

No. 706,751.

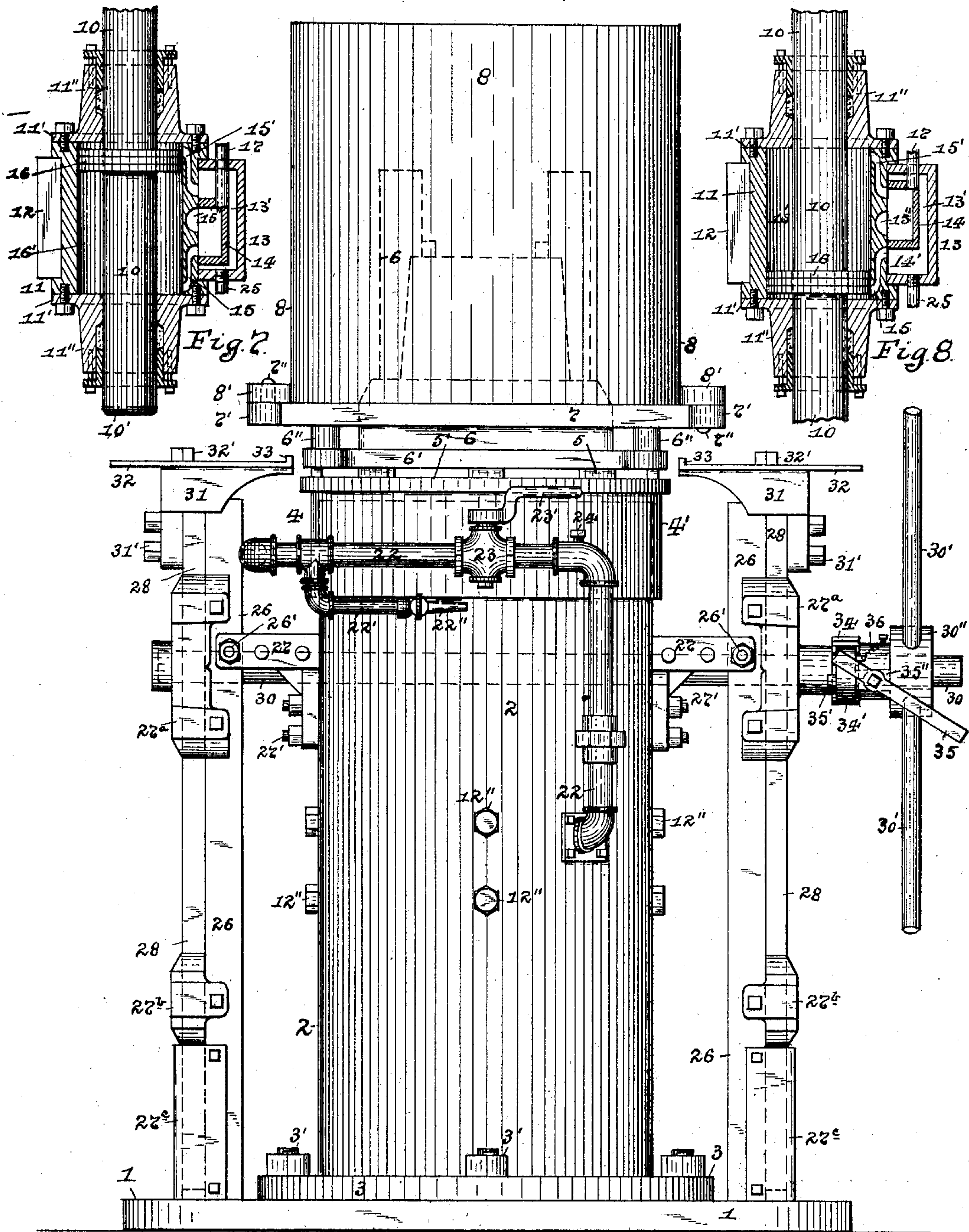
Patented Aug. 12, 1902.

