

1,059,448.

5 SHEETS--SHEET 1.



D. W. Edlin.

W. Rockwell

Jay O. Farwell

Ernie Goldbrough 20th

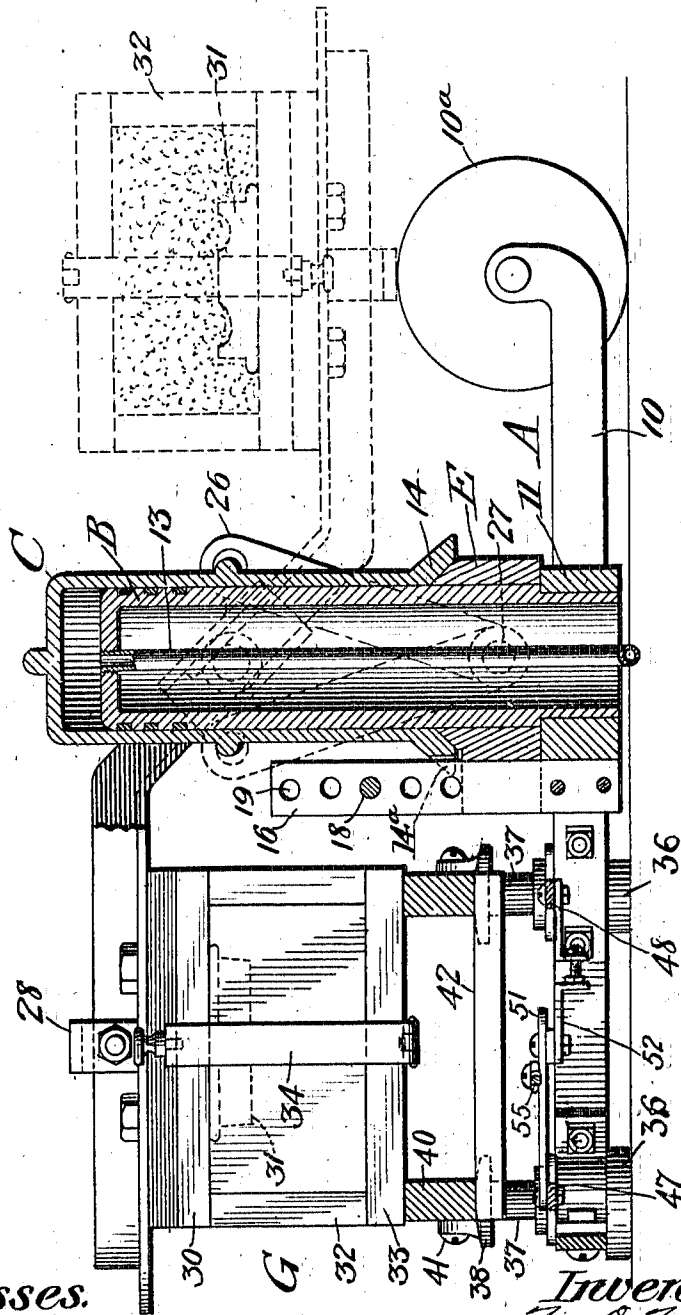
F. O. FARWELL.
MOLDING MACHINE.
APPLICATION FILED NOV. 4, 1910.

1,059,448.

Patented Apr. 22, 1913.

5 SHEETS-SHEET 2.

Fig. 2.



Witnesses.

