Sept. 6, 1960 R. W. TACCONE 2,951,270

MOLDING MACHINE UPSET

Filed April 18, 1955

2 Sheets-Sheet 1

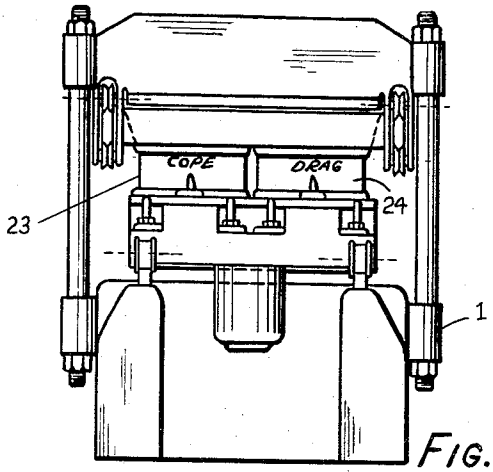


FIG. 1.

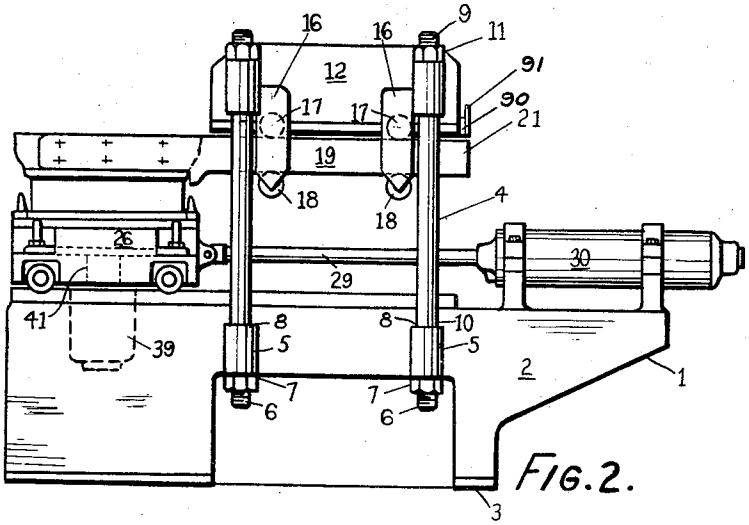


FIG. 2.

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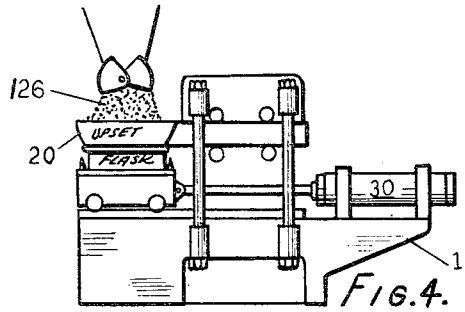


FIG. 4.

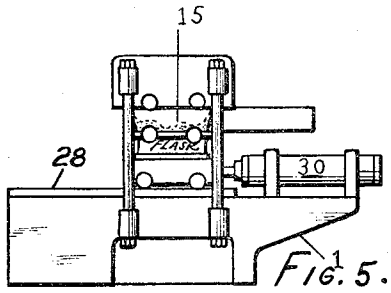


FIG. 5.

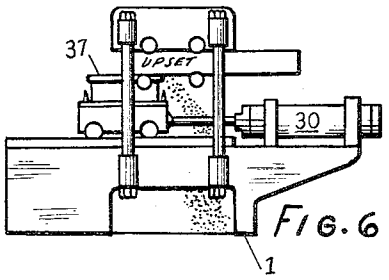


FIG. 6.

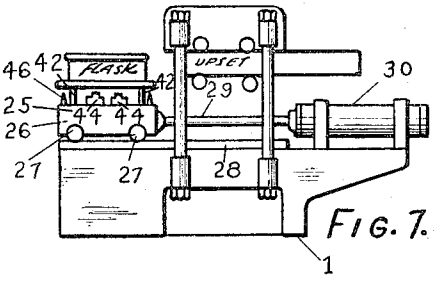


FIG. 7.

