J. BARKER.

MOLDING MACHINE.

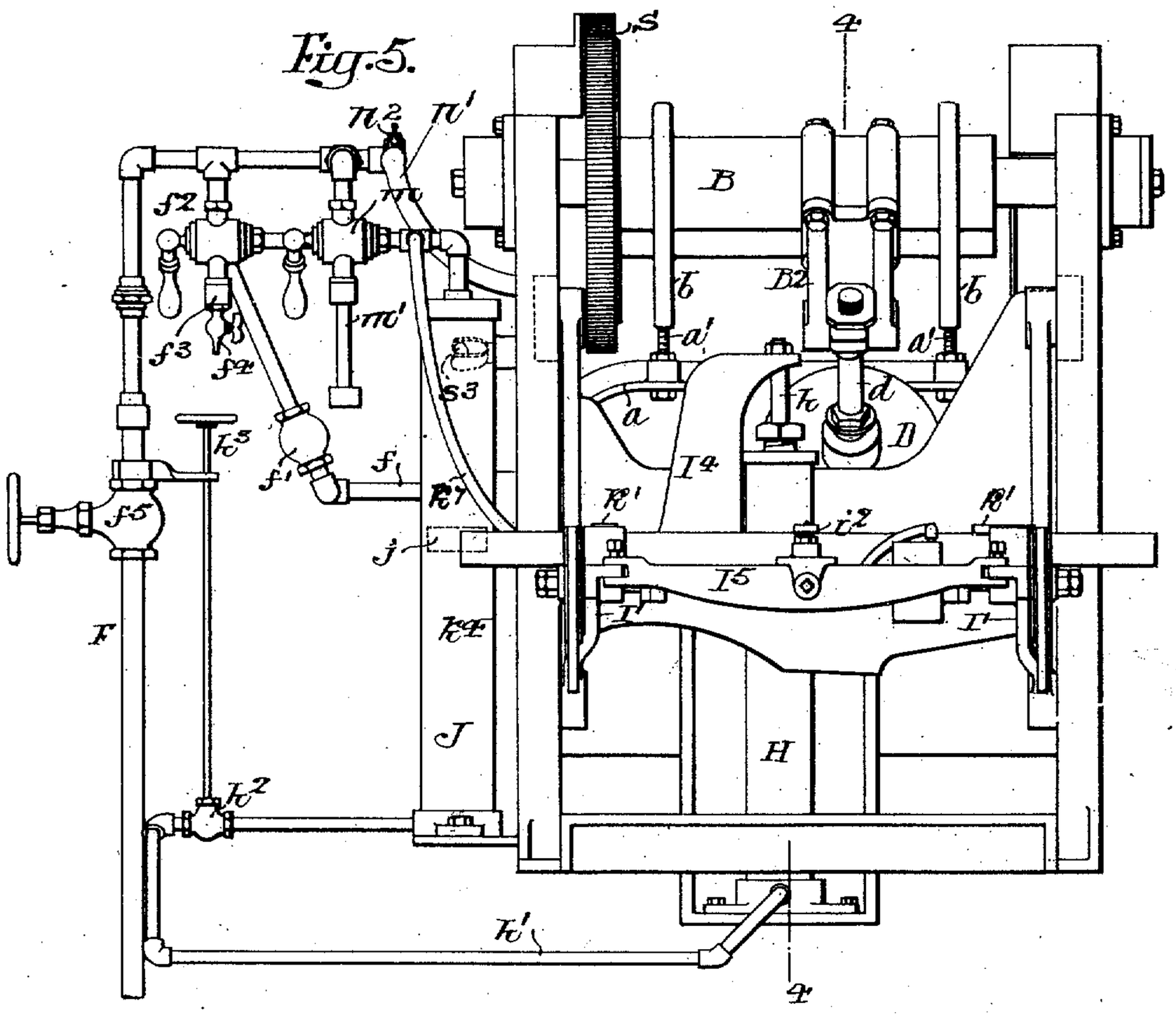
APPLICATION FILED JAN. 11, 1910.

988,922.

Patented Apr. 4, 1911.

4 SHEETS—SHEET 4

Fig. 5.



