No. 775,530. PATENTED NOV. 22, 1904.

F. W. HALL.

MOLDING MACHINE.

APPLICATION FILED JUNE 30, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1

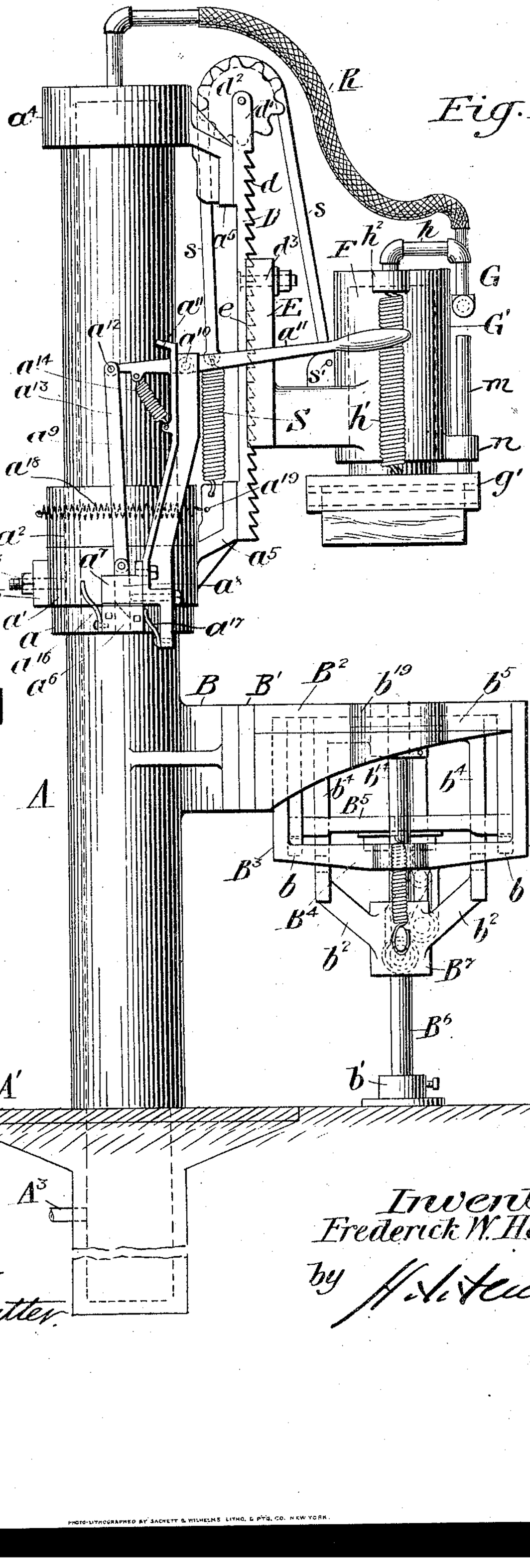
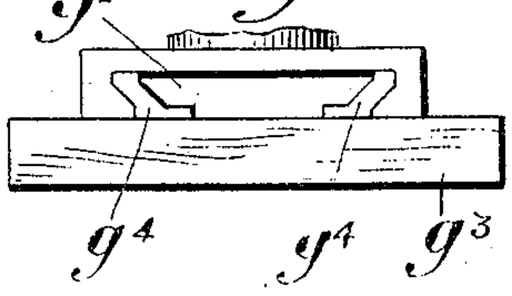