C. HERMAN.  
MOLDING MACHINE.

(Application filed Apr. 9, 1901.)

(No Model.)

4 Sheets—Sheet I.



Witnesses:  
J. L. Trefaller, Jr.  
M. B. Beatty.

Fig. 1.

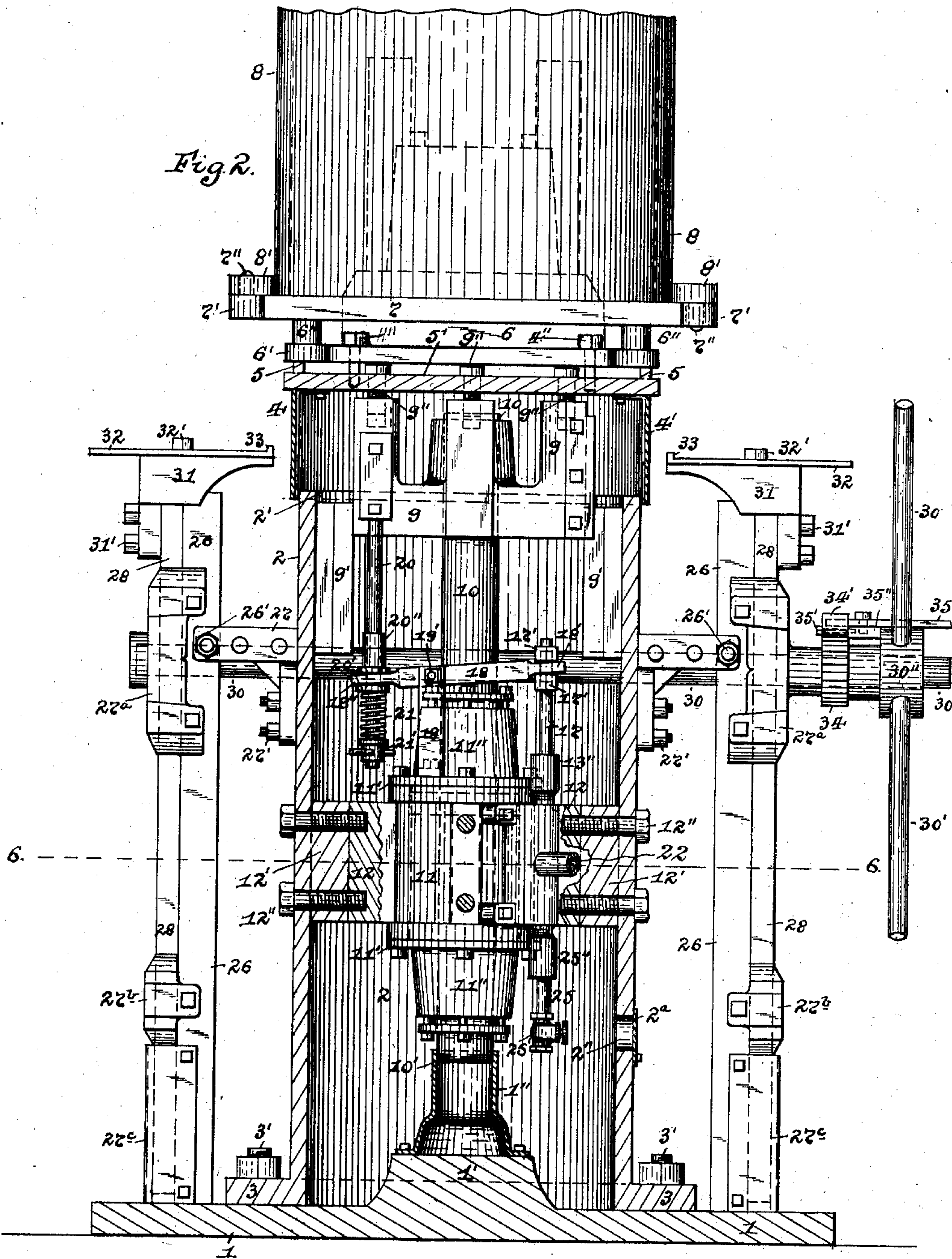
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4 Sheets—Sheet 2.



