J. N. BATTENFELD.

MOLDING MACHINE.

APPLICATION FILED JULY 27, 1914.

1,207,361.

Patented Dec. 5, 1916.

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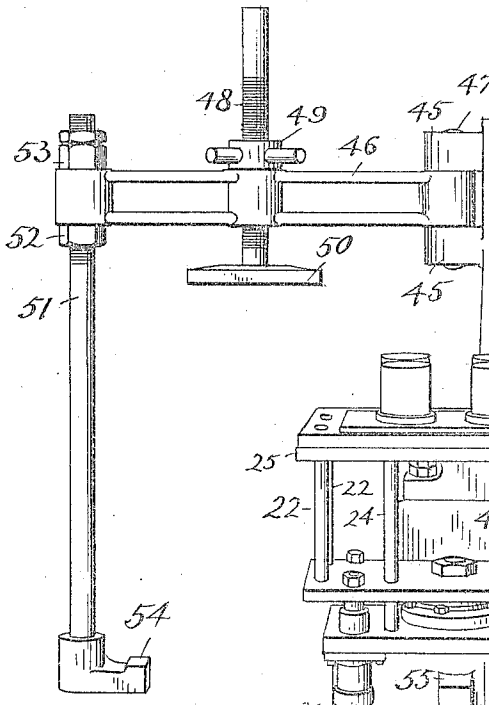


Fig. 1.

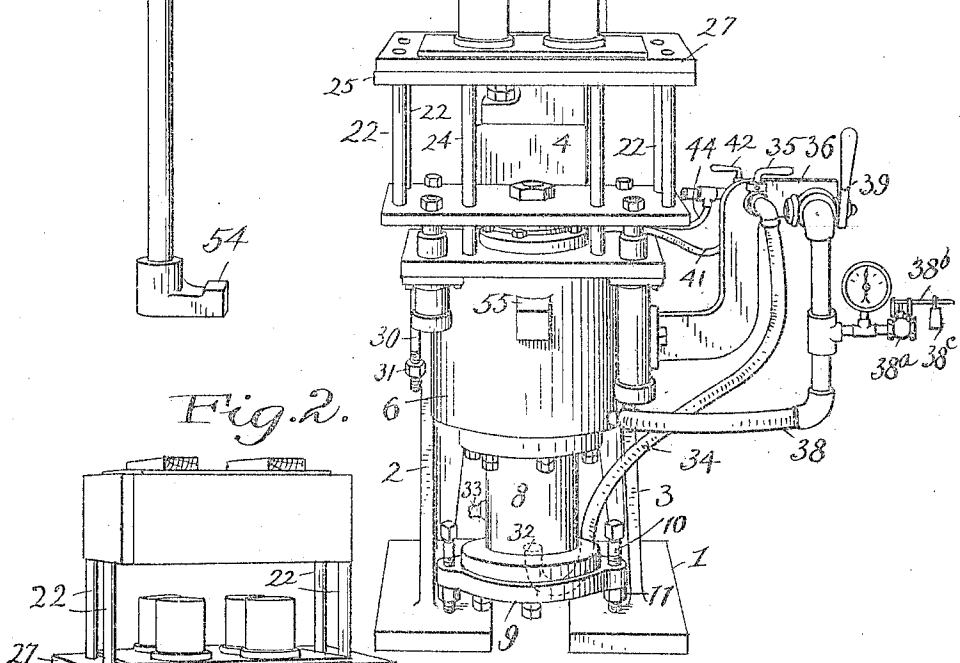
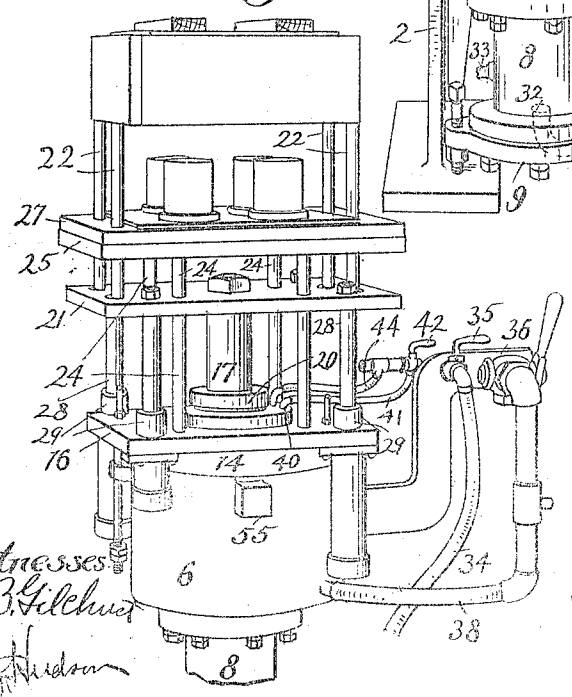


