

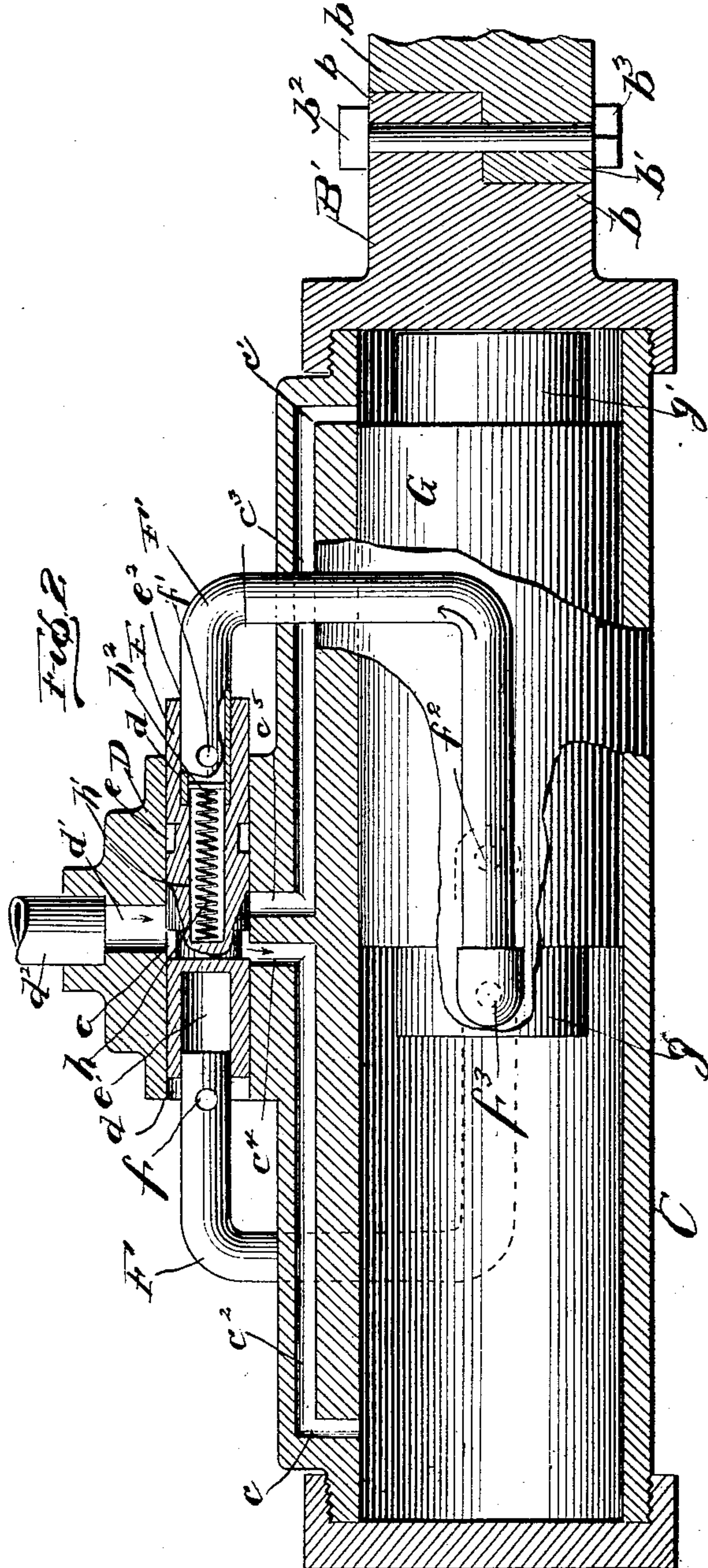
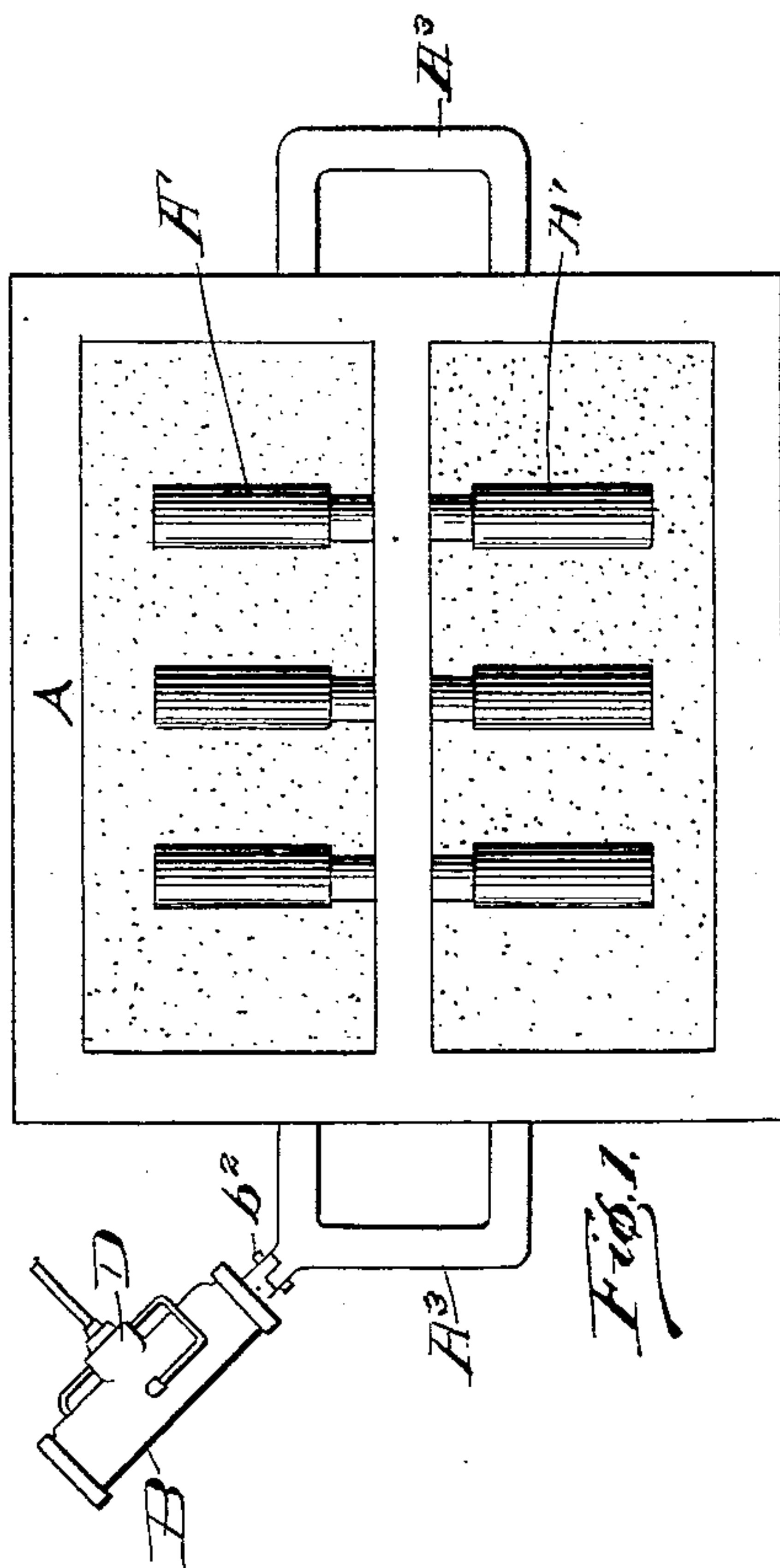
No. 750,641.