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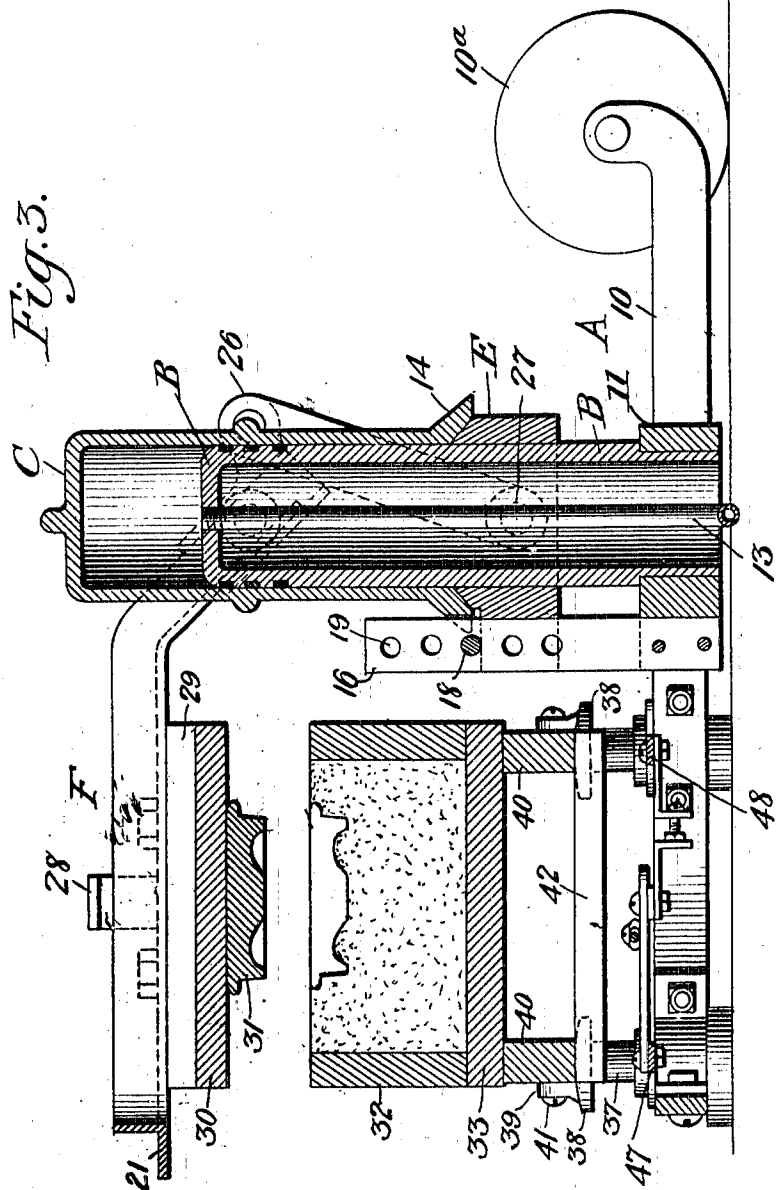
By *[Signature]*
Attorney