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

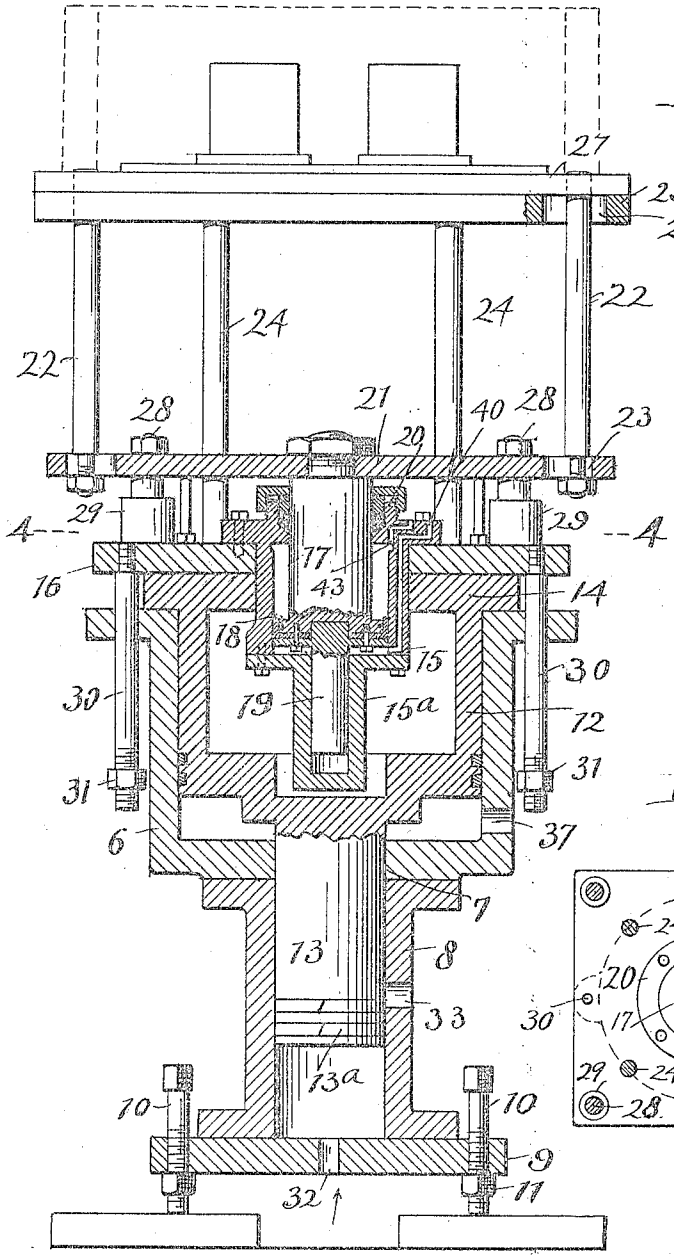
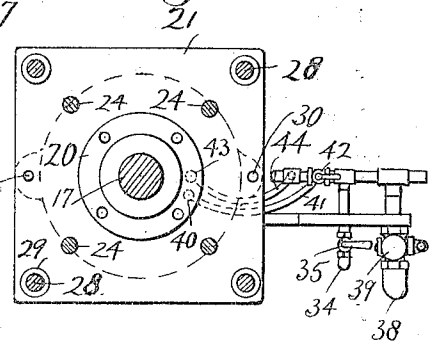


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN N. BATTENFELD, OF CLEVELAND, OHIO.