Fig. 5



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2

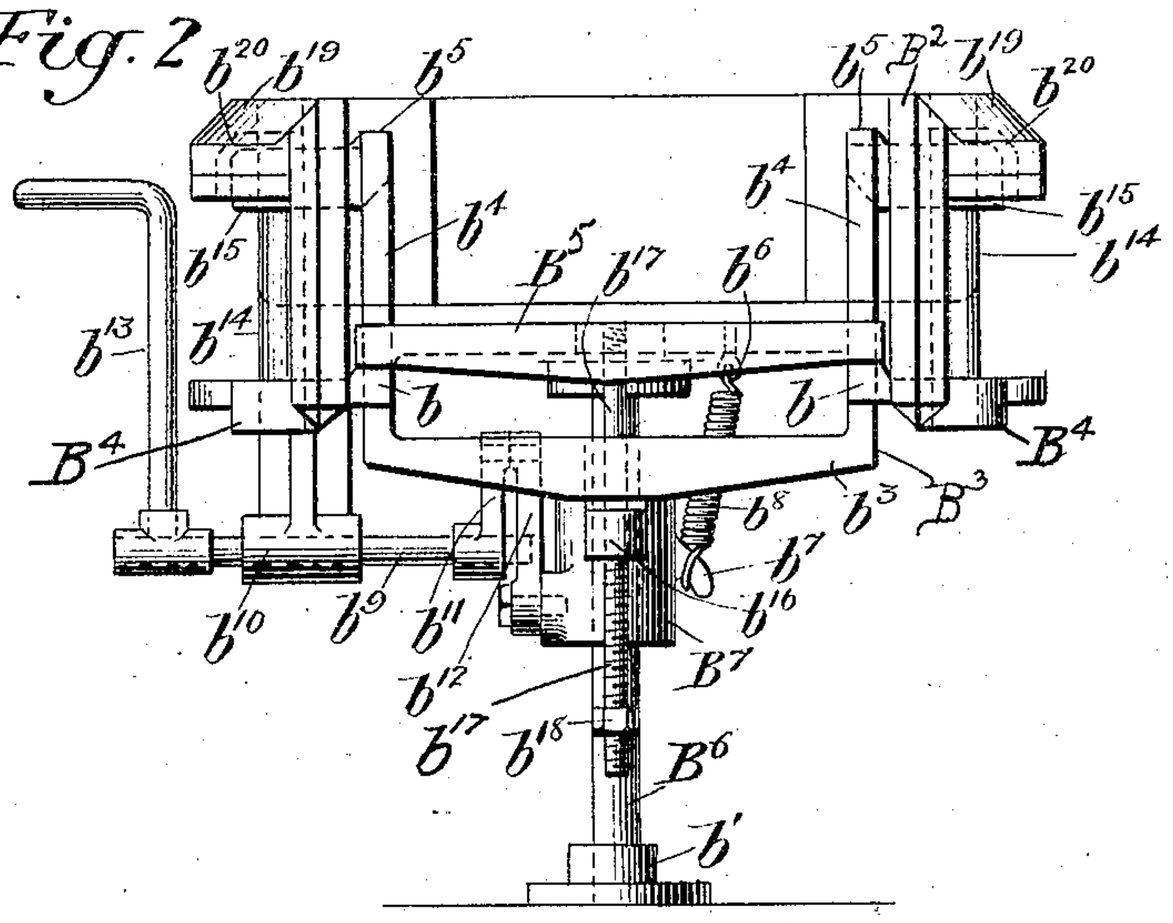


Fig. 3

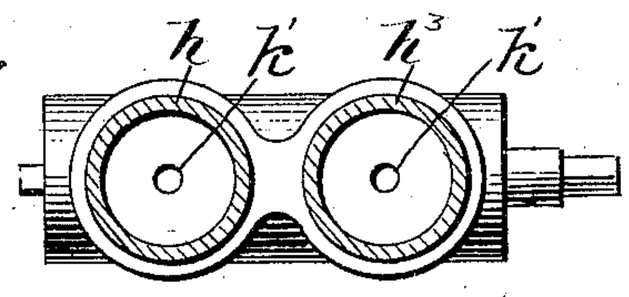


Fig. 4.