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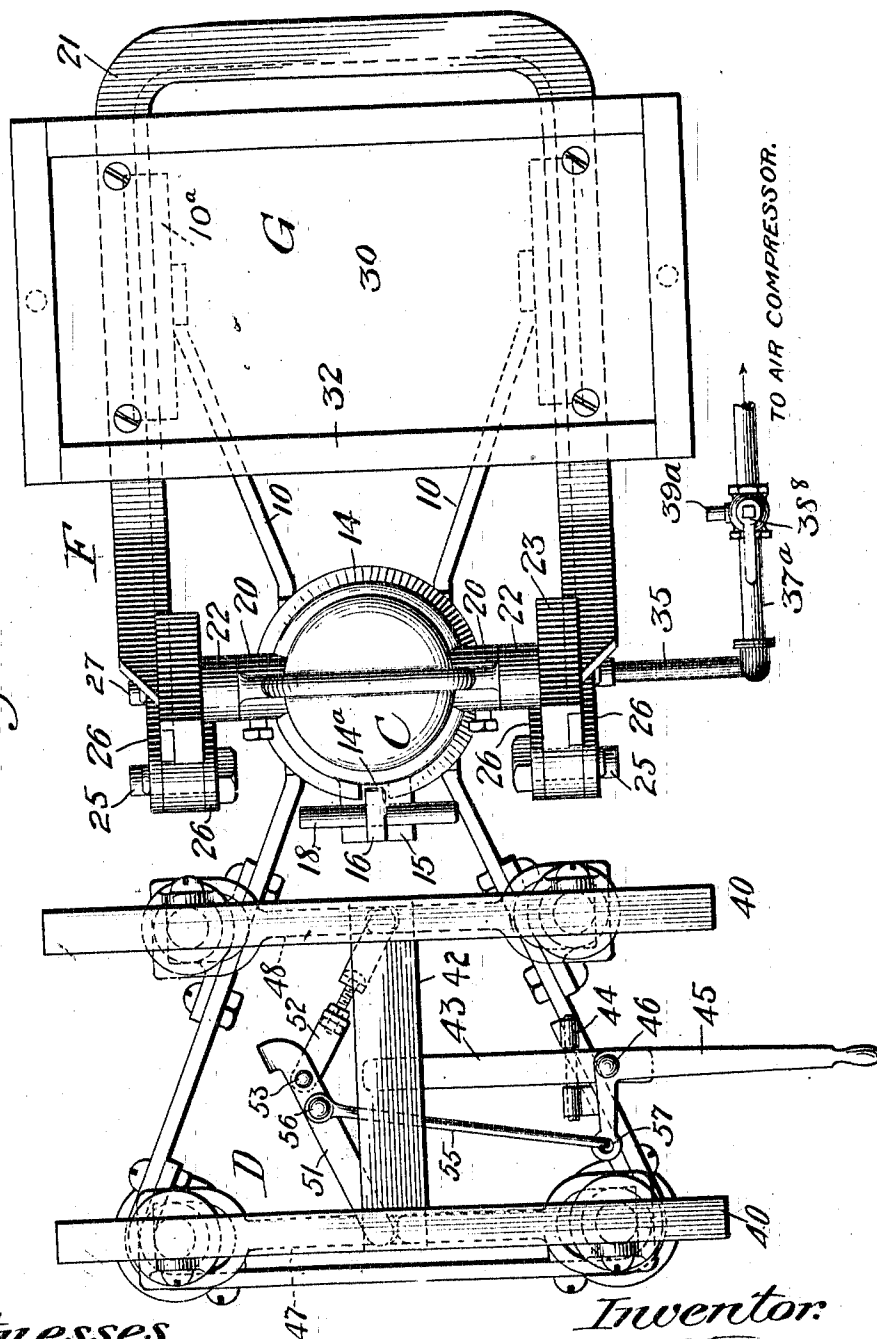


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Fig. 4.