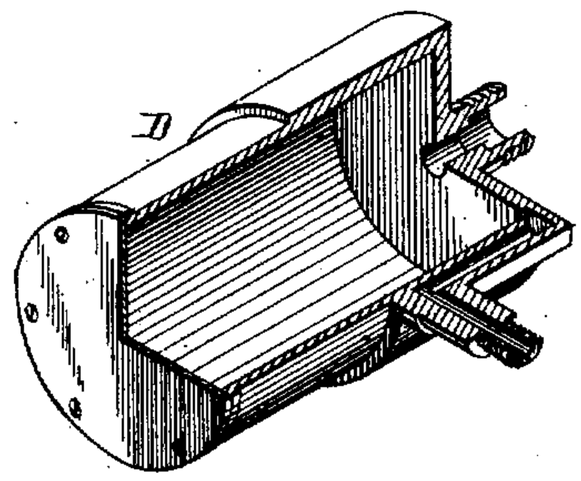
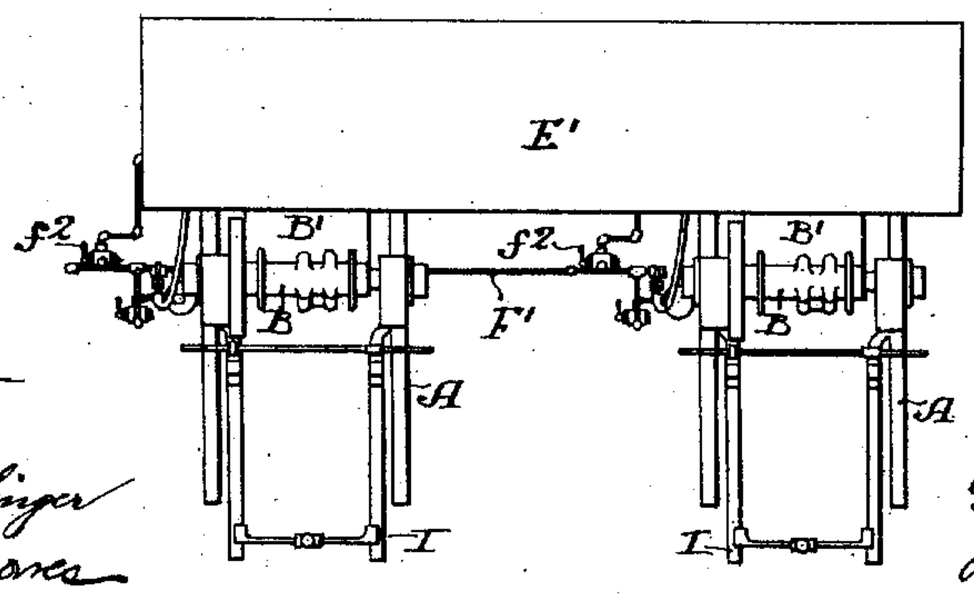


Fig. 6.

Fig. 12.



Witnesses.-

Stella P. Cullinger

Wills A. Burrows

Inventor.-

James Barker

by his Attorneys.-

Hoom & Hoom

UNITED STATES PATENT OFFICE.

JAMES BARKER, OF PHILADELPHIA, PENNSYLVANIA.

MOLDING-MACHINE.

988,922. Specification of Letters Patent. **Patented Apr. 4, 1911.**

Application filed January 11, 1910. Serial No. 537,552.

To all whom it may concern:

Be it known that I, JAMES BARKER, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Molding-Machines, of which the following is a specification.

My invention relates to certain improvements in molding machines, in which the pattern part is carried by a platform pivotally mounted on standards, so that when the sand is rammed in the flask, the flask and mold can be bodily inverted, after which the parts are detached and the mold withdrawn from the pattern.

The main object of the present invention is to perfect the construction of this type of machine and to utilize air under pressure for actuating the mechanism.

A further object of the invention is to provide a suitable support for the flask so that it will always draw properly from the pattern.

In the accompanying drawings:—Figure 1, is a perspective view of my improved molding machine showing the flask removed from the pattern; Fig. 2, is a perspective view showing the pattern returned to its first position and the mold ready to be removed from the machine; Fig. 3, is a side view of my improved molding machine with the pattern and mold removed; Fig. 4, is a longitudinal sectional view on the line 4—4 Fig. 5; Fig. 5, is an end view; Fig. 6, is a sectional perspective view of the cylinder. Figs. 7 and 8 are detached sectional views of the supporting bar; Fig. 9, is a perspective view of the table lever and supporting bar; Fig. 10, is a sectional view on the line 10—10, Fig. 4; Fig. 11, is a view of a modification; and Fig. 12, is a plan view showing two machines carrying a single flask.

A is the frame of the molding machine having a standard A′ in which is mounted a shaft B; secured to this shaft is the supporting arm or "rock over" B′ for the pattern carrier C, which can be secured to the arm in any suitable manner. This carrier consists in the present instance of the board c and flask c' which may be of any form desired.