MOLDING-MACHINE.

1,207,361. Specification of Letters Patent. Patented Dec. 5, 1916.

Application filed July 27, 1914. Serial No. 853,336.

To all whom it may concern:

Be it known that I, JOHN N. BATTENFELD, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Molding-Machines, of which the following is a full, clear, and exact description.

This invention relates to a molding machine, and provides a machine which combines a jarring mechanism and means for compressing the sand within the flask. Further, it comprises means for drawing the pattern from the mold.

Generally speaking, the invention comprises the elements and combinations thereof set forth in the accompanying claims.

Reference should be had to the accompanying drawings forming a part of this specification, in which—

Figure 1 is a perspective elevation of the machine; Fig. 2 is a perspective elevation showing the machine in a certain operating position; Fig. 3 is an elevation with parts in section of the molding machine; and Fig. 4 is a top plan view on the line 4—4 on Fig. 3.

The whole machine is mounted upon a base 1, from which there are upwardly extending legs 2 and 3, which legs are joined to a rear standard 4, which has an upward extension 5.

The cylinder 6 is preferably secured to the legs 2 and 3 and to the back portion 4. This cylinder 6 is hollow, and in the bottom portion is provided with an opening 7. Secured to the cylinder 6 is a cylinder 8, the central opening in which registers with the opening 7. The lower end of the cylinder 8 is closed by a plate 9. This plate is provided with openings through which extends rods 10, which are screw threaded at their lower ends to receive nuts 11. The lower ends of the rods 10 engage with the base 1, while the nuts are screwed into engagement with the plate 9. These rods therefore afford in part a supporting means for the plate 9, and steady the lower cylinder 8 and plate 9 against vibration.

Within the cylinder 6 there is a hollow raising piston 12, which is provided with suitable packing to make an air tight joint between the piston 12 and the cylinder 6. Extending downwardly from the piston 12 is a piston 13, which passes through the opening 7 in the cylinder 6, and has a working sliding fit within the cylinder 8. Suitable packing is provided for the piston 13, as indicated at 13^a.

The hollow piston 12 is provided with a head 14, which is adapted to rest upon the upper portion of the cylinder 6. This head is provided with a central opening, and the interior of the piston 12 is hollow. Through the opening in the head 14 there extends a casing 15 to the lower portion of which is secured a hollow extension casing 15^a. The casing 15 is secured to a supporting table 16, so that the supporting table 16 and the casing 15, when moved, will move as a unit.

Within the casing 15, which is hollow, there extends a piston 17. This piston is of less diameter than the diameter of the casing 15, and so provides a space between the piston 17 and the casing 15. The piston 17 carries a head 18 having suitable packing, which engages with the interior wall of the casing 15. The head 18 has a downwardly projecting portion 19, which extends within the lower casing 15^a. The piston 17 at its upper end projects through a suitable stuffing box indicated at 20, which is secured to or forms a part of the casing 15. The piston 17 is secured to a plate 21.

Upon the supporting table there are secured four or more posts which are represented at 22. These posts are mounted in slots, indicated at 23, which permit the posts 22 to be adjusted inwardly or outwardly upon the plate 21.

Secured to the table 16 are four or more upwardly extending posts 24, and these posts at their upper ends support a molding table 25. The posts 24 extend through suitable openings in the plate 21. The molding table 25 is provided with slots 26, which permit movement of the posts 22 in accordance with the adjustment of these posts in the slots 23.

The molding table 25 is adapted to receive

a pattern plate indicated at 27, and the tops of the posts 22 will lie substantially flush with the upper surface of the pattern plate 27, and when a flask is mounted upon the plate 27 the posts 22 will engage with the lower portion of the sides of the flask.

The supporting table 21 has secured to it depending rods 28. These rods extend into housings 29, which are carried upon the table 16. These rods form means for guiding the plate 21 as it may be raised and lowered.