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F. W. HALL.
VIBRATOR FOR MOLDING APPARATUS.

APPLICATION FILED JUNE 30, 1903.

NO MODEL.



Witnesses
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VIBRATOR FOR MOLDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 750,641, dated January 26, 1904.

Application filed June 30, 1903. Serial No. 163,736. (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 Vibrators for Molding Apparatus, 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 that type of molding apparatus wherein the pattern is supported or secured to a vibrator-frame, and more particularly to the vibrator by which the frame carrying the patterns is given a series of rapid blows while the pattern is still in the sand or mold-cavity to enable the pattern to be readily removed from the mold-cavity without injury thereto.

The object of the present invention is to provide a vibrator of simplified construction which may be readily attached to a vibrator-frame and wherein the fluid-operated valve and hammering-piston may at all times be maintained in proper relative position for starting the action of the vibrator by simply admitting the fluid thereto.

With these general objects in view the invention consists of a vibrator having fluid-operated hammering-piston and valve and in the parts and combinations, as will be hereinafter fully described and then definitely pointed out in the claims.

In the drawings, Figure 1 is a diagrammatic view showing a vibrator-frame having patterns attached thereto and a vibrator connected to said frame; and Fig. 2 is a sectional view of the vibrator, parts being broken away and others shown in elevation to disclose the relation of the mechanical features and their mode of operation.

