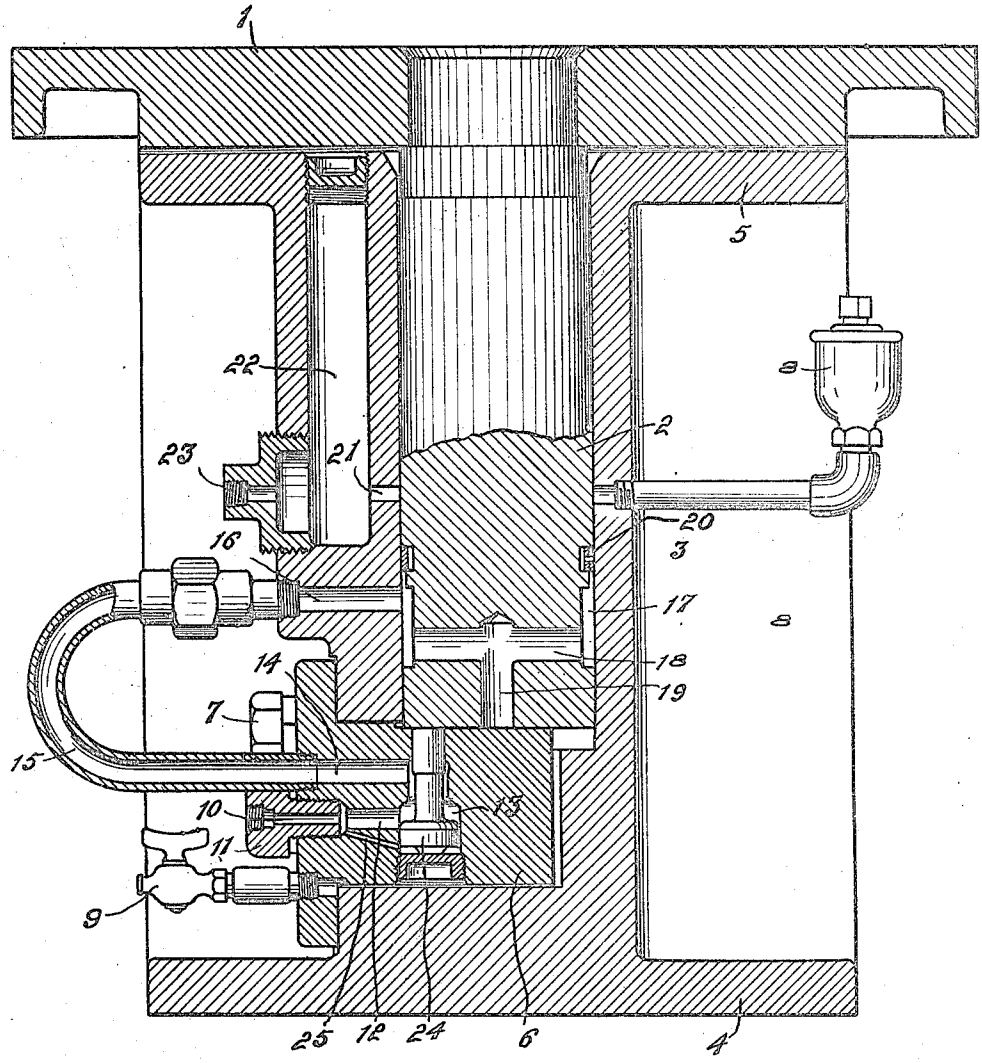
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JOLT RAMMING MACHINE.

APPLICATION FILED JULY 3, 1912.

1,167,511. Patented Jan. 11, 1916.



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EDGAR H. MUMFORD AND EDWARD MELVILLE HUGGINS, OF PLAINFIELD, NEW JERSEY; SAID HUGGINS ASSIGNOR TO MUMFORD MOLDING MACHINE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY; ROSE SKEEL MUMFORD EXECUTRIX OF SAID EDGAR H. MUMFORD, DECEASED.

JOLT RAMMING-MACHINE.

1,167,511. Specification of Letters Patent. Patented Jan. 11, 1916.

Application filed July 3, 1912. Serial No. 707,618.

To all whom it may concern:

Be it known that we, EDGAR H. MUMFORD and EDWARD MELVILLE HUGGINS, both citizens of the United States, residing at Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Jolt Ramming-Machines, of which the following is a specification.

The invention relates to what are known as jolt ramming machines, and particularly to the valve mechanism for controlling the reciprocating member whether it be a cylinder or a piston. The invention has for its primary objects the provision of a valve mechanism which shall operate with precision and positiveness; the provision of a valve of a very simple and cheap construction, and one by the use of which the amount of air wasted is reduced to a minimum, and the provision of a valve which will be moved with a maximum degree of rapidity from one operative position to another. One embodiment of the invention is shown in preferred form in the accompanying drawing, wherein—

The figure is a transverse section through a jolt ramming machine equipped with our improved valved mechanism.