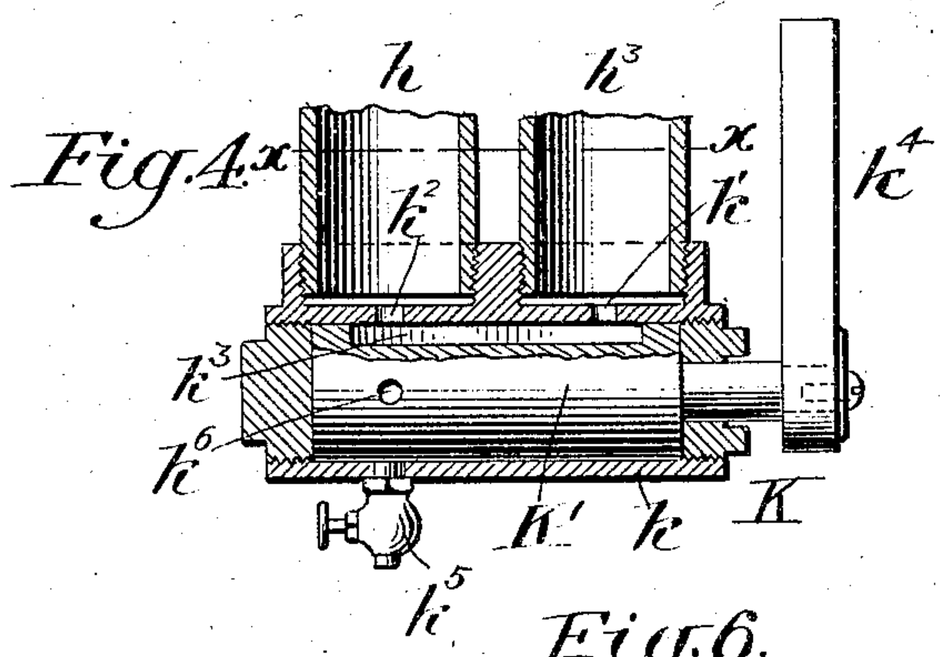
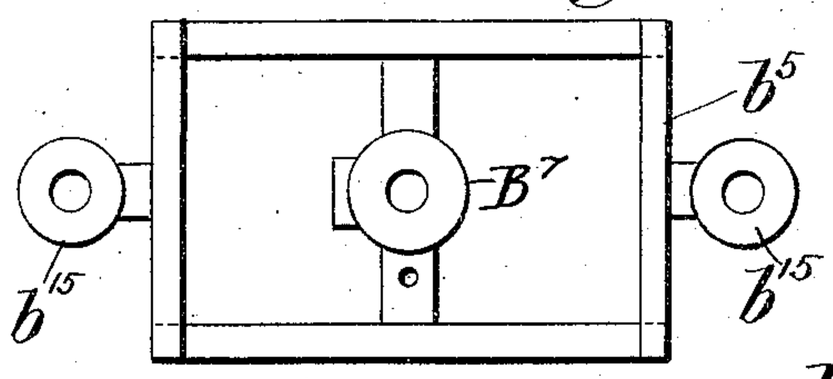


Fig. 6.



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No. 775,530. Patented November 22, 1904.

UNITED STATES PATENT OFFICE.

FREDERICK W. HALL, OF CAMDEN, NEW JERSEY, ASSIGNOR OF ONE-HALF TO J. W. PAXSON COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

MOLDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 775,530, dated November 22, 1904.

Application filed June 30, 1903. Serial No. 163,735. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. HALL, a citizen of the United States, residing at Camden, in the State of New Jersey, have invented certain new and useful Improvements in Molding-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

The invention to be hereinafter described relates to molding-machines, and more particularly to that class of such machines wherein the sand is rammed in the flask and about the patterns by power-operated ramming devices.

Generally stated, the object of the present invention is to provide a machine of the type referred to wherein there shall be combined power-operated ramming mechanism and stripping mechanism to readily detach the patterns from the molded sand after the ramming operation has been completed and to provide in such machine means for making molds in flasks of widely different sizes, means being employed whereby a wide range of work may be executed with one and the same apparatus and to facilitate the ready placement and removal of the flask without danger of injury to the mechanism or mold.

With these general objects in view the invention consists of the parts and combinations that will be hereinafter more fully described and then definitely pointed out in the claims.

In the drawings, Figure 1 is a side elevation of a machine embodying the present invention. Fig. 2 is a detached front view of the stripping mechanism. Fig. 3 is a sectional view on line $x\,x$ of Fig. 4, showing the valve construction. Fig. 4 is a sectional detail and elevation of the valve. Fig. 5 is a detail of the means for connecting the rammer head and board, and Fig. 6 is a detached plan view of the pattern-plate carrier.