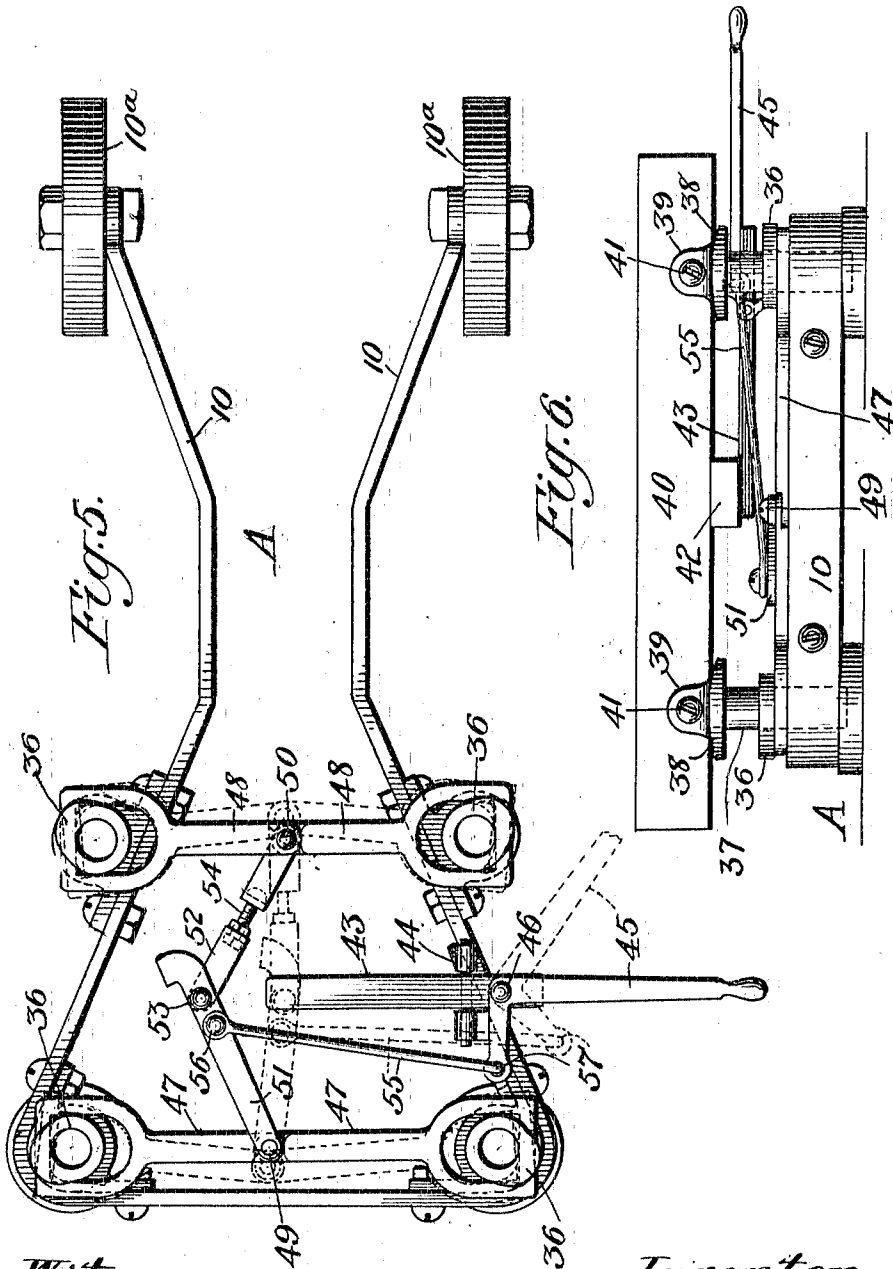
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5 SHEETS-SHEET 5.



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UNITED STATES PATENT OFFICE.

FAY O. FARWELL, OF DUBUQUE, IOWA.

MOLDING-MACHINE.

1,059,448.

Specification of Letters Patent.

Patented Apr. 22, 1913.

Application filed November 4, 1910. Serial No. 590,664.

To all whom it may concern:

Be it known that I, FAY O. FARWELL, a citizen of the United States, residing at Dubuque, county of Dubuque, State of Iowa, have invented certain new and useful Improvements in Molding-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to molding machines, and particularly to rock-over machines for making sand molds.

The invention aims to furnish a machine wherein the jolting or jarring of the flask for packing the sand, the rocking over of the flask to inverted or stripping position, and finally the stripping of the mold, are all effected by a single mechanical means. It is also proposed to effect all of these results by the use of fluid pressure, such as compressed air, and in particular by a single pneumatic cylinder and piston so connected with a mold or flask carrier as to jolt or jar the same, rock it over into coöperation with the flask-supporting platform or frame on which stripping is accomplished, and then effect the stripping action itself, after which the carrier can be rocked or swung back by the same means to its initial position, where it is ready for the preparation of the next mold.

I also aim to furnish a machine wherein the amplitude of the jarring motion used for packing the sand can be easily regulated, and in which the rocking over movement of the flask carrier is in effect a continuation of the jarring movement, that is, said carrier can be moved directly from its jarring position into its swinging over or rocking movement merely by the admission of more air into the pneumatic cylinder. In stripping, the actuation of the pneumatic cylinder always produces a straight lift of the pattern from the mold, varying in amplitude in correspondence with the depth of the pattern; and on the further admission of air, the flask carrier, on which the pattern is secured, enters its return rocking movement preparatory to the preparation of a new mold.