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# UNITED STATES PATENT OFFICE.

CHARLES HERMAN, OF ALLEGHENY, PENNSYLVANIA.

## MOLDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 706,751, dated August 12, 1902.

Application filed April 9, 1901. Serial No. 54,973. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES HERMAN, a resident of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Molding-Machines; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to sand-molding machines, and has for its object to provide a cheap and simple construction of such machine, whereby the sand may be rapidly and evenly compacted around the pattern in the flask and the flask containing the mold-cavity easily and quickly raised from around the pattern.

I will now describe my invention, so that others skilled in the art may make and use the same, referring to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side view of my improved sand-molding machine, showing the parts in their normal position ready for the jarring operation. Fig. 2 is a like view, partly in section, showing the parts in their raised position during the jarring operation. Fig. 3 is a like view looking at the opposite side of the machine, showing the parts in the act of raising the flask with the finished mold-cavity therein from around the pattern. Fig. 4 is a top view of the machine, showing the flask, stripping-plate, pattern, and pattern-plate removed. Fig. 5 is a like view with the casing-cover removed. Fig. 6 is a cross-section on the line 6 6 of Fig. 2. Figs. 7 and 8 are vertical sections on the line X X of Fig. 6, showing the raised and lowered positions, respectively, of the shaft and operative parts.

Like symbols of reference indicate like parts in each.

My improved sand-molding machine is supported on a base-plate 1, upon which is a jarring-block 1', and extending up from the base-plate, around said block, is a cylindrical casing 2, secured to the base-plate by bolts 3', passing through the flange 3 of the casing. Fitting over the upper end 2' of the casing is a cover 4, provided with a depending flange 4', and extending from the upper face 5' of said cover is a series of lugs 5 for supporting a pattern-plate 6', carrying the pattern 6, which pattern-plate is removably secured to

the cover 4 by bolts 4'', passing through the plate and into the cover. The pattern-plate 6' is also provided with lugs 6'' for supporting a stripping-plate 7, upon which is carried the flask 8, having lugs 8' for engaging by means of dowel-pins 7'' with the lugs 7' on the stripping-plate.

Within the casing 2 is the jarring mechanism, comprising a post 10, secured at its upper end to a cross-head 9, which slides on guides 9' on the casing, while the lower end 10' of the post is adapted to contact with the jarring-block 1' in the operation of jarring, as hereinafter described, and is supported within a bearing 1'', secured to said block. Fitting around the shaft 10 is a cylinder 11, provided with the usual heads 11' and stuffing-boxes 11''. The cylinder 11 is removably secured to lugs 12', formed on the casing 2, by means of bolts 12'', passing through the casing, the lugs, and into wings 12 on the sides of the cylinder. The cylinder has a valve-chest 13, within which travels a slide-valve 14, having a space 14', adapted to communicate with supply-ports 15 15' and the exhaust-port 15'' in its different positions. The ports 15 15' lead from the valve-chamber 13' into the cylinder, the latter being provided with a piston 16, secured to the post 10. Connected to the slide-valve 14 is the valve-stem 17, which extends through a packing-box 13'' on the upper end of the valve-chest and is provided with nuts 17' at its upper end, between which nuts 17' the forked end 18' of a rocking lever 18 extends, said lever being pivoted at 19' to a standard 19, secured to the upper cylinder-head 11'. The opposite end of the lever 18 is also forked, as at 18'', and extends around a rod 20, secured to and extending down from the cross-head 9 and between a washer 20' and a sleeve 20'', loosely mounted on said bar or rod 20, while a spiral spring 21 is interposed on said rod between the washer 20' and a collar 21' at the lower end of the rod.