In general construction the main support for the working parts of the apparatus consists of a hollow column or upright A, suitably supported on a base A′ and preferably extending some distance below the ground or floor line A^2, said upright or column, in addition to constituting the support for the working parts, serving also as a storage-receptacle for compressed air or other fluid and being provided with an inlet-pipe, as A^3, leading from a suitable fluid-supply.

Projecting from the column or upright A at a suitable height is a bracket B, to which is connected a back plate B′, having projecting outward therefrom the side arms B^2 B^2, which constitute the stripping-plate support, the stripping-plate not being shown, as it forms no part of my present invention and is well understood in the art. Secured to the stripping-plate support are the depending parts B^3 B^3, connected by ties B^4 to form a rigid structure, said depending parts B^3 B^3 having ears or lugs b b projecting inward therefrom to constitute sustaining means for the stool-plate support B^5, which is appropriately secured thereto. Extending downward from the stool-plate support B^5 is the vertical standard B^6, firmly secured at its lower end in a step b', and sliding on said standard is a hub or sleeve B^7, having arms b^2 b^2 and cross-ties b^3, Fig. 2, from which project the upwardly-extending arm b^4 b^4, connected by cross-arms b^5, constituting the pattern-plate support. Secured at one end, b^6, to the stool-plate support is the spring b^8, the opposite end of which is secured to a lug b^7, projecting from the sliding sleeve or hub B^7, whereby said hub and its connected pattern-plate carrier is normally held in its raised position, as shown in Figs. 1 and 2. The downward movement of the hub and connected pattern-plate carrier b^5 is secured by means of a shaft b^9, journaled in bearing b^{10}, projecting downward from the part B^4 of the stripping-plate support or other suitable sustaining means and having at its inner end a crank-arm b^{11}, connected to an arm b^{12}, pivotally joined to the sliding hub B^7, a handle b^{13} being provided for the manipulation of the shaft b^9, and consequently the pattern-plate carrier, as will be readily understood.

In order that the pattern-plate carrier may

be properly guided during its up-and-down movement to thereby obviate any lateral play thereof calculated to injure the mold-cavities as the molds are being drawn from the flask, there are extended between the brackets B^2 and the ties B^4 the guide-rods b^{14} b^{14}, which are engaged by the perforated projections b^{15} b^{15}, extending from the pattern-plate carrier. Thus the pattern-plate carrier while movable upward under the tension of spring b^8 and downward by means of the hand-operated shaft and connections with hub B^7 is guided at three widely-separate points—viz., at the center by means of the hub B^7, sliding on the upright B^6, and at each side of the pattern-plate carrier in substantially the plane of the top surface of said carrier by means of the perforated projections b^{15} b^{15} and guide-rods b^{14} b^{14}. In this class of stripping-plate mechanism it is desirable that the pattern-plate carrier shall be adjustably limited in its downward movement under the action of the hand-operated devices, and to this end I have provided on one side of the hub B^7 a perforated projection b^{16}, through which passes stop-rod b^{17}, secured at its upper end to the stool-plate support, as shown in Fig. 2, and having on its lower portion below the perforated projection b^{16} a screw-thread on which there is a suitable nut b^{18}. From this construction it will be obvious that the amount of downward movement of the pattern-plate carrier can be adjusted by simply turning the nut b^{18} so that it may occupy a position higher or lower upon the stop-rod b^{17}, the said nut acting as a stop against which the projection b^{16} strikes when the pattern-plate carrier has been moved downward sufficient for the patterns to be drawn from the flask.

In order that the top of the pattern-plate carrier may rise sufficiently high to present its upper surface slightly below the surface of the stripping-plate support and yet the said carrier be steadily guided to the full extent of its upward movement upon the guide-rods b^{14} b^{14}, I have provided each of the side arms B^2 B^2 with side projections b^{19}, which have their under surfaces countersunk, as at b^{20} b^{20}, (shown by dotted lines in Fig. 2,) to accommodate the projections b^{15} b^{15} of the pattern-plate carrier as it rises to the upper limit of its movement. It will be noted by referring to Fig. 2 that the upper ends of the guide-rods b^{14} b^{14} extend into the countersunk under portions of the projections b^{20} b^{20} and are secured in appropriate manner in said projections and that by reason of such countersunk construction the projections b^{15} b^{15} of the pattern-plate carrier can rise well up toward the surface of the stripping-plate support and yet be securely guided and controlled throughout the full extent of such movement.