The machine also comprises improved means for receiving and sustaining the flask at the end of its movement into stripping

position, whereby the flask when detached from its carrier is sustained at the proper elevation and in a level position, so that the stripping of the pattern can take place easily and without injury to the mold.

In particular, I aim to provide a flask supporting platform or frame embodying supports that are individually movable upward toward the mold by a suitable operating element, such as a lever, which is also capable of locking all of said supports in their adjusted or flask-sustaining position simultaneously.

The foregoing and other novel features of the invention will appear more clearly from the following description, and the scope of the invention will be defined in the appended claims.

In the accompanying drawings, Figure 1 is a side elevation of a molding machine constructed in accordance with the invention, showing the same in position for jolting the mold. Fig. 2 is a vertical longitudinal section of the machine with the flask swung over on its supporting platform preparatory to stripping. Fig. 3 is a view similar to Fig. 2, but illustrating the stripping position, the pattern being at the upward limit of its stripping movement. Fig. 4 is a top plan view of the machine. Fig. 5 is a top plan view of the base frame of the machine, with its adjunctive parts, and Fig. 6 is an end view of the stripping platform.

The base frame A of the machine preferably includes a metal bar 10 bent into substantially U shape and having its side branches or legs directed inward toward each other at their intermediate portions, between which the base 11 of an upright hollow piston B is secured, as by the screws 12. The divergent free ends of the frame bar 10 are equipped with heavy metal wheels or rollers 10^a by which the frame is supported on the ground at that point, and at the opposite end of the base frame the same is equipped with a stripping platform D, the special construction of which will hereinafter appear.

The upright hollow piston B is fitted within the block 11 in any appropriate manner, and it is thereby supported in a stationary position, the bottoms of the base block and of the hollow piston being left open to accommodate an upwardly directed air pipe 13 which extends through the top

of said piston and discharges into a movable cylinder C slidable vertically on said piston. At its lower end the cylinder C is formed with an outstanding collar or flange 14 having an interior beveled seat designed to engage the inclined edge of a collar E slidable on the piston beneath the cylinder, as shown in Fig. 3. Said collar is provided with an outwardly projecting split or bifurcated lug 15, the cheeks of which slide along opposite faces of an upright guide bar 16 extending alongside the cylinder and piston and secured at its lower end in a bifurcated lug 17 formed on the base block 11. In this way, the collar E is prevented from rotating on the stationary piston in its movement upward and downward on the latter, and the movable cylinder C is also prevented from rotation on the piston by the provision of a notch 14^a in the flange 14, which notch straddles the edge of the guide bar 16. The upward movement of the collar E on the piston is limited by a pin 18 which may be set in any of a number of holes or sockets 19 arranged in a series extending longitudinally of the guide bar.

The pneumatic cylinder C is provided intermediate of its ends with outstanding trunnions 20 on which a flask carrying frame F is mounted to swing in a vertical plane. This frame is preferably formed of an angle bar 21 bent into U shape, as shown, and having its end portions journaled on the trunnions 20 by means of suitable bearings 22. These bearings are formed on blocks 23 secured to the ends of the bar 21 by means such as the screws 24, and said blocks 23 pass beyond the pivots 20, 22 to a slight extent. At their projecting ends they are pivoted by means of pivot pins 25 to double links 26, the opposite ends of which are pivoted to trunnions 27 formed on the collar E at diametrically opposite points.

Referring particularly to Fig. 1, it will be seen that the flask carrying frame F is arranged to extend horizontally and laterally from the cylinder C, and to be supported on the wheels 10^a of the base frame by means of lugs or brackets 28 applied to the sides of the carrier frame and depending therefrom. The sides of the carrier frame are also equipped at their upper surfaces with cleats 29 and a pattern-plate 30 is suitably secured to said cleats and carries upon its upper surface the pattern 31 (Fig. 2), which is fastened thereto in any convenient manner. The flask is indicated at 32, and the latter is provided with a bottom board 33 which is removably secured thereon by means of clamps of any appropriate character, such as the swinging clamps 34 arranged at the opposite ends of the flask.