In the drawings, A is a vibrator-frame of any usual or desired character having secured thereto in any suitable manner the patterns A' A', the said frame being provided with side hand-grips or projecting portions A³, if desired, by which it may be readily handled in assembling and disassociating the parts.

Secured to the vibrator-frame at a suitable

point (shown in the present embodiment of the invention to the hand-grip A³) is a vibrator B, one end of said vibrator being preferably provided with a projection B', Fig. 2, having shouldered portions *b b*, corresponding to similar shouldered portions *b' b'* on one of the hand-grips of the vibrator-frame A, said shouldered portions being adapted for close connection by means of a bolt *b²* and nut *b³*, whereby the parts may be readily connected and disconnected, as desired. From the close contact of the shouldered portions *b* and *b'* it will be evident that all vibration of the vibrator B will be transmitted directly through those shouldered portions, the bolt *b²* serving, primarily, to hold the shouldered portions in close contact.

The vibrator comprises a cylinder C, having suitable end heads, and arranged at one side of the cylinder are the air or fluid ports *c c'*, connected by suitable air or fluid passages *c² c³* with suitable inlet-ports *c⁴ c⁵*, said ports and passages connecting the opposite ends of the cylinder C with the valve-chamber D, suitably disposed upon the side of the cylinder. The valve-chamber D is preferably disposed upon the side of the cylinder C and formed integral therewith, although the location and integral formation referred to are not essentials of the invention. The valve-chamber D has the open ends *d d* and an inlet *d'*, connected by a suitable pipe *d²* with a suitable source of fluid-supply, such as compressed air or steam. Freely movable longitudinally within the open-ended valve-chamber D is the valve E, the ends of which may in its longitudinal movement project beyond the open ends of the valve-chamber, as shown on the right of the valve in Fig. 2, and disposed between the ends of the valve E are the two circular grooves *e e*, either of which when in register with the inlet *d'* and ports *c⁴* or *c⁵* permitting the free passage of the fluid into the ends of the cylinder C, as will be obvious to one skilled in the art. The valve E is provided at each end with an extended recess or exhaust-controlling seat *e' e²*, into which project the ends of the exhaust-pipes F F', hav-

ing the exhaust side ports $f f'$, respectively, which by the endwise movement of the valve E, to be hereinafter more fully described, are alternately opened and closed by the exhaust-controlling seats $e' e^2$ in the ends of the valve. Each of the pipes F F' are connected to suitable exhaust-ports $f^2 f^3$ in the side wall of the cylinder C, as shown by full and dotted lines in Fig. 2, the exhaust-port f^2 for pipe F being disposed to one side of the transverse central line of the cylinder and the exhaust-port f^3 for pipe F' being disposed on the other side of the said central line of the cylinder in the manner clearly disclosed by Fig. 2. Movable lengthwise within the cylinder is the hammering-piston G, having the hammering-heads $g g'$, adapted in the reciprocation of the piston to alternately strike the opposite heads of the cylinder, and thereby impart vibration to the structure, as will be obvious. It will be noted that the inlet-ports $c c'$ are disposed in the walls of the cylinder C a short distance from the ends of the cylinder, and in order that the motor fluid may be admitted to properly act upon the piston G when the latter has reached the end of its stroke the hammering-heads $g g'$ are made somewhat smaller in diameter than the piston and of a length to leave the ports $c c'$ uncovered when the piston is at either end of the cylinder.

From the construction thus far described and assuming the parts to be in position as indicated by Fig. 2 it will be obvious that the motor fluid is flowing in the direction of the arrows—that is to say, the piston is just reaching the end of its movement to the right, the fluid passing through groove e of the valve and by-port c^4 , passage c^2 , and inlet-port c to the left of the piston. It will also be obvious that the valve E, now at the right of its movement, will be acted on by the exhaust through port f^3 , pipe F', the said port f^3 having been just uncovered as the piston reaches the limit of movement to the right, and that said valve E will thus be moved under fluid-pressure to the left. Such movement of the valve will shut off the supply of fluid to the left of the cylinder through the ports and passages referred to and open supply to the opposite end of the cylinder. At the same time the side exhaust-port f' in pipe F' will be opened as the exhaust-controlling seats or recesses $e' e^2$ move over the ends of the pipes F F', as will be obvious from Fig. 2. The exhaust-controlling seats or recesses $e' e^2$ therefore not only act to receive the full fluid-pressure from the ends of pipes F F', which project some distance into each, and thus give endwise movement to the valve E, but by riding over the ends of pipes F F' they serve to control the exhaust through the side exhaust-ports $f f'$.