Leading from a suitable storage-tank, air-pump, or any source of supply is a supply-pipe 22, which is provided with an auxiliary pipe 22', having a cock-nozzle 22'' at its end, to which a hose or other flexible pipe can be attached, by which when desired the air may be employed to dust or clean the sand off the pattern. The supply-pipe 22 commu-



nicates with the valve-chamber 13' and is provided with a suitable valve or stop-cock 23, operated by a handle 23'. A screw-plug 24 engages with a suitable opening in the supply-pipe 22 for supplying oil through said pipe to the parts within and connected to the cylinder 11, the oil being permitted to escape through a pipe 25, leading from the valve-chamber through a packing-box 25'' at the lower end of the valve-chest and having a suitable drip-cock 25' for drawing off the oil, said drip-cock being operated by means of a wrench, which may be inserted through an opening 2'' in the casing 2, closed by a pivoted cover 2<sup>a</sup>.

The mechanism for raising the flask 8 after the compacting of the sand by the jarring mechanism, above described, so as to form the mold-cavity 8'' by the pattern 6, is similar to that shown and described in Letters Patent No. 647,673, granted to Henry C. Herman April 17, 1900, for a molding-machine, and consists of two standards 26, extending up from the base-plate 1 outside of and on opposite sides of the casing 2 and supported by brackets 27, secured to the casing by bolts 27' and to said standards by bolts 26'. Secured to and extending out from the standards 26 are the clamps 27<sup>a</sup> 27<sup>b</sup> 27<sup>c</sup> for supporting and guiding the lifting-bars 28, which are provided with racks 28', meshing with gear-wheels 29, mounted on a shaft 30 and inclosed within bearings 29', formed by the clamps 27<sup>a</sup>, said shaft being provided with handle-bars 30', formed on a bearing 30'' at one end for operating the same. The upper ends of the lifting-bars 28 are provided with cross-pieces 31, secured thereto by bolts 31', and horizontal extensions 32 are removably secured to the cross-pieces on each end thereof by bolts 32', passing through holes 32'' and into the cross-pieces 31. The horizontal extensions 32 are provided with a number of the holes 32'' to permit of adjustment of the same for different sizes of stripping-plates and flasks, and they are also provided with projections 33 for engaging the stripping-plate to raise it and the flask when desired. Mounted on the shaft 30 is a ratchet-wheel 34, with which a pawl 34' is adapted to engage and which is held in engagement with the ratchet-wheel by a spiral spring 36, but is lifted therefrom during the raising of the lifting-bars 28 by a lever 35, pivoted on the bearing 30'.

The operation of my improved sand-molding machine is as follows: The parts being in their normal position, (shown in Fig. 1,) with the pattern-plate 6' carrying the pattern 6, resting upon the lugs 5, the operator places the stripping-plate 7 over the pattern 6 and rests the same upon the projections 6'' of the pattern-plate, after which the flask 8 is placed over the pattern and held in place on the stripping-plate by means of the dowel-pins 7''. The flask 8 is then filled with sand and the operator turns the handle 23' of the valve 23 to the position shown in Fig. 5, where-

upon the air from the supply-pipe 22 enters the valve-chamber 13', from whence it passes to the cylinder through the port 15 and raises the piston 16 and post 10 to the position shown in Fig. 7. As the piston 16 and post 10 are thus raised the cross-head 9, connected to said post and to the cover 4, is also raised on its guides 9', elevating the cover, the pattern-plate 6', the stripping-plate 7, and flask 8, containing the sand, to the position shown in Fig. 2, and as the cross-head 9 is thus raised the bar or rod 20, connected thereto, is also raised, pushing up through the medium of the collar 21', spring 21, and washer 20' the end 18'' of the rocking lever 18, which movement will lower the other end of the lever 18, and with it the valve-stem, pushing the valve to the position shown in Fig. 7. The air will then enter the cylinder 11 through the port 15' and exerting its force on the piston 16 will cause the same to assume its lowermost position, as shown in Fig. 8, the air in each case exhausting through the exhaust-port 15''. As the shaft or post 10 and piston 16 are thus lowered the cross-head 9 and the parts connected thereto are also lowered, the lower end 10' of the post 10 striking against the jarring-block 1' and compacting the sand in the flask around the pattern. As the cross-head 9 is thus lowered the rod 20 is also lowered, and its length of movement being greater than the distance between the cross-head and the top of the sleeve 20'' on the rod the cross-head will contact with said sleeve and force the sleeve down, which movement will also force down the end 18'' of the lever 18 and cause the other end of said lever to be raised, which, transmitting its motion to the valve-stem, will cause the valve to assume the position shown in Fig. 8, and the air will enter the cylinder and raise the piston and the parts connected to it. As will be seen, these operations of raising and lowering the parts for the purpose of packing the sand are automatically performed and continuous so long as the operating fluid is allowed to flow.