The arm B′, as shown in Fig. 1, in the present instance consists of two members b, b and a plate b' to which the pattern carrier C is secured by cleats b^2. Projecting from the frame is an upright a in which is an adjustable stud a' for limiting the downward movement of the arm B′ when in its first position.

Secured to an arm B^2 on the shaft B is a rod d of a piston d' which is mounted in a cylinder D, this rod being connected at d^2 to the arm B^2 by a swivel joint. The cylinder D is pivoted at d^3 to bearings g secured to the frame A, so that the cylinder will accommodate itself to the movement of the arm as it shifts the arm carrying the pattern and the flask from the position shown in Fig. 4, to the position shown in Fig. 1. The cylinder has a stuffing box d^4 and a wiping box d^5 for wiping off any sand or grit which may adhere to the rod before it reaches the box.

The pattern carrier or match flask C, I have shown as made of metal, but it will be understood that it may be made of wood or any suitable material without departing from the invention, and the flask E may also be made of wood or metal.

The flask E is coupled to the pattern support by suitable clamps, so that when the flask is properly rammed it can be inverted and the two parts carried to the position illustrated in Fig. 1, after which the clamps are removed and the rammed flask can be withdrawn from the pattern.

An air pipe f connects the cylinder D with the main air supply pipe F which is coupled to any suitable air pressure device.

f' is a valve for regulating the amount of air passing through the pipe f, and f^2 is a valve for controlling the flow of air through the pipe, and connected to this pipe is an escape pipe f^3 having a pet cock f^4 which can be regulated so as to allow a certain amount of air to escape when the valve f^2 is turned to a given position, so that on operating the valve f^2 the air in the cylinder D will throw the arm B′ over and by shifting the valve the air will escape through the small openings in the pipe f^3 and the flask and pattern will settle slowly onto the movable flask supporting frame. By shifting the valve again the arm can be returned to its normal position, again settling by the escape of the air through the pipe f^3.

I is a vertically movable supporting table for the flask after it is withdrawn from the pattern. This table consists of two arms I′, a cross member I^2 and an upright I^3 on which are rollers i—i' adapted to travel in guides on the standards A′ of the machine.

H is a cylinder containing oil or other

liquid and provided with a piston and piston rod h connected to a member I^4 projecting from the table I. This cylinder is connected by a pipe h' to a pressure tank J, and in the pipe is a needle valve h^2 having a handle h^3 within easy reach of the operator, so that on turning the handle the oil can be held in the cylinder H. Secured to the arms I' is a cross member I^5 having an adjustable supporting stud i^2, and pivoted at k to the arms I' are weighted arms K carrying a cross member K' on which are two adjustable supports k' for the flask.

The arms K are slotted as at k^2 and adapted to the slots are spindles k^3, k^4, and bearing against the faces of the arms are frictional washers of fiber or other material, which may be adjusted by means of nuts on the spindles. On the spindle k^4 is a cylinder k^5 in which is mounted a piston k^6 carried by the other spindle k^3; a pipe k^7 for air under pressure leads from the valve m to the cylinder k^5. K^2 is a spring coupled at each end to lever bars K^3 fulcrumed on a rod K^4, one bar bearing against the back of the cylinder k^5 and the other against a collar k^8 secured to the spindle k^3 the lever bars K^3 being mounted on the spindles k^3 and k^4 and the rod K^4 being attached to the arms I' or other suitable supports. When air enters the cylinder k^5 it forces the bars K^3 apart against the pressure of the spring K^2, but when the air is exhausted the spring draws the bars K^3 toward each other, causing the washers to clamp the arms K, holding them in the position to which they are adjusted. In the present instance the arms K have hooks k^9 which enter openings k^{10} in the bar K', as shown in Figs. 6 and 9, so that the bar is free to adjust itself to the flask, and it will be noticed that the adjustable supports span the bar K' and are held to it by the clamp block and that one support is arranged at right angles to the other, Fig. 9. The object of this construction is to allow the supports on the frame I to be automatically adjusted to the flask carried by the pattern support, so that no matter whether the pattern support is perfectly level or not there will be no jar when the flask is withdrawn from the pattern. This is essential to the perfect drawing of a flask from a pattern.

The air pressure pipe F is provided with a shut-off valve f^5 and extends to the upper end of the pressure tank J. The upper half of this tank contains air under pressure and the lower half oil, the two being separated by a loose disk j, shown by dotted lines in Fig. 5.

m is a valve for controlling the flow of air to the cylinder J and this valve is a three-way valve and has an escape nozzle in the form of a muffler m'. When the valve is turned in one position air under pressure is admitted to the upper portion of the tank J, and if the valve h^2 in the pipe h' is open, then oil under pressure will flow into the cylinder H and raise the support I.