From the table 16 there are downwardly depending rods 30. These rods extend through suitable openings provided in the head of the hollow cylinder 6, and at their lower ends the rods are screw threaded to receive nuts 31. These nuts may be adjusted upon the rods 30, and will serve as a means for limiting the upward movement of the table 16.

The plate 9 is provided with an opening 32, which forms an inlet for a motive fluid under compression. In the cylinder 8 there is an exhaust port 33, which lies a suitable distance above the lower end of the piston 13, when this piston is in its lowermost position. When motive fluid is admitted through the port 32, it will raise the piston 13 and with it all the parts of the machine which are supported upon this member. When the piston rises far enough to uncover the port 33, the air will exhaust, permitting the piston and the parts carried thereby to descend by gravity. This cycle of operations is continuous, and results in a jarring action which causes the sand within the flask to pack around the pattern in a manner well understood in the art.

Motive fluid may be supplied from a fluid pressure line to the port 32, by means of a conduit 34, which will be governed by a suitable valve 35, carried by a bracket 36, which is suitably secured to the hollow cylinder 6.

There is a port 37 which communicates with the lower portion of the interior of the cylinder 6, and beneath the hollow piston 12. This port 37 is by means of a suitable conduit 38 connected with a fluid pressure line, and controlled by a valve 39, which is a three-way valve, in one position, permitting compressed fluid to pass beneath the piston 12 and in another position permitting the fluid to exhaust from beneath the piston 12. When the fluid under pressure is supplied beneath the piston 12, it will cause the piston 12 and the parts carried thereby to be raised.

In conjunction with the pipe 38 there is a valve generally indicated at 38^a attached to a lever 38^b, and upon the lever there is a weight 38^c. This weight is so positioned upon the lever 38^b that the valve 38^a will open at a predetermined pressure. When therefore air is admitted through the valve 39 and raises the squeezing cylinder, as soon as there develops beneath the squeezing cylinder a pressure equal to that for which the valve 38^a is set, this valve will open. It will therefore be apparent that the same squeezing pressure will always be applied to the molds made in the machine, which will insure uniformity in the molds, a very desirable feature.

There is a duct 40 formed in the wall of the casing 15. This duct has an outlet opening at the lower part of the casing 13 beneath the head 18 of the piston 17. This duct 40 by means of a flexible conduit 41 communicates with a fluid pressure line, and is controlled by a valve 42.

Through the upper wall of the casing 15 there is a duct 43, which communicates with the space between the piston 17 and the inner wall of the piston 15. This duct by means of a conduit 44 communicates with the fluid pressure line, and under normal conditions of operation this duct is always in communication with the pressure line. This provides a means for normally holding the piston 17 against relative movement during the jarring operation, for, as will be readily appreciated, there would otherwise be considerable likelihood of the piston 17 moving as the piston 12 is moved during the jarring operation.

The presence of the air pressing down upon the head 18 of the cylinder 17 also has the function of steadying the raising of the mold when air is admitted beneath the piston head 18. If, for any reason, the piston head 18 does not move uniformly, due to any sticking or hanging action, the pressure will build up beneath the piston head 18, and, when sufficiently great, will raise the piston head 18 with a jerk. That is to say, this would be the likely thing but for the pressure acting downwardly upon the head 18. The air above the piston head 18 will act as a cushion, so that there will be no violent movements of the piston 17 and its head 18. It is, however, entirely possible to move the piston 17 by admitting motive fluid beneath the head 18, because of the greater area for pressure beneath the head 18 than the pressure exerted by the air above the head.

Upon the upright portion 5, there are extending ears 45, which are spaced apart, and receive an arm 46. The portion of the arm between the ears 45 and the ears themselves are provided with openings which aline and receive a pin 47. The arm 46 at its central portion has an opening, which is screw-threaded, and coöperating with this opening is a post 48 which is also screw-threaded. Engaging with the post and lying above the arm 46 is a threaded nut 49, which will lock the post 48 in its adjusted position with respect to the arm 46. Upon the lower part of

the post 48 is a head 50, which is adapted to engage the sand within the flask to compress the same.