The air pipe 13 which passes through the hollow piston and supplies the cylinder with air may be extended horizontally at the base

of the piston, as indicated at 35, it being then extended upward as shown at 36^a. The pipe section 36^a is in turn connected with a supply branch 37^a in proximity to the movable cylinder, and the air in said branch, which is furnished from a suitable source, (not shown), is controlled by an ordinary three-way cock 38^a in such a way as to either supply air pressure to the cylinder or to place such cylinder in communication with an exhaust port 39^a (Fig. 4) associated with the controlling valve.

The stripping platform D, previously mentioned, is constructed substantially as follows: That part of the base frame A which is at the side of the cylinder opposite the supporting wheels 10^a, is equipped with a plurality of upwardly directed sockets 36, preferably four, as shown in Fig. 5. These sockets, which may be conveniently formed of cast metal, are bolted or screwed to the side faces of the bar 10, as indicated, and in said sockets individually movable supporting members or standards 37 are movable vertically. The upper ends of the standards 37 are provided with flanges 38 having upstanding side lugs 39. Upon the flanges 38 of each pair of sockets rests a supporting piece or beam 40 that extends transversely of the machine and is loosely connected to its supporting standards by screws 41 or similar fastenings passing through the side lugs 39 into said beam. The top surfaces of the flanges 38 are made slightly convex, and this in connection with the independent movement of the supporting standards and the pivotal connection 41 of the beam ends with the standards, enables the end portions of each beam to be moved upward or downward independently to a certain extent, as will be manifest. These beams are connected at their intermediate portions by means of a cross beam 42 which is adapted to be raised by means of a lever 43 pivoted to the base A at 44 to move in a vertical plane. Hence by depressing the outer end of the lever 43 its inner end will be raised beneath and against the cross beam 42, whereby the platform proper, embodying the supporting beams 40 will be raised as a unit. The lever 43 is operated by means of an elbow or bell crank lever 45 swiveled on the lever 43 at 46 and having in addition to a vertical movement for the purpose of elevating the aforesaid platform, a laterally swinging movement which locks the beams 40 in their adjusted position, wherein they hold the flask horizontal. In order to effect this end, each of the sockets 36 is provided near the upper end with a slot in its side wall, in which locking members or stirrups 47—48 operate. The stirrups 47 are pivotally connected at 49 and the stirrups 48 are similarly connected at 50, the pivots 49 and 50 being in turn connected by means of jointed links 51—52 pivotally connected at 53. The

link 52 is made adjustable in length by means of a turn buckle 54. The entire system of locking members and connecting links is operated by means of a link 55 connected with the link 51 at 56, and pivoted at the opposite end to the inner ends of the elbow lever 45, as indicated at 57. The pairs of locking stirrups 47-48 are so arranged that when the stirrups of a pair are aligned with each other the locking surfaces of the stirrups lie idle in their slots in the sockets without gripping the standards in said sockets, but if the operating lever 45 be swung on its pivot 46 to the right, with reference to Fig. 5, the pivotal connections 49-50 of the locking stirrups will be moved in opposite directions, viz., outward and away from each other, by means of the link connection 55, 51, 52 whereby the gripping portions of the stirrups of each pair are drawn toward each other forcibly and thereby frictionally engage the respective standards to such an extent that the latter will be firmly locked in position. In effecting this result, the links 51, 52, which form a toggle, are straightened by the actuation of the link 55 until the pivots 49, 50 and 53 are in line or, in fact, the pivot 53 is just past the center line, as indicated in dotted lines in Fig. 5, thereby locking the stirrups in frictional engagement with the standards.