Referring to Fig. 1 of the drawings, the hollow column or upright A has secured thereto or formed integral therewith an enlarged shoulder a, upon which rests a collar a', free to rotate upon the upright A, a second shoulder a^2 being appropriately secured to the column or upright A above the collar a' to maintain the latter in proper position upon the column or upright and yet permit rotative movement of the collar. Rotatably mounted upon the upper end of the column or upright A is a collar a^4, each of said collars a' a^4 being provided with a bracket a^5, and said brackets being joined by a rack-plate D, whereby said rotatable collars a' a^4 may be so held in rigid connection that they will rotate in unison. The rack-plate D, as will be hereinafter described, carries the power-operated ramming devices, so that by rotation of the collars a' a^4 the rack-plate D and the power-operated ramming devices carried thereby may be swung to a position above the stripping-plate support or to a position out of vertical alinement therewith, as will be obvious.

Secured to the fixed shoulder a on the column or upright A is a catch-block a^6, and likewise secured to the rotatable collar a' is a catch-carrying block a^7, in which there vertically slides a catch a^8, having a beveled lower end, said catch when in connection with the catch-block a^6 holding the collar a' against rotative movement, and consequently also serving to hold the rack-plate and power-operated ramming devices against rotative movement with respect to the column or upright A. Projecting upward from the block a^7 is a bracket a^9, having pivoted thereto at its upper end, as at a^{10}, a hand-operated lever a^{11}, the end of said lever at a^{12} being connected by rod a^{13} to the catch a^8, whereby said catch a^8 may be manipulated by the hand of an attendant operating the lever a^{11}, as will be obvious from Fig. 1, a spring a^{14} between the end of the lever a^{11} and bracket a^9 serving to normally hold the catch a^8 in its lowered position. Likewise secured to the rotatable collar a' is a stop-plate a^{15}, appropriately secured to the said collar by a bolt and nut, as a^3. Secured at one side of the catch-block a^6 is a spring a^{16}, and likewise secured to the lower projecting end of the bracket a^9 is a similar spring a^{17}, the object of said springs being to cushion or gradually stop the movement of the rotatable collar a' when the catch a^8 is not in engagement with the catch-block and the said collar, with the parts carried thereby, is being rotated.

Connected at one end, as a^{19}, to the lower portion or bracket a^5, is a spring a^{18}, having its opposite end connected to the fixed shoulder a^2, the normal tendency of said spring being to rotate the collar a' when the catch a^8 is moved out of engagement with the catch-carrying block, so that the power ramming devices may be automatically moved from their position above the stripping-plate support when the catch a^8 is tripped, as will be understood, the springs a^{16} a^{17} serving to gradually

check the rotative movement of the collar a' as it approaches the end of its rotative movement.

The rack-plate D, which rigidly connects the upper and lower brackets a^5, so that the collars a' a^4 shall rotate in unison, carries at its upper end d' a pulley or sprocket wheel d^2, and the face of said rack-plate is provided with downwardly-pointed teeth d, as will be seen from Fig. 1.

Adjustably secured to the rack-plate D, as by means of the bolt d^3, is the rammer-carrying plate E, having upwardly-pointed teeth e and complemental to the downwardly-pointed teeth d on the rack-plate D, whereby any upward thrust upon the rammer-carrying plate E will tend to force the teeth d and e into close locking position and so hold them as to prevent any upward movement or give to the rammer-carrying plate during the ramming of the flask, as will be clear. The side edges of the rammer-carrying plate E preferably embrace the outer side edges of the rack-plate D to act as a guide for the plate E when it is adjusted, as shown by Fig. 1.

The ramming devices (generally designated by the letter G) are connected to the rammer-carrying plate E, and said ramming devices are suitably counterbalanced by a spring or equivalent device S through the medium of a flexible connection s, secured at one end, as s', to the ramming devices, and after passing over the pulley or sprocket wheel d^2, secured at its other end to the spring S or similar device, all as will be clear from Fig. 1 of the drawings.