By closing the valve h^2 the oil is trapped in the cylinder and will hold the frame I in the position to which it is adjusted, then on turning the valve m so as to form communication between the exhaust muffler m' and the tank J, and on opening the valve h^2, the air escaping will release the oil in the cylinder H and allow the frame to lower by the weight of the parts.

A vibrator n is placed on the arm B' and connected to the air supply through a flexible pipe n'. Air is admitted to the vibrator by pressing down the lever n^3 of the valve n^2. This vibrator is set in motion as the mold is drawn from the pattern.

In order to prevent the re-bound of the arm carrying the pattern and flask when moving in either direction, I mount a ratchet wheel S on the shaft B and pivoted at s to a bearing on the frame A, Fig. 3, is a double pawl s', s^2, having teeth which engage the teeth of the ratchet wheel S. On the end of the pivot of the pawl is a yoke frame carrying a bar s^3 and adapted to slide on this bar is a loop t^2 of a coiled spring t attached at t' to the base.

When the arm B' is raised from the position shown in full lines in Figs. 3 and 4, to that shown in dotted lines in Fig. 4, the piston in the cylinder D moves the full length of the cylinder and then returns as the arm passes over the center and, in some instances, unless suitable means are provided for checking the arm, it may re-bound without going the full distance, but by securing the ratchet wheel S to the shaft and having the pawl s' in action when the arm is moving from the position shown by full lines in Fig. 4, to that shown by dotted lines, it is impossible for the arm to re-bound, and by shifting the spring t on the bar s^3 when it is wished to return the arm with the pattern, the arm cannot re-bound on the return movement. The movement of the spring on the bar s^3 throws one or other of the pawls in engagement with the ratchet wheel.

In Fig. 12, I have shown two machines arranged side by side, with a single flask E' carried by the supporting arms or rockovers B' of each machine, and these machines may be operated independently or may be connected by one or more pipes F', so as to be operated from one system. By this arrangement very large molds can be made in a single flask which would be too large for one machine, but by arranging the machines close together and preferably coupling them, a single large flask can be readily handled.

The operation of the machine is as follows:—The pattern carrier or match flask is

secured to the arms B′ and the flask E is then placed on the carrier. The flask is rammed in the ordinary manner and leveled off and the bottom board applied, after which cleats or clamps are attached to secure the three parts together. Then the valve f^2 is actuated so as to allow air under pressure to enter the cylinder D; the spring t being in the position illustrated in Fig. 3, this causes the arm B′ to lift the pattern and flask and turn them a one-quarter turn and its own weight moves it to the position illustrated by dotted lines in Fig. 4; the air being forced out of the cylinder through the pet cock f^4, which wire draws the air and allows it to settle slowly in position. As the flask and pattern board are thus suspended the frame I is raised by operating the valve m, which allows air to pass into the tank J under pressure, which causes the liquid in the tank to pass into the cylinder H and lift the frame until its bearing points i^2 and k' rest against the underside of the bottom board, and the levers K automatically move to accommodate themselves to any irregularities in the position of the flask and bottom board; air being admitted to the cylinder k^5 at the same time that air is admitted to the tank J, releasing the levers K. As soon as the valve m is turned to allow the air to exhaust for the tank J and cylinder k^5 the spring K^2 is released and will clamp the levers K and hold them in the position to which they are adjusted. After which the cleats or clamps are removed so as to free the flask from the pattern board and by operating the valve n^2 the vibrator n is set in motion, and then on opening the valve h^2 oil is transferred from the cylinder H into the tank J and the frame I is lowered with the flask clear to the pattern board, and then by actuating the valve f^2 and shifting the spring t to throw the pawl s^2 into engagement with the ratchet wheel S the arm b' with the pattern board is returned to its first position and the flask and bottom board can be removed from the machine.

In some instances I may use a rod u and handled nut u' to clamp the levers K, as shown in Fig. 11, without departing from my invention, but I prefer to use the automatic clamps as described above.

I claim:—

1. The combination in a molding machine, of a frame, a shaft mounted on the frame, a pivoted arm carrying a pattern, an arm on the shaft, a pivotally mounted cylinder, a piston adapted to the cylinder and having a rod connected to the arm on the shaft, and means for preventing the arms from rebounding when the shaft is moved forward.

