwardly to initial position. The carriage 9 may then be shifted laterally to the right or left, as the case may be, into alignment with the next set of molds to be poured.

It will, of course, be understood that the vertical distance between the upper surfaces of the rollers 8 and the under surface of the pressure plate 28, when the latter is in upwardly shifted or inoperative position, is a matter of choice, depending upon the size of the flasks being used in the particular foundry operation for which the mold-handling machine A is designed. It is entirely possible to build the mold-handling machine A with a vertical height sufficient to accommodate a single very deep flask or a number of shallow flasks stacked in superposed relation.

It should be understood that changes and modifications in the form, construction, arrangement, and combination of the several parts of the foundry machinery may be made and substituted for those herein shown and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A mold-handling machine comprising a base platform for supporting a plurality of molds in stationary position in a row in side-by-side straight line relation, a carriage arranged for shiftable movement to and fro along the row from mold to mold while the molds remain stationary, a pressure plate operatively mounted on and carried by the carriage for superposition optionally over any one of the molds, and means on the carriage associated with the pressure plate for forcing the pressure plate downwardly upon the upwardly presented face of any one of the molds.

2. A mold-handling machine comprising a base platform for supporting a plurality of molds in stationary position in side-by-side straight line relation, a wheel-mounted carriage arranged for shiftable movement to and fro along the row from mold to mold while the molds remain stationary, a pressure plate operatively mounted on and carried by the carriage for superposition optionally over any one of the molds, a pneumatic cylinder on the carriage said pneumatic cylinder including a downwardly presented push rod which is operatively contacted at its lower end with the pressure plate, valve means carried by the carriage and operatively connected to the cylinder and to a source of fluid under pressure whereby to controllably admit such fluid to the cylinder for forcing the pressure plate downwardly upon the upwardly presented face of any one of the molds over which the carriage is positioned.

3. A mold-handling machine comprising a base platform for supporting a plurality of casting molds in stationary position in side-by-side straight line relation, said base being provided along its opposite longitudinal margins with track-forming means, a carriage disposed straddlewise over the platform and having downwardly extending legs provided with rollers operatively engaged in the track-forming means so that the carriage may be freely shifted to and fro along the platform from mold to mold while the molds remain stationary, a pressure plate operatively mounted on and carried by the carriage for superposition optionally over any one of the molds, a pneumatic cylinder on the carriage, a piston operatively mounted in the cylinder and connected with the pressure plate, valve means carried by the carriage and operatively connected to the cylinder and to a source of fluid under pressure whereby to controllably admit such fluid to the cylinder for forcing the pressure plate downwardly upon the upwardly presented face of any one of the molds over which the carriage is positioned.

4. For use with a plurality of molds arranged in stationary position in side-by-side straight-line relation, a mold stabilizing machine comprising a pair of frame members having substantially the shape of an inverted U transversely connected in spaced parallel relation so as to freely straddle the molds and being capable of movement freely to and fro along the row of molds, wheels operatively mounted at the lower ends of said frame members for facilitating such movement, a bridge member extending between the upper portions of the frame members, a pneumatic cylinder carried by said bridge member, said pneumatic cylinder including a push-rod extending downwardly with respect to the bridge member, a pressure plate operatively mounted on the lower end of the push rod for bearing down upon the top surface of any one of the molds over which the mold stabilizing machine may be positioned, and a valve operatively mounted on and carried by the mold stabilizing machine, said valve being connected to the cylinder and to a source of fluid under pressure, whereby to controllably admit such fluid to the cylinder for forcing the pressure plate downwardly into engagement with the mold over which it is located.

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