The ramming devices comprise a cylinder G′, carried by the plate E and having therein a plunger or piston F, (shown by dotted lines, Fig. 1,) the said plunger or piston being provided at its lower exposed end with a head g', having a beveled recess g^2. The purpose of this head construction is to permit ramming-boards, as g^3, of different sizes or characters corresponding to the flask to be rammed to be readily substituted one for the other, the said ramming-boards g^3 being provided with beveled cleats g^4 g^4, corresponding to the bevel g^2 of the head. Connected to the upper portion of the cylinder G′ is an inlet-pipe h to supply steam, compressed air, or other fluid for the downstroke of the piston or plunger, its upward stroke being made under the contractile force of springs, as h', secured at one end to the lug h^2, projecting from the sides of the cylinder, and their opposite ends connected to the head g'. In order to provide for the control of the motor fluid to and from the cylinder G′ and to prevent sudden shocks and jars due to the sudden stopping of the head in its upward movement, I have provided a valve (designated as a whole by K, Figs. 3 and 4) interposed between the cylinder and the source of fluid-supply. This valve comprises a casing k, having a port or opening k', communicating with a pipe h^3, leading from the source of fluid-supply, and a port or opening k^2, communicating with pipe h, leading to the cylinder G′. Within the casing k is a cylindrical rotatable valve-plug K′, having in its wall a channel-way k^3, which when the plug or valve is in the position shown in Fig 4 puts the ports or openings k' k^2 in communication, and fluid may pass from the pipe h^3 through the pipe h to the cylinder. A suitable handle k^4 is employed for turning the plug or valve K′. The plug or valve K′ is further provided with a perforation or hole k^6, passing diametrically therethrough, which when the plug or valve is turned to disconnect the ports k' k^2 is brought into register with the port or opening k^2. In the casing k is provided a regulating-cock k^5, which registers with the diametrical opening k^6 when said opening is in communication with the port or opening k^2, so that the escape or exhaust of motor fluid from the cylinder may be readily adjusted and the requisite cushioning of the plunger secured as the latter rises under the action of the springs h'. In order to guide the plunger in its rising and lowering movements, I provide a lug n on the lower part of the cylinder, through which passes the guide-rod m, secured to the rammer-head, as will be obvious from Fig. 1.

From the above-described construction it will be noted that a proper flask and stripping-plate being placed upon the stripping-plate support and patterns being placed upon the pattern-plate carrier, which is in its upward position, and said patterns projecting through the stripping-plate into the flask, as usual, with loose sand placed about the patterns in the flask the power-operated ramming devices may be actuated by means of the handle k^4, which permits the motor fluid to pass from the column A into the cylinder and depress the plunger-head with a proper degree of compression. The valve-handle k^4 may then be turned to disconnect the fluid-supply from the cylinder and connect the opening k^2 by means of the diametrical opening k^6 with the cock k^5, so that the fluid may escape from the cylinder under the returning action of the springs h', and such returning action of the plunger may be controlled gradually as to its speed and the amount of cushioning desired by regulating the cock k^5. The sand having been thus properly rammed, it is desirable that the power-operated ramming devices be turned out of the way, so that the flask and the parts upon the stripping-plate support may be properly manipulated, and to secure this object it is only necessary for the attendant by means of the hand-lever a^{11} to trip the catch a^8, whereupon the tensile force of the spring a^{18} will turn the collars a' a^4 and the power-operated ramming devices about the column A from over the stripping-plate support. The patterns may then be depressed and drawn from the flask through the

stripping-plate by manipulation of the handle b^{13}, which serves to depress the head B^7 and with it the pattern-plate carrier, as has been described.