At its outer end the post is provided with a screw threaded opening, through which extends a locking arm 51. The upper portion of the arm 51 is screw-threaded, and engages with the threaded opening in the end of arm 46. Lock nuts 52 and 53 are threaded upon the locking arm 51 to lie above and below the arm 46.

At its lower end the arm is provided with an inwardly extending head 54, and this head when swung inwardly is adapted to cooperate with a lug 55, which is secured to or formed integrally with the cylinder 6. When the head 54 and lug 55 are in engagement, the presser head is in proper position to engage the sand in the flask, and during the pressing operation the presser 50 is held against upward movement.

The operation of the machine is as follows: When the parts of the molding machine are in normal position, such as shown in Fig. 3, a flask may be secured to the molding table 25 in any well known manner. Sand will then be placed within the flask, and motive fluid admitted beneath the piston 13 which will cause the jarring action, as previously explained, thus packing the sand around the pattern. When this is completed, the pressure head 50 is swung in position above the flask, and motive fluid is admitted beneath the hollow piston 12. This raises the plate 14 and the molding table 25, which is supported through the rods 24, from the table 16, and causes the presser plate 50 to squeeze the sand in the mold. This action being completed, the piston 12 is permitted to return to its normal lower position, the presser plate swinging out of the way, and air is admitted beneath the head 18 of the piston 17. This causes the intermediate plate 21 to be elevated, and with it the rods 22, which as before stated, engage the lower part of the sides of the flask. The flask having been loosened from the plate 25 will be elevated and drawn away from the pattern. The arm 46 with the presser plate 50 having previously been swung out of the way, permits the mold to be removed from the posts 22. Subsequently the air will be exhausted from beneath the head 18 of the piston 17, so that the parts may return to their original and normal position, as shown in Fig. 3.

Having described my invention, I claim:

1. In a molding machine, the combination with a base, a back portion extending from said base, a cylinder supported by the back portion, and adjustable rods carried by the cylinder and engaging the base.

2. In a molding machine, the combination with a base, a back portion supported by said base, a cylinder supported by the back portion, a plurality of threaded rods adapted to engage threaded openings upon a portion of the cylinder, the said rods engaging the base.

3. In a molding machine, the combination with a cylinder, an extending cylinder of smaller diameter communicating with the first mentioned cylinder, a piston in each cylinder, said pistons being in axial alinement, means for admitting compressed fluid between each of said cylinders and its piston.

4. In a molding machine, the combination with a cylinder, an extending cylinder of smaller diameter communicating with the first mentioned cylinder, a piston in each cylinder, said pistons being in axial alinement, independent means for admitting compressed fluid between each of said cylinders and its piston, one of said cylinders having an exhaust port which is uncovered by the movement of its piston.

5. In a molding machine, the combination with a cylinder, an extending cylinder of smaller diameter communicating with the first mentioned cylinder, pistons in each of said cylinders, which pistons operate together, a port for the entrance and exit of compressed fluid in the larger cylinder near the bottom portion thereof, an inlet port for compressed fluid communicating with the lower portion of the smaller cylinder, and an exhaust port for the smaller cylinder, said exhaust port being opened and closed by the movement of the piston in the smaller cylinder.

6. In a molding machine, the combination with a supporting table, a molding table supported above the supporting table, a plate member intermediate said molding table, and the supporting table, posts carried by the said intermediate plate member, said posts extending through openings in the molding table, and means for moving said intermediate plate member.

7. In a molding machine, the combination with a supporting table, a molding table provided with openings and supported from the supporting table, an intermediate plate member, posts carried by said intermediate plate member and extending through the openings in the molding table, means for guiding the movement of the said intermediate plate member, and means for moving the said intermediate member.

8. In a molding machine, the combination with a supporting table, a molding table provided with openings and supported above said supporting table, an intermediate plate member between the molding table and the supporting table, posts carried by the said plate and extending through the openings in said molding table.

