May 27, 1941. E. E. ETEAU 2,243,092

MOLD MAKING MACHINE

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Fig. 2.

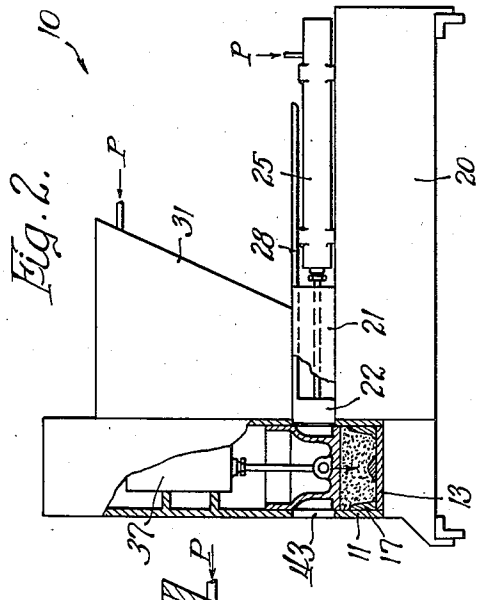
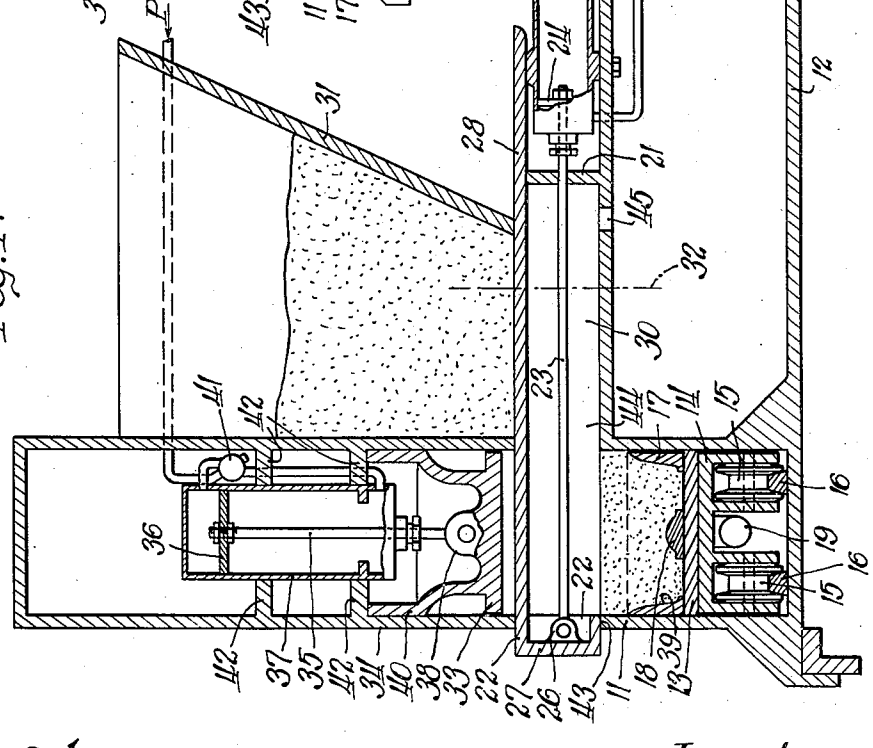


Fig. 1.



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MOLD MAKING MACHINE

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4 Claims. (Cl. 22—40)

My invention relates, generally, to making sand molds, and it has particular relation to machines for making such sand molds.

An important object of my invention is to machine make foundry sand molds whereby the rate of production of such sand molds may be greatly increased over methods now in use.

Another important object of my invention is to machine make foundry sand molds of high grade and uniformity.

Another object of my invention is to provide a machine for making such foundry sand molds.

Another important object of my invention is to pack sand into a flask while the flask and pattern plate are being vibrated to thereby make an improved sand mold.

Still another important object of my invention is to provide an improved mold flask whereby the sand is packed inwardly against the side of the pattern.

Other objects of my invention will, in part, be obvious and in part appear hereinafter.

Accordingly, my invention is disclosed in the embodiments thereof shown in the accompanying drawing, and it comprises features of construction, combination of parts, and arrangement of elements which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the appended claims.

For a more complete understanding of the nature and scope of my invention, reference may now be had to the following detailed description, taken in conjunction with the accompanying drawing, in which:

Figure 1 is a vertical sectional view taken lengthwise through a mold making machine forming one embodiment of my invention; and

Figure 2 is a side elevational view, partly in section, and partly broken away, of the mold making machine of Figure 1 showing one of the operating stages thereof.