The operation of the machine as a whole is substantially as follows: When the flask carrying frame F is in the position shown in Fig. 1, the pattern is suitably fastened on the top surface of the plate 30, and the flask is then filled with sand in the usual manner, the sand rising above the open top of the flask. The machine is then ready for jolting or jarring in order to pack the sand around the pattern, and this is accomplished by quick alternate movements of the air valve 38. These movements cause air to be alternately admitted to and exhausted from the movable cylinder C, and as a result said cylinder will rise quickly to the desired extent under the impetus of the air pressure, and then, as soon as the air is turned off, drop back by gravity, thereby expelling the admitted air rapidly out of the exhaust port 39 of the air valve. During this operation the pin 18 is located in the lowermost hole in the guide bar 19, so that each time a small amount of air is admitted to the cylinder, the latter will swing the carrier F upwardly to a slight extent by means of the connections 20, 22, 23, said carrier being swung about the pivots 25 of the links 26, which during this movement are practically stationary. At the end of each downward movement of the carrier, due to the release of the air, the lugs or brackets 28 will engage forcibly with the jolting wheels 10, with the result that the flask is thoroughly jolted or rammed in

order to pack the sand to the required extent. The jolting action is then discontinued, the sand leveled off at the top of the flask, and the bottom board 23 placed in position and locked on the flask by the clamps 34. When the jolting has been completed the flask is ready for rocking over onto the platform D. When air is first admitted to the cylinder the latter, in rising, begins to swing the carrier upward just as in the jolting operation. Upon a further admission of air, however, and a corresponding elevation of the cylinder, the raising of the trunnions 20 will elevate the pivots 25 as well as the carrier, and thereby gradually swing the links 26 toward the right, with reference to Fig. 1, until said pivots are aligned vertically with said trunnions, at which time the carrier will have reached a vertical position. The carrier will then pass this position, under the impetus of the movement given it, and will swing downward toward the platform D as far as is permitted by the volume of air in the cylinder, the links 26 moving to the right in the meantime and toward the position shown in full lines in Fig. 2. The three-way cock 38 is then so manipulated as to exhaust the air from the cylinder gradually, and the latter will sink by gravity to its lowermost position, moving down the carrier into the position shown in Fig. 2, wherein it is supported horizontally above the platform D. The platform is then elevated by a depression of the operating lever 45, as previously described, this actuation of the lever being conveniently effected by the foot of the operator, and the beams 40 are thereby raised into engagement with the bottom of the flask so that they conform to the horizontal position taken by the latter. When the beams 40 are properly engaged with the flask in this manner, it is necessary to lock the standards 37 in their adjusted position, and this is accomplished by giving the operating lever 45 a laterally swinging movement on its pivot 46, as previously described. This operation may likewise be effected by the operator's foot so that his hands are left free for operating the air valve and for other purposes. When the flask is thus supported from beneath in a horizontal position, the mold is ready for stripping. The clamps 34 are released so that the pattern plate 30 is freed from the body of the flask. The pin 18 is then placed at such an elevation as to give the carrier and the attached pattern plate the requisite amount of straight lift, and after the usual rapping has taken place to release the pattern properly from the mold, air is admitted to the cylinder, as before. Inasmuch as the pin 18 is now at some distance above the sliding collar E, the latter is carried upward along with the cylinder until its

lug abuts said pin, said collar being raised by the cylinder through the links 26 and their connections, as will be understood. As the collar and cylinder are therefore maintained in the same relation to each other, no swinging movement of the carrier will take place, but on the other hand the cylinder, collar, links 26 and carrier will be moved upwardly in a vertical line as a unit, without relative movement. As a consequence, the pattern plate and pattern mounted on the carrier are likewise moved vertically through a distance corresponding to the location of the pin 18, so that there is a straight lift of the pattern out of the mold; and as the latter is held firmly in a horizontal position on the platform D during this operation, the pattern lifts free and clear and without injury to the surfaces of the mold cavity. The pin 18 is set at such an elevation that the collar E will abut against the pin 18 only after the pattern has cleared the mold, and when this occurs the relative movement of the cylinder and carrier as previously described again takes place to rock the carrier back to its initial position over the jolting support. In other words, when the collar E is arrested by the pin after stripping has been effected, a rocking movement which is the reverse of the one first described will occur in order to restore the parts to their initial position, the rocking over commencing at a higher elevation, however, in this instance, as will be understood. After stripping, the mold is removed from the stripping platform, as usual, and when the carrier is returned to its initial position, as described, the machine is ready for the preparation of the next mold, with the same or a different pattern.