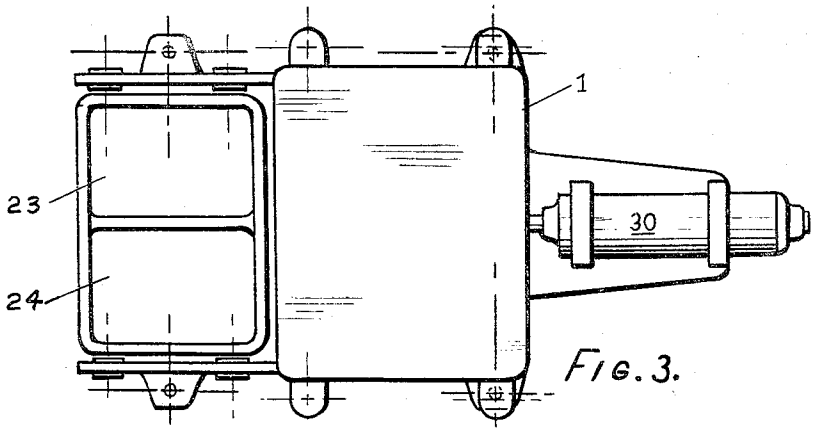


FIG. 3.

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MOLDING MACHINE UPSET

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Filed Apr. 18, 1955, Ser. No. 501,947

5 Claims. (Cl. 22—42)

This application relates to molding machines and more particularly to machines for automatically making molds from sand or other similarly related material for producing metal castings.

This application is a continuation in part of copending application, Serial No. 280,223, filed April 3, 1952, which issued as Patent No. 2,715,758 on August 23, 1955.

Molds made by diaphragm molding machines usually have an indented outside sand surface irregular in shape where it is compressed by the obtruder. This sometimes results in a thin sand section adjacent a projection on the pattern with the outside surface spaced inwardly from a platform when the mold is set thereon. As a result of the sand surface being unsupported and spaced from the platform or molding board, the unsupported strength of the sand must withstand the great ferrostatic pressures from metal poured thereinto. To overcome this difficulty, I propose to level the outside sand surface of the finished mold, after compressing it so that the entire surface may rest on a level support or molding board while metal is being poured thereinto. In the said copending application, a method for making molds is disclosed wherein a flask is moved under a diaphragm member and sand is packed therein. In the present application, a machine is disclosed wherein an automatic means is provided for moving the flask under the diaphragm member which is supported on a head supported at a fixed space from a support and for leveling the surface of the sand on top of the flask.

It is, accordingly, an object of this invention to provide a device or machine for making molds which is simple in construction, economical to manufacture, and simple and efficient to use.

Another object of the invention is to provide a molding machine wherein molding sand or other suitable granular material may be deposited in a flask in bulk without regard to the specific distribution thereof and wherein the sand will be packed properly in the mold and the packed sand in the finished packed sand in the mold is struck off flush with the outer edge of the mold.

Another object of this invention is to provide an upsetting member for use in combination with the molding machine disclosed herein for acting as a hopper to provide excess sand in the flask and to subsequently strike the sand off after molding.

With the above and other objects in view, the present invention consists of the combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawings and more particularly pointed out in the appended claims, it being understood that changes may be made in the form, size, proportions, and minor details of construction without departing from the spirit thereof or from the scope of the appended claims.

In the drawings:

Fig. 1 is an end view of a molding machine according to the invention;

Fig. 2 is a side view of the molding machine shown in Fig. 1;

Fig. 3 is a top view of the molding machine shown in Figs. 1 and 2;

Fig. 4 is a side view of the molding machine with the upset member in loading position over the flask and with a clam shell bucket depositing sand into the flask and upset member;

Fig. 5 shows the molding machine shown in the prior figures with the flask with the upsetting device moved under the head and the diaphragm exerting pressure on the sand in the upset and flask to pack sand therein;

Fig. 6 shows the mold being moved out from under the molding head and the upset member held in place under the head whereby packed sand in the mold is levelled off even with the top of the flask; and

Fig. 7 shows the mold moved out of the machine after being molded and the flask lifted off the pattern by the stripping device.

Now with more specific reference to the drawings, a molding machine **1** is shown having a base **2** mounted on a support at **3** and having rod like structural members **4** extending through lugs or bosses **5** in the base **2** and having the ends of the structural members **4** threaded at **6** to receive nuts **7** thereon. The threaded ends **6** are of smaller diameter than the main portion **10** of the structural members **4** so that a shoulder is provided at **8** to abut against the upper edge of the bosses **5** to lock the structural members **4** therein. The upper ends of the structural members **4** have reduced size threaded portions **9**. Nuts **11** are provided thereon to lock the head **12** to the structural members **4**.

The head **12** is made of the construction of the head of the molding machine shown in the said co-pending application. The head **12** supports a diaphragm **15** which is withdrawn into the head **12** when not in molding position and has a provision to apply compressed air above the diaphragm **15** to force the diaphragm **15** into engagement with the sand to compress sand in the flask made up of the members **23** and **24** when the flask is in the position shown in Fig. 5 and when the mold is completed to apply vacuum between the diaphragm **15** and the head **12** to withdraw the diaphragm **15** into the head **12** in the manner described in the said copending application.