In order to raise the flask 8, with its mold-cavity, from around the pattern, all that is necessary to do is for the operator to grasp one of the handle-bars 30' and turn the same in the proper direction, when the lifting-bars 28 will move upwardly through the medium of the pinions 29 on the shaft 30 meshing with the racks 28' on the bars 28. As the bars 28 are raised the projections 33 engage with the bottom of the stripping-plate 7, raising said plate, and with it the flask, away from the pattern, the pattern-plate 6' and pattern remaining stationary on the cover during this operation, as shown in Fig. 3. After these parts are thus raised the lifting-bars, plate 7, and flask are held from dropping by the pawl 34' engaging one of the teeth in the ratchet-wheel 34. When the stripping-plate and flask have been raised above the top of the pattern 6, the operator lifts them off the extensions 32 and conveys them to any suit-



able place, after which the lifting-bars can be lowered by grasping the lever 35 and freeing the pawl 34' from the ratchet-wheel 34 and by turning the handle-bars 30' in a reverse direction to that just described.

The parts within the casing 2 can be oiled as often as desired by removing the screw-plug 24 from the opening in the supply-pipe 22 and pouring oil into said pipe, which may, if desired, be forced through the working parts of the valve chamber and cylinder by means of the air-pressure, and when a sufficient amount has been thus inserted the plug 24 is replaced, and any surplus oil within the valve-chamber 13' may be drawn off through the pipe 25 and cock 25' by a wrench inserted through the opening 2' engaging with the handle of said cock.

It will be manifest that other fluid than air—such as steam, &c.—may be used to operate the motor of the jarring mechanism and that various other modifications may be resorted to by the skilled artisan without departing from the spirit of the invention or sacrificing any of its advantages.

My machine is simple in its construction and operation, is very durable, and by its use the sand can be easily, rapidly, and thoroughly packed around the pattern to form a perfect mold-cavity, after which the stripping-plate and flask may be easily and quickly raised from around the pattern without the employment of any hard or manual labor. The parts for jarring being confined within the casing and the cover always inclosing the upper end of the casing in all positions renders the machine practically sand-tight, so as to obviate the danger of sand gaining access to the working parts and injuring the same.

I claim—

1. In a molding-machine, the combination of a jarring-block, a casing, a post within said casing having a pattern-plate thereon carrying a pattern, a stripping-plate supported by the pattern-plate and carrying a flask, and a power-motor contained within said casing and directly connected to said post for imparting a vertical reciprocatory movement to the post and the pattern-plate, pattern, stripping-plate and flask carried thereby and partaking of the movements thereof, whereby said post is caused to strike against said jarring-block for the purpose of compacting the sand in the flask around the pattern; substantially as described.

2. In a molding-machine, the combination of a jarring-block, a casing having guides on its inner surface, a cover fitting over and around the top of said casing, a cross-head in said casing connected to said cover and adapted to slide on said guides, a post in said casing connected to said cross-head, a pattern-plate carrying a pattern connected to said cover, a stripping-plate carrying a flask supported by said pattern-plate, and a power-

motor connected to said post for imparting a vertical reciprocatory movement to said post and the pattern-plate, pattern, stripping-plate, and flask carried thereby and partaking of the movements thereof, whereby said post is caused to strike against said jarring-block for the purpose of compacting the sand in the flask around the pattern; substantially as described.