Referring now to Figures 1 and 2 of the drawing, the reference character 10 designates generally a sand mold making machine having a mold housing 11. The mold housing 11 may be supported on a frame base 12. A pattern plate 13 is supported on a carrier 14 within the mold housing 11. The carrier 14 may be provided with rollers 15 adapted to run on a pair of steel rails 16 mounted on the support base 12, as shown. The inward movement of the carrier 14 may be limited by stops (not shown). A mold flask 17 rests on the pattern plate 13 to be filled with sand for obtaining a mold of a pattern 18 on the pattern plate 13. The pattern 18 may be held securely on the pattern plate 13 by screws (not shown). In order to facilitate the pressing of the sand in the flask 17, a vibrator 19 of the compressed air type may be provided on the under side of the carrier 14, as shown. Any other suitable type of vibrator may be used.

A support frame 20 is provided on the right hand side of the mold housing 11 which supports a sand impeller housing 21. A sand impeller 22 is provided within the housing 21, and is connected by a connecting rod 23 with a piston 24 of a hydraulic or compressed air driver 25. The connecting rod 23 is pivotally connected to the sand impeller 22 by the connection shown at 26. The sand impeller 22 comprises a head 27 and a top plate 28. A valve 29 is provided for admitting liquid under pressure or compressed air, whichever the case may be, to the front or back of the piston 24, according to which direction it is desired to move the sand impeller 22.

The impeller housing 21 also forms a sand pocket 30 for receiving sand from a sand hopper 31 thereabove, when the sand impeller is withdrawn into the sand pocket 30. The rear position of the head 27 of the sand impeller 22 is indicated by the line 32. This may be varied as desired according to the amount of sand required for pressing into the flask 17.

In order to pack the sand into the flask 17, a squeeze head 33 is provided in a squeeze head housing 34. The squeeze head 33 may be operatively connected by a connecting rod 35 to a piston 36 of a hydraulic or compressed air driver 37 as shown. The connecting rod 35 is pivotally secured to the squeeze head 33 by the connection 38. Guides 40 are provided upstanding from the squeeze head 33 for guiding it in its movement within the squeeze head housing 34. The guides 40 serve to prevent binding and to accurately control the movement of the squeeze head within the squeeze head housing 34. In order to drive the piston 36 in alternate directions as desired, the driver 37 may be connected to compressed air or fluid pressure lines as shown, with a valve 41 provided for admitting the compressed air or liquid under pressure to opposite sides of the piston 36. The driver 37 is supported within the housing 34 by brackets 42, the lower ones serving to limit the upward movement of the squeeze head 33.

An opening 43 is provided in the side of the mold machine 10, registering with the opening 44 into the sand pocket 30, through which the

head 27 of the sand impeller 22 may project, as shown in Figure 1 of the drawing.

Any excess sand which may gather behind the sand impeller 22 is removed from the housing 21 through a hole 45 in the bottom thereof.

The guides 40, together with the rails 16 and rollers 15, serve to secure the accurate registering and cooperation of the squeeze head 33 and the flask 17 in the mold machine 10. Such accurate registration is particularly important where a pattern is carried on the underside of the squeeze head 33 to form a mold space in the top of the flask 17.

The inner walls of the flask 17 curve or slant inwardly, as indicated at 39, in contrast with the conventional perpendicular walls of mold flasks. This is an important feature, especially when straight-sided patterns are used. When sand is packed into the flask 17, the slanting walls 39 serve to pack or compress the sand inwardly toward the pattern 18. This prevents the sand being pressed and broken away from the sides of the pattern 18. Also uniform hardness of the sand around the sides of the pattern 18 is insured by this inward packing action.

If desired, the sand impeller 22 and squeeze head 33 may be motor driven with suitable controls. However, the fluid operated drivers 25 and 37 provide very satisfactory driving means.

In operation, the pattern plate 13 with the flask 17 are inserted in the mold housing 11 and the sand impeller 22 is withdrawn into the sand pocket 30. The control apparatus may be set so that the head 27 of the sand impeller 22 is withdrawn by the driver 25 to the position indicated by the line 32, or any other predetermined position as desired. When the sand impeller 22 is thus withdrawn, sand will run from the hopper 31 down into the sand pocket 30. The driver 25 now pushes the impeller 22 ahead thereby pushing the sand in the sand pocket 30 ahead of it into the mold housing 11 to fill it and the flask 17 as shown. The head 27 of the sand impeller 22 is pushed slightly beyond the mold housing 11, as shown in Figure 1 of the drawing, thereby striking off any sand which is in excess of that needed to fill the mold housing 11. The sand impeller is now withdrawn so that the head 27 thereof is just slightly within the sand pocket 30, as shown in Figure 2 of the drawing. While the sand impeller 22 remains in this position, the squeeze head 33 is moved down into the mold housing 11 as shown in Figure 2 of the drawing, thereby pressing the sand into the flask 17 to the desired hardness. The vibrator 19 aids in the uniform packing of the sand into the flask 17 by the squeeze head 33. After this packing operation, the squeeze head 33 is lifted to the position shown in Figure 1 of the drawing, and the completed mold is removed from the mold housing 11 and lifted from the pattern plate 13. When the pattern plate 13 is re-inserted with an empty flask into the mold housing 11, the above cycle of operation can be repeated.