9. In a molding machine, the combination with a support and a supporting table, a piston member and a cylinder member, one of said members supported from the support, the other carried by the supporting table, a molding table supported by and above the supporting table, an intermediate plate member, guiding means for said interminate plate member carried by the supporting table, pins carried by the intermediate plate member and adapted to extend through openings in the molding table, and coöperating means carried by the supporting table and intermediate plate member for moving the intermediate plate member.

10. In a molding machine, the combination with a base, a molding table, a cylinder member, a piston member, one of said members being supported by the base, the other of said members supporting the molding table, a presser plate above the molding table, a conduit for conducting compressed fluid between said cylinder and piston, a valve in said conduit, and means for setting said valve to open at a predetermined pressure.

11. In a molding machine, the combination with a base, a molding table, a cylinder member, a piston member, one of said members being supported by the base, the other of said members supporting the molding table, a presser plate above the molding table, a conduit for conducting compressed fluid between said cylinder and piston, a valve in said conduit, and means normally holding said valve closed, said means being adjustable so that the valve may be opened at predetermined pressures.

12. In a molding machine, the combination with a base, a molding table, a cylinder member, a piston member, one of said members being supported by the base, the other of said members supporting the molding table, a presser plate above the molding table, a conduit for conducting compressed fluid between said cylinder and piston, a valve in said conduit, a lever engaging said valve, and a weight adjustably mounted upon said lever.

13. In a molding machine, in combination with a jarring cylinder and piston, a squeezing cylinder and piston, a presser plate adapted to engage the sand in a flask, a molding table, a supporting member below the molding table, means carried by the supporting member and adapted to extend beyond the molding table to engage a flask and raise the same, and means for operating said supporting member.

14. In a molding machine, in combination, a jarring cylinder and piston, a squeezing cylinder and piston, a presser plate adapted to engage the sand in a flash, a molding table, a supporting member beneath the molding table, members extending from said supporting member and adapted to engage a flask upon the molding table, a fluid operated cylinder and piston, operatively connected to the supporting member and the molding machine, whereby the supporting member and flask engaging members can be raised and lowered.

15. In a molding machine, in combination, a jarring cylinder and piston, a squeezing cylinder and piston, a presser plate adapted to engage the sand in a flask, a molding table, a plate beneath the molding table, upwardly projecting members supported by said plate adapted to engage a flask upon the molding table, a piston member and a coöperative cylinder member, one of which members is carried by said supporting table, the other of which is supported from the squeezing piston, and means for admitting a fluid under pressure between the last mentioned cylinder and piston.

16. In a molding machine, in combination, an alined jarring cylinder and squeezing cylinder, an alined and connected jarring piston and squeezing piston, a molding table, a supporting table beneath the molding table supported by the squeezing and jarring pistons, means carried by the supporting table adapted to engage a flask upon the molding table, a cylinder member and a piston member, one of which members is carried by the said supporting table, and the other is supported from the squeezing piston, and means for admitting air between the last mentioned cylinder and piston.

17. In a molding machine, in combination, an alined jarring cylinder and squeezing cylinder, an alined and connected jarring piston and squeezing piston within the aforesaid respective cylinders, means for admitting motive fluid between the aforesaid coöperating cylinders and pistons, a supporting table above the squeezing piston, a molding table supported by and above said supporting table, a plate intermediate the molding table and the supporting table, means carried by said plate adapted to engage a flask carried upon the molding table, a piston carried by said plate, a cylinder carried by said supporting table, means for admitting motive fluid between the last mentioned piston and cylinder, and a pressure plate supported above the molding table and adapted to engage the sand within a flask carried by said molding table.

18. In a molding machine, in combination, a jarring cylinder and piston, a squeezing cylinder and piston, a pressure plate adapted to engage the sand in a flask, a molding table, a plate beneath the molding table, upwardly projecting members supported by said plate adapted to engage a flask upon

the molding table, means for operating said members comprising a piston member and a coöperating cylinder member, one of which members is carried by said plate, the other of which is supported from the squeezing piston, means for admitting motive fluid between the last mentioned cylinder and piston, and means for effecting a downward resilient pressure above and upon the last mentioned piston head.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

JOHN N. BATTENFELD.

Witnesses:
A. J. HUDSON,
L. I. PORTER.