Since the vibrator may be stopped at times when the valve E is not at one end of its stroke by shutting off the fluid-supply or may be moved to such midway position with neither

of the grooves $e e$ in communication with the inlet d' , difficulty would be experienced at such times in starting the vibrator. To obviate this objection, I have provided an expansion-spring h , having one end seated in and secured to one of the pipes, as F', its opposite end projecting into a spring-recess h' in the end of the valve E. This spring is shown in Fig. 2 as secured in the end of pipe F' by a cross-pin h^2 , although, as will be obvious, any usual or desired means may be employed for holding the spring in position. From this construction it will be obvious that the expansive action of the spring h will tend to maintain the valve at one end of its stroke when the device is not in use, so that when starting the vibrator it is only necessary to turn on the supply of fluid, and the apparatus will start into operation at once.

It will be obvious that many changes may be made in the described details of construction, and I do not wish to be understood as limiting myself to the precise form, size, and disposition of parts, nor do I intend to limit the use of the device to a vibrator for molds, although it is devised with this object in view, as other uses may suggest themselves.

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

1. In a vibrator for molding-machines, the combination of a cylinder, a piston movable therein, a valve-chamber, a valve movable in said chamber, and having a recess or exhaust-controlling seat at each end, exhaust-pipes connected to the cylinder and having side exhaust-ports, the ends of said pipes projecting into the exhaust-controlling seats in the ends of the valve, said seats opening and closing the side exhaust-ports in the pipes as the valve is moved longitudinally.

2. In a vibrator for molding-machines, the combination of a cylinder having suitable inlet and exhaust ports and passages, a piston movable in the cylinder, an open-ended valve-chamber connected to said cylinder, a slide-valve movable in said chamber and having an exhaust-controlling seat or recess at each end, exhaust-pipes connected to the cylinder and having side exhaust-ports, the ends of said pipes projecting into the exhaust-controlling seats in the ends of the valve, said seats opening and closing the side exhaust-ports in the pipes as the valve is moved longitudinally.

3. In a vibrator for molding-machines, the combination of a cylinder having suitable inlet and exhaust ports and passages, a hammering-piston movable in the cylinder, an open-ended valve-chamber connected to said cylinder, a slide-valve movable in said chamber, and having an exhaust-controlling seat or recess at each end movable past the open end of the valve-chamber, and exhaust pipes or conduits connected to the cylinder and having side exhaust-ports, the ends of said pipes or con-

duits projecting into the exhaust-controlling seats or recesses in the ends of the valve, said seats opening and closing the side exhaust-ports in the pipes or conduits as the valve 5 moves longitudinally, and means for holding the valve with the ports thereof in position for starting the vibrator while the vibrator is not in use.

10 4. In a vibrator for molding-machines, the combination of a cylinder, a piston, and suitable inlet and exhaust ports and passages, a valve-chamber, a valve movable therein, exhaust pipes or conduits having a sliding connection with the ends of the valve for controlling the movement thereof under fluid- 15 pressure, and a spring for holding the valve in position for starting when the vibrator is not in use.

20 5. In a vibrator for molding-machines, the combination of a cylinder, a piston, and suitable inlet and exhaust ports and passages, a valve-chamber, a valve movable therein, exhaust pipes or conduits having a sliding connection with the ends of the valve for controlling the movement thereof under fluid-pres- 25 sure, and a spring disposed between the end of one of said pipes or conduits and the valve for holding the latter at one limit of its movement when the vibrator is not in use.

30 6. In a vibrator for molding-machines, the combination of a cylinder, a piston, and suit-

able inlet and exhaust ports and passages, a valve-chamber, a valve longitudinally movable therein and having an exhaust-controlling seat or recess at each end, exhaust-pipes connected 35 to the exhaust-ports of the cylinder, the ends of said pipes projecting into the exhaust-controlling seats or recesses, a spring seated in the end of one of the exhaust-pipes and bearing upon the valve to maintain it at one end 40 of its movement when the vibrator is not in use.

7. In a vibrator for molding-machines, the combination of a cylinder, piston, and suitable ports and passages, a valve-chamber, a valve 45 longitudinally movable therein and having at each end an exhaust-controlling seat or recess, and a spring-recess at one end, exhaust pipes or conduits connected to the exhaust-ports of the cylinder, the ends of said pipes projecting 50 into the exhaust-controlling seats or recesses, a spring seated in the end of one of said pipes and bearing in the spring-recess of the valve to maintain the valve at one end of its movement when the vibrator is not in use. 55

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

FREDERICK W. HALL.

Witnesses:

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A. HARVEY CUTTER.