Brackets **16** are attached to the head **12** and have rollers or wheels **17** and **18** attached thereto in spaced relation. The rollers **18** are attached to the lower end of the brackets **16** and are adapted to carry an upset member **19** while the rollers **17** above the upset member **19** hold the upset member **19** in alignment with the lower surface of the head **12**.

The upset member **19** is made up of the frame box like portion **20** having four sides and is open at the top and bottom and attached to a boom **21**. The boom **21** slides between the wheels **17** and the wheels **18**. The boom **21** is adapted to fit over the top of the cope **23** and the drag **24** which are mounted on the top of pattern plate **25**. The pattern plate **25** is supported on a car **26** having wheels **27** thereon which run on a track **28** carrying the flask under the head **12** when the car **26** with cope **23** and drag **24** mounted thereon and the upset **19** mounted thereover are filled with sand and pulled by a piston rod **29** of a double acting hydraulic cylinder **30** into molding position under the head **12**. A locking device which may comprise a bracket **90** and a slide **91** is provided to lock the upset **19** during strike off when the car **26** is being removed as shown in Fig. 6.

In actual operation, the cope **23** and drag **24** are mounted on the car **26** in the manner shown in Figs. 1 and 3. Then the upset member **19** is moved to the position shown in Fig. 4 and sand such as sand **126** is

emptied into the flask and upset member **19**. Then the entire device, including the upset member **19** and the flask, is pulled by means of the hydraulic piston rod **29** into a position under the head **12** where it is held in place. Then air is applied in the head **12** behind the diaphragm **15** in the manner described in the said previous application. The air forces the diaphragm **15** down onto the sand as indicated in Fig. 5, packing the sand in the flask. Then the upset member **19** is held in position while hydraulic pressure is applied to the cylinder **30**. This forces the car **26** to the left on track **28**. The upset member **19** will be held in fixed position under the head **12** and the flask moved out from under the upset **19**, causing the upset **19** to be effectively drawn across the top edge **37** of the flask, striking the excess packed sand off of the flask as indicated in Fig. 6 and presenting a level surface on top of the flask which can be rested on a molding board during casting process. Then when the car **26** has been moved to the position shown in Fig. 7, air pressure will be applied to a piston **39** which has a shaft **41** extending upward through the car **26**. The shaft **41** will engage the flask and lift it by means of a pin **42** which extends through the mold and will move it off of a pattern **44**. The flask can then be lifted by means of a crane or otherwise and set down on the proper base. The cope **23** can be set down first and the drag **24** on top of the cope **23** in the proper manner and properly clamped and the metal then poured into the flask in the conventional manner. Guide pins **46** are attached to the car **26** which slide in holes in the flask to positively locate the cope **23** relative to the drag **24** so that the two halves of the pattern cavity will be in perfect alignment when the drag **24** and cope **23** are put together.

The foregoing specification sets forth the invention in its preferred practical forms but the structure shown is capable of modification within a range of equivalents without departing from the invention which is to be understood is broadly novel as is commensurate with the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A molding machine comprising a base having a track mounted thereon, a molding head supported over a portion of said base and said track, a boom, means to slidably support said boom on said head, a hopper supported on said boom, means to support a flask on said track, said boom being slidable to bring said hopper into position over said flask when said flask is supported on said track out from under said head, said hopper adapted to direct molding material into said flask, means to move said flask on said track to a position under said head, means in said head to compress molding material in said hopper and said flask, and means to hold said hopper in position under said head while said flask is moved out from under said head and said hopper whereby molding material in said flask is levelled even with the top edges of said flask after having been compressed by said means to compress said molding material, said means to support said boom on said head comprising two pairs of vertically spaced rollers supported on said head, said boom having track means thereon adapted to be supported between said spaced rollers and horizontally movable relative thereto.

2. The molding machine recited in claim 1 wherein said flask is supported on said track by means of wheels.

3. The molding machine recited in claim 2 wherein said means to move said flask comprises a hydraulic cylinder fixed to said base and having a piston rod attached to said flask.

4. The molding machine recited in claim 2 wherein said means to compress said molding material comprises a diaphragm having its edges sealingly connected to said head and defining a closed space with a cavity in said head, and means to apply compressed air in the space in said head above said diaphragm whereby said diaphragm is adapted to be forced into engagement with said molding material and exerts a force thereon.

5. The molding machine recited in claim 4 wherein means is provided to apply a vacuum to the space behind said diaphragm to draw said diaphragm into said head.

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