It is desirable in devices of this character that the power-operated ramming devices may be of service in ramming sand into flasks of widely different sizes or depths, yet, since the ramming devices are desirably made as light as possible, it is evident that without some adjustment of these devices the stroke of the plunger would not serve always to secure the proper ramming of the sand in the flask. By the construction, as hereinbefore described, under which the power-operated ramming devices may be adjusted toward and from the stripping-plate support, it is evident that when a flask of small depth is to be rammed the power-operated ramming devices may be adjusted to the lower part of the rack-plate D and when a flask of greater depth is to be rammed then such ramming devices may be adjusted to their appropriate position upward with relation to the rack-plate D, the counterbalance-spring or similar device S under such adjusting movement of the ramming devices serving to counterbalance the ramming devices, so that by slight manual force such devices may be readily moved upward or downward with respect to the rack-plate D upon loosening of the bolt d^3 and slight downward movement to disengage the teeth of the rammer-carrying plate E from the teeth of the rack-plate.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a molding-machine, the combination of a column or upright, a stripping-plate support secured to said column or upright at a point intermediate its length, power-operated ramming devices, collars mounted upon the column or upright and by which the power-operated ramming devices are supported to have a swinging movement about said column or upright, and means acting upon one of said collars to hold the power-operated ramming devices in a fixed position above the stripping-plate support.

2. In a molding-machine, the combination of a hollow column or upright constituting a combined support and fluid-reservoir, a stripping-plate support secured to said column or upright, power-operated ramming devices connected to said column or upright to swing about the same, and means to hold the power-operated ramming devices in a fixed position above the stripping-plate support.

3. In a molding-machine, the combination of a column or upright, a stripping-plate support connected thereto, collars mounted to turn upon said column or upright, ramming devices mounted upon the said collars, means normally acting to swing or rotate the ramming devices about the column or upright, and devices for holding the ramming devices in position above the stripping-plate support in opposition to the action of said means.

4. In a molding-machine, the combination of a column or upright, a stripping-plate support secured to said column or upright, power-operated ramming devices connected to said column or upright to have a swinging movement about the same, cushioning-stops for limiting the swinging movement of the ramming devices, and means to hold the power-operated ramming devices in a fixed position above the stripping-plate support.

5. In a molding-machine, the combination of a column or upright, a stripping-plate support connected thereto, ramming devices rotatably mounted upon the column or upright, means normally acting to swing or rotate the ramming devices about the column or upright, yielding devices for gradually checking the swinging or rotation of said ramming devices about the column or upright, and devices for holding the ramming devices in position above the stripping-plate support in opposition to the action of said means.

6. In a molding-machine, the combination of an upright or column, power-operated ramming devices rotatably mounted upon said upright or column, means normally acting to turn or rotate the ramming devices about the column or upright, a manually-operative catch for holding the said devices against rotative or turning action, and springs for cushioning the movement of the ramming devices as they are turned about the column or upright and reach the end of their rotative movement.

7. In a molding-machine, the combination of a hollow column or upright constituting a combined support and fluid-reservoir, power-operated ramming devices supported thereby, said ramming devices being bodily adjustable in two directions, one rotatably about the column or upright and the other longitudinally thereof and means connecting the power-operated ramming devices with the interior of said hollow column or upright.

8. In a molding-machine, the combination of a hollow column or upright constituting a support and reservoir, power-operated ramming devices carried by said column or upright, means for controlling air or other fluid in its passage from the hollow upright or column for actuating the ramming action of the ramming devices, and springs for returning the ramming devices to their original position after the ramming action.

9. In a molding-machine, the combination of a column or upright, power-operated ramming devices secured thereto, a stripping-plate support connected to the upright or column below the ramming devices, said stripping-plate support comprising brackets extending from the column or upright and having enlarged side portions or projections provided with countersunk under surfaces, a pat-

tern-plate carrier having perforated projections adapted to enter the said countersunk surfaces, guide-rods for said perforated side projections, and means for raising and lowering the pattern-plate carrier.

10. In a molding-machine, the combination of a column or upright, a stripping-plate support secured thereto, a pattern-plate carrier, means for moving said pattern-plate carrier vertically with respect to the stripping-plate support, guide-rods disposed one at each side of the stripping-plate support for guiding the pattern-plate carrier in its vertical movement, the stripping-plate support having countersunk projections into which parts of the pattern-plate carrier may enter to permit the same to reach the limit of its upward movement.

In testimony whereof I have hereunto affixed my signature this 25th day of June, A. D. 1903.

FREDERICK W. HALL.

Witnesses:
A. FLORENCE YERGER,
A. HAWEYCUTTER.