3. In a molding-machine, the combination of a jarring-block, a casing, a post within said casing having a pattern-plate thereon carrying a pattern, a stripping-plate supported by the pattern-plate and carrying a flask, and a power-cylinder contained within said casing having its piston directly connected to said post for imparting a vertical reciprocatory movement to the post and the pattern-plate, pattern, stripping-plate, and flask carried thereby and partaking of the movements thereof, whereby said post is caused to strike against said jarring-block for the purpose of compacting the sand in the flask around the pattern; substantially as described.

4. In a molding-machine, the combination of a jarring-block, a casing having guides on its inner surface, a cover fitting over and around the top of said casing, a cross-head in said casing connected to said cover and adapted to slide on said guides, a post in said casing connected to said cross-head, a pattern-plate carrying a pattern connected to said cover, a stripping-plate carrying a flask supported by said pattern-plate and a power-cylinder having its piston connected to said post for imparting a vertical reciprocatory movement to said post and the pattern-plate, pattern, stripping-plate and flask carried thereby and partaking of the movements thereof, whereby said post is caused to strike against said jarring-block for the purpose of compacting the sand in the flask around the pattern; substantially as described.

5. In a molding-machine, the combination of a jarring-block, a post having a pattern-plate carrying a pattern, a power-cylinder having its piston directly connected to said post, valve mechanism for said cylinder, and mechanism whereby said valve mechanism is automatically operated to admit fluid to the cylinder to impart to the piston a vertical reciprocatory movement, which movement is transmitted to the post whereby said post is caused to strike against said jarring-block for the purpose of compacting the sand around the pattern; substantially as described.

6. In a molding-machine, the combination of a jarring-block, a post having a pattern-plate carrying a pattern, a power-cylinder having its piston directly connected to said post, valve mechanism for said cylinder, and mechanism whereby said valve mechanism is operated to admit fluid to the cylinder to impart to the piston a vertical reciprocatory movement, which movement is transmitted to the post whereby said post is caused to



strike against said jarring-block for the purpose of compacting the sand around the pattern; substantially as described.

7. In a molding-machine, the combination  
5 of a jarring-block, a casing having guides on its inner surface, a cover fitting over and around said casing, a cross-head within said casing connected to said cover and adapted to slide on said guides, a post within said casing  
10 connected to said cross-head, a pattern-plate carrying a pattern connected to said cover, a stripping-plate carrying a flask supported by said pattern-plate around the pattern, a power-cylinder having its piston connected to said post, valve mechanism for said  
15 cylinder, and mechanism whereby said valve mechanism is automatically operated to admit fluid to the cylinder to impart to the piston a vertical reciprocatory movement, whereby  
20 by said post is caused to strike against the jarring-block for the purpose of compacting the sand in the flask around the pattern; substantially as described.

8. In a molding-machine, the combination  
25 of a jarring-block, a casing having guides on its inner surface, a cover fitting over and around said casing, a cross-head within said casing connected to said cover and adapted to slide on said guides, a post within said casing  
30 connected to said cross-head, a pattern-plate carrying a pattern connected to said cover, a stripping-plate carrying a flask supported by said pattern-plate around the pattern, a power-cylinder having its piston connected to said post, valve mechanism for said  
35 cylinder, a bar connected to said cross-head, and a lever pivoted on the cylinder and connected to said rod and to said valve mechanism whereby said valve mechanism is automatically operated to admit fluid to the cylinder to impart to the piston a vertical reciprocatory movement whereby said post is  
40 caused to strike against said jarring-block for the purpose of compacting the sand around the pattern; substantially as described.