Of course it will be understood that this construction provides for a straight lift from the jolting support, if desired, as well as a straight lift from the stripping support. During the jolting operation, the jolting wheels 10^a must be placed on a firm foundation, as will be manifest. The rapping of the mold when in stripping position may be accomplished in the most advantageous way by means of a pneumatic vibrating device. Inasmuch as the air valve may be controlled by one hand and the platform operating lever actuated by one foot while the operator occupies a position at one side of the machine, the other hand of the operator is left free for such manipulation of the other parts as is necessary.

It will be readily understood from the foregoing description that my improved machine is simple in form, reliable in operation, and that the several operations described may be carried out with great rapidity and with a minimum expenditure of energy.

Of course I have not attempted to describe the various modifications of the machine that may be adopted without digressing from my inventive idea, the scope of which is set forth in the claims.

What I claim is:—

1. In a molding machine, a flask carrier, and a single fluid pressure cylinder and piston for jolting said carrier and then moving it to a laterally located stripping position.

2. In a molding machine, a flask supporting platform, and a single fluid pressure means to jolt the flask, rock it over onto said platform and then strip the mold.

3. In a molding machine, a flask supporting platform, a single means to jolt the flask, rock it over onto said platform and then give the pattern a straight lift preparatory to a return rocking movement, and means for varying the amplitude of such straight lift.

4. In a molding machine, the combination of a base frame having a jolting support at one side and a stripping support at the opposite side, a flask carrier mounted to swing between said supports in a vertical plane, and power mechanism intermediate said supports and connected with the carrier to effect the jolting thereof and likewise the swinging or rocking over movement.

5. In a molding machine, the combination of a base frame having a jolting support at one side and a stripping support at the opposite side, a flask carrier mounted to swing between said supports in a vertical plane, and a pneumatically operated device intermediate said supports and connected with the carrier to effect the jolting thereof and likewise the swinging or rocking over movement.

6. In a molding machine, the combination of a base frame having supports at opposite sides, a fixed piston rising from the frame between said supports, a cylinder slidable on said piston, a flask carrier pivoted to said cylinder, a collar slidable on the piston beneath the cylinder and limited in its vertical movement, and links connecting the carrier with said collar.

7. In a molding machine, the combination of a fixed piston, a cylinder slidable thereon, a collar slidable on said piston, means to limit the movement of the collar, a flask carrier pivoted to the cylinder, and links pivotally connecting said carrier and said collar.

8. In a molding machine, a base frame having supporting wheels, a flask carrier supported by said wheels, and means to elevate the carrier from the wheels and permit it to drop down thereon by gravity for jolting purposes.

9. In a molding machine, a jolting sup-

port, a vertically swinging flask carrier above and sustained thereby, a pneumatic cylinder and piston for operating the carrier, and a controlling valve for said cylinder and piston operative on alternate movements to raise the carrier from the jolting support and then permit it to drop down thereon by gravity.

10. In a molding machine, the combination with a fixed piston and a cylinder slidable thereon, of a collar also slidable on the piston, a flask carrier operatively connected with the cylinder and the collar, and means for varying the amplitude of movement of the collar.

11. In a molding machine, the combination of a fixed piston, a cylinder slidable thereon, a flask carrier pivoted to the cylinder and movable bodily therewith, and means for effecting a rocking movement of the carrier with respect to the cylinder,

comprising a member having a restricted sliding movement on the piston and connected with the carrier.

12. In a molding machine, the combination of a vertically movable element, a normally fixed element, a flask carrier pivoted to the former, connections between said carrier and the normally fixed element whereby relative movements of the elements will effect a pivotal movement of the carrier, means to render the relatively fixed element movable in unison with the vertically movable element to effect a vertical movement of the flask carrier, and means to actuate said vertically movable element.

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

FAY O. FARWELL.

Witnesses:

FRANK B. HIRD,
GLENN MUFFLY.