2. The combination in a molding machine, of a frame, a shaft mounted on the frame, a pivoted arm carrying a pattern, an arm on the shaft, a pivotally mounted cylinder, a piston adapted to the cylinder and having a rod connected to the arm on the shaft, and means for preventing the arm from re-bounding when the shaft is moved in either direction.

3. The combination in a molding machine, of a frame, a shaft, an arm carried by the shaft and carrying the pattern, said shaft having a second arm, a cylinder pivoted to the frame, a piston, a rod connected to the piston and to the arm on the shaft, a ratchet wheel on the shaft, a double pawl, and means for shifting and yieldingly holding the pawls either in one position or the other.

4. The combination in a molding machine, of a flask carrier, a vertically adjustable frame for receiving the flask, means for raising the frame, a liquid cylinder having a piston connected to the frame, a tank communicating at the bottom with the cylinder and at the top with the air pressure supply, a valve for cutting off communication between the cylinder and tank, and means for admitting air to the tank or allowing it to escape therefrom.

5. The combination in a molding machine, of a pivoted arm carrying the flask and pattern, a vertically adjustable frame for receiving the flask, and means for raising the frame by air pressure and lowering it by the escape of liquid.

6. The combination in a molding machine, of a supporting frame, a flask, a liquid cylinder having a piston connected to the frame, a tank communicating at the bottom with the cylinder and at the top with an air pressure supply, a valve for cutting off communication between the cylinder and tank, and a three-way valve for admitting air to the tank and allowing air to escape therefrom when the valve is turned.

7. The combination in a molding machine, of a frame, a pivoted arm carrying the pattern, a pivoted cylinder for turning the said arm, a vertically movable frame adapted to receive the flask after it is detached from the pattern board, a vibrator for rapping the pattern, means for adjusting the support so as to properly locate the support in respect to the flask, and means for lowering the flask clear of the pattern board to draw the flask.

8. The combination in a molding machine, of a vertically movable supporting frame for carrying the flask, said frame having at one end a bearing point and at the other end a cross member having two bearing points, said cross member being yieldingly mounted on the frame so that the frame will adjust itself to any irregularities of the flask.

9. The combination in a molding machine, of a vertically movable supporting frame having a bearing point at one end, two levers pivoted to the frame, a cross member

mounted loosely on the levers and having two bearing points, with means for locking the levers in position after the frame has been adjusted to the flask.

10. The combination in a molding machine, of a vertically adjustable frame carrying the flask having a bearing point at one end, two weighted levers pivoted to each side of the frame, a cross member loosely supported on the levers, and two supports adjustably mounted on the cross member, one support arranged at right angles to the other support.

11. The combination in a molding machine, of means for carrying the pattern, a flask, a vertically adjustable flask supporting frame, means for operating said frame to bring it in contact with the other side of the flask, a supporting stud on one end of the frame, two slotted and weighted levers pivoted to the frame carrying a cross member, adjustable supports mounted thereon, headed spindles extending through the slots of the levers, a piston on one spindle, a cylinder on the other spindle, lever bars engaging the spindle, a spring connecting the said lever bars, and means controlling the fluid admitted to the cylinder.

12. The combination in a molding machine, of a frame having standards, a shaft mounted in the standards, a supporting arm or rock-over secured to the shaft and on which the pattern board or match flask is mounted, a ratchet wheel also mounted on the shaft, a double pawl adapted to engage the ratchet wheel, a spring for yieldingly throwing one or both of the pawls into engagement with the ratchet wheel, a cylinder pivoted to the frame and having a piston, the rod of said piston being connected to an arm on the said shaft, a vertically movable table, adjustable supports carried by the table, a hydraulic cylinder lifting the table, said table being guided on the standards, a tank, the lower end of the said tank being connected to the hydraulic cylinder, an air pressure pipe connected to the upper end of the tank and a connection between said air pressure pipe and the cylinder, a valve for controlling the flow of air to and from the cylinder, a valve for controlling the air to and from the tank, and a valve located in the pipe connecting the tank with the hydraulic cylinder, whereby the vertically movable table can be held rigidly in the position to which it is adjusted.

13. The combination in a molding machine, of two frames situated side by side, each having a supporting arm or rock-over and each having a vertically adjustable table with a flask, a pattern supported by both arms or rock-overs, and means for actuating said arms and tables in unison.

14. The combination in a table of a molding machine, of a pair of levers hung to the table, a bar carried by said levers on which one portion of the flask rests, a spring for rigidly holding the levers, and a cylinder and piston for releasing the hold of the spring.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JAMES BARKER.

Witnesses:
WM. E. SHUPE,
WM. A. BARR.