The operation of the hydraulic or compressed air drivers 25 and 37, together with the operating lines and valve controls therefor, has not been described in detail since this is well known to the art and a question of design which may be readily arranged as required. The control apparatus may be readily arranged and designed so that the mold making machine 10 will operate automatically through the above outlined cycle.

An important feature of the mold making machine 10 is to have the squeeze head 33 pressed or pushed down on the sand in the mold housing 11 with a predetermined limited force. This may be carried out by controlling the pressure exerted against the piston 36 on the down stroke of the driver 37. In this manner molds of substantially uniform hardness may be turned out by the machine 10.

Having the pattern plate 13 and flask 17 vibrated when the squeeze head 33 is packing sand into the flask 17 is an important feature of my invention. This vibration lessens the time of packing, secures a more uniform packing of the sand throughout, and insures improved reproduction of pattern detail.

Since certain further changes may be made in the foregoing construction, and different embodiments of the invention may be made without departing from the scope thereof, it is intended that all matter shown in the accompanying drawing or described hereinbefore shall be interpreted as illustrative and not in a limiting sense.

I claim as my invention;

1. A sand mold making machine comprising, in combination, a mold housing, carrier means for supporting a pattern plate with a flask thereon in said mold housing, housing means above and to one side of said mold housing and providing a sand pocket on said one side and having an excess sand opening on the opposite side, a sand hopper above said sand pocket for supplying sand thereto, a sand impeller operable in said sand pocket for pushing sand therefrom into said mold housing and operable into and out of said opening for pushing excess sand therethrough, operating means for reciprocating said sand impeller, head means and means for guiding the same for up and down movement through said housing means and into and out of said mold housing for pressing sand into said flask, and operating means for reciprocating said head means.

2. A sand mold making machine comprising, in combination, a mold housing, carrier means having roller means on its underside adapted to support on its upper side in said mold housing a pattern plate with a flask thereon, track means for said roller means, housing means above and to one side of said mold housing and providing a sand pocket on said one side, a sand hopper communicating with said sand pocket for supplying sand thereto, a sand impeller operable in said sand pocket for pushing sand therefrom into said mold housing, operating means for said sand impeller, head means movable up and down through said housing means and into and out of said mold housing for pressing sand into said flask, operating means for reciprocating said head means, and guide means for said head means, said guide means and said track means cooperating to secure accurate registration of said flask and head means when the latter is moved into said mold housing.

3. A sand mold making machine comprising in combination, a mold housing for receiving a pattern plate and a flask thereon, housing means above and to one side of said mold housing and providing a sand pocket on said one side and having an excess sand opening on the opposite side, a sand hopper above said housing means and communicating with said sand pocket whereby sand flows by gravity from the hopper into the pocket, a sand impeller including a head and a top plate reciprocable through said housing means and said opening, and means for moving

said sand impeller through said sand pocket and the head thereof entirely across said mold housing so that sand is pushed from the pocket and falls by gravity into the mold housing and flask with excess sand being pushed out of said opening, said top plate of said sand impeller meanwhile closing off the bottom of said sand hopper.

4. A sand mold making machine comprising, in combination, a mold housing for receiving a pattern plate and a flask thereon, housing means above and to one side of said mold housing and providing a sand pocket on said one side and having an excess sand opening on the opposite side, a sand hopper above said housing means and communicating with said sand pocket whereby sand flows by gravity from the hopper into the pocket, a sand impeller including a head and a top plate reciprocable through said housing means and said opening, means for moving said sand impeller through said sand pocket and the head thereof entirely across said mold housing so that sand is pushed from the pocket and falls by gravity into the mold housing and flask with excess sand being pushed out of said opening, said top plate of said sand impeller meanwhile closing off the bottom of said sand hopper, head means conforming to the shape of said mold housing and movable up and down through said housing means into and out of said mold housing for pressing sand into said flask, guide means for registering said head means with said mold housing, and operating means for reciprocating said head means.

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