9. In a molding-machine, the combination  
of a jarring-block, a casing, a post within said casing having a pattern-plate thereon carrying a pattern, a stripping-plate supported by the pattern-plate and carrying a  
50 flask, a power-motor contained within said casing and directly connected to said post for imparting a vertical reciprocatory movement to the post and to the pattern-plate, pattern, stripping-plate and flask carried thereby and partaking of the movements thereof, whereby  
55 said post is caused to strike against said jarring-block for the purpose of compacting the sand in the flask around the pattern; and mechanism for engaging with said stripping-plate to raise the same and the flask from around the pattern; substantially as described.

10. In a molding-machine, the combination  
65 of a jarring-block, a casing, a post within said casing having a pattern-plate thereon carrying a pattern, a stripping-plate supported by

the pattern-plate and carrying a flask, a power-motor contained within said casing and directly connected to said post for imparting a  
70 vertical reciprocatory movement to the post and the pattern-plate, pattern, stripping-plate and flask carried thereby and partaking of the movements thereof, whereby said post is caused to strike against said jarring-block  
75 for the purpose of compacting the sand in the flask around the pattern, vertically-movable lifting-bars adapted to engage with said stripping-plate to raise the same and the flask from around the pattern, and mechanism for  
80 operating said lifting-bars; substantially as described.

11. In a molding-machine, the combination  
of a jarring-block, a casing, a post within said casing having a pattern-plate thereon carrying  
85 a pattern, a stripping-plate supported by the pattern-plate and carrying a flask, a power-motor contained within said casing and directly connected to said post for imparting a vertical reciprocatory movement to the post  
90 and to the pattern-plate, pattern, stripping-plate and flask carried thereby and partaking of the movements thereof, whereby said post is caused to strike against said jarring-block for the purpose of compacting the sand in the  
95 flask around the pattern, vertically-movable lifting-bars adapted to engage with said stripping-plate to raise the same and the flask from around the pattern, gear-racks on said lifting-bars, and gear-wheels meshing with said  
100 gear-racks for lifting and lowering said lifting-bars; substantially as described.

12. In a molding-machine, the combination  
of a jarring-block, a casing, a post within said casing having a pattern-plate thereon carrying  
105 a pattern, a stripping-plate supported by the pattern-plate and carrying a flask, a power-motor connected to said post for imparting a vertical reciprocatory movement to the post and to the pattern-plate, pattern, stripping-  
110 plate and flask carried thereby and partaking of the movements thereof, whereby said post is caused to strike against said jarring-block for the purpose of compacting the sand in the flask around the pattern, vertically-movable  
115 lifting-bars adapted to engage with said stripping-plate to raise the same and the flask from around the pattern, gear-racks on said lifting-bars, gear-wheels meshing with said gear-racks for operating said lifting-bars, a ratchet-  
120 wheel on said shaft, and a pawl engaging with said ratchet-wheel for holding said lifting-bars in their elevated position; substantially as described.

13. In a molding-machine, the combination  
125 of a jarring-block, a casing, a post within said casing having a pattern-plate thereon carrying a pattern, a stripping-plate supported on the pattern-plate around the pattern and carrying a flask, mechanism connected to said  
130 post for imparting a vertical reciprocatory movement to said post, pattern-plate, pattern, stripping-plate and flask, whereby said post is caused to strike against said jarring-



block, vertically-moving lifting-bars for en-  
gaging said stripping-plate to raise the same  
and flask, gear-racks on said lifting-bars,  
gear-wheels meshing with said gear-racks for  
5 operating said lifting-bars, a ratchet-wheel,  
a spring-operated pawl for engaging with  
said ratchet-wheel to hold said lifting-bars in  
their raised position, and a pivoted lever  
adapted to come in contact with said pawl for

holding the same in engagement with said ratchet-wheel; substantially as described.

In testimony whereof I, the said CHARLES HERMAN, have hereunto set my hand.

CHARLES HERMAN.

Witnesses:

J. L. TREFALLER, Jr.,

J. N. COOKE.