Referring to the drawing, 1 is the table upon which the molds to be rammed are placed, 2 is the plunger secured to the table 1; 3 is the cylinder in which the piston 2 works, such cylinder having at its lower end the base portion 4, and at its upper end the anvil portion 5 for receiving the impact of the table; 6 is a block fitting in the recess in the base 4 and carrying the valve mechanism, such block being removably secured in position by means of a series of studs 7, one only of which is shown; 8 is an oil cup connected to the cylinder in the manner shown, and 9 is a drip cock mounted in the block 6 and adapted to drain the cylinder and the chamber carrying the valve parts.

Air is admitted to the cylinder 3 beneath the piston 2 via the admission passage 10 in the plug 11, the passage 12, the valve chamber 13, the passage 14, the pipe 15, the passage 16 through the wall of the cylinder, the annular passage 17 around the periphery of the piston, and the passages 18 and 19 leading from the annular passage 17 to the lower end of the piston. The piston is packed by means of the usual ring 20, and exhaust begins when the lower edge of such ring passes the exhaust port 21 on the upward movement of the piston, the air thus exhausted first passing into the chamber 22 and then through the exhaust outlet 23. Working in the valve chamber 13 is the piston valve 24, which in the position shown permits a free passage of air from the passage 12 to the passage 13, but which upon an upward movement seats and prevents any further passage of air to the pipe 15 and cylinder. A small passage 25 leads from the left hand end of the passage 12 to the valve chamber 13 beneath the head of the valve.

Starting with the parts in the position shown, the operation is as follows—assuming that the plug 11 is coupled to an air supply pipe. Air passes through the passages 10 and 12 to the valve chamber 13 and thence through the passages 14, 15, 16, 17, 18 and 19 to the lower end of the piston, thus causing such piston to rise. This action continues until the packing ring 20 passes the exhaust port 21 and brings the annular passage 17 into communication with such exhaust port 21. The opening of this exhaust port 21 permits a sudden rush of air from the cylinder beneath the piston and from the passages leading to the valve chamber 13, and as result the pressure upon the upper end of the valve stem and the upper sides of the valve head is so reduced that valve 24 moves upwardly and cuts off communication between the valve chamber 13 and the passage 14, being held securely in its upper position at this time by reason of the air pressure applied to the lower side of the head. The supply of air to the cylinder now being cut off, and the exhaust chamber being open, the weight of the piston 2 and the parts carried thereby causes the return of the parts to the position shown, the lower end of the piston at the end of such movement striking the upper end of the valve 24 and returning it to the position shown, thus bringing the parts to their original position, the operation being repeated indefinitely as long as air is supplied through the plug 11. It will be noted that the salient features of

the operation are the actuation of the valve 24 by the rush of air or change in pressure induced when the exhaust is opened, the return of such valve to its original position by reason of the positive engagement between the valve and the piston or some member actuated by the piston. It will also be noted that the size of the passage 25 is slight, and also that the size of the passage 10 is less than the passage 12. This arrangement tends to reduce the pressure beneath the valve head, and as a result the valve remains in the position shown until the exhaust port 21 is uncovered and the lower edge of passage 17 has obstructed passage 16, at which time the difference in pressure due to the decrease in pressure in the cylinder above the end of the valve stem, and the increase of pressure beneath the head 24, causes a sharp upward movement of the valve to closed position. With air supplied at full pressure directly from the passage 12 to the lower end of the valve, the tendency of the valve is to follow the movement of the piston up, that is to rise too soon and throttle the supply of air before the exhaust is opened. With the arrangement as illustrated and described the valve remains in its lowest position until the exhaust is opened, thus giving a full supply of air to the cylinder until such time, and at such time the valve closes with great rapidity, entirely shutting off the supply of air and eliminating any waste which would occur if the valve were not fully closed. The arrangement thus provides for a quick positive closure of the valve and an equally quick positive opening of the valve incident to the engagement between the end of the piston and the end of the valve.

It will be apparent that the construction as described and illustrated is simple and positive in operation, and that a valve mechanism of this character will wear indefinitely and is not liable to get out of order. It will also be apparent that the fundamental idea involved in the operation of the valve is capable of wide variation of embodiment, the scope of the invention being limited only by the claims, and the purpose being to comprehend any and all valve constructions in which the valve is operated in one direction by the sudden rush of air or change of pressure incident to the opening of the exhaust port, and in which the valve is positively actuated in the other direction from the reciprocatory member upon its return movement. The valve may be placed in chambers located differently than that illustrated, and it is of course not necessary that the plunger or movable member contact directly with the valve to move it reversely, as other equivalent means might be substituted for actuating the valve positively without direct contact with the plunger.

Having thus described our invention and illustrated its use, what we claim as new and desire to secure by Letters Patent, is the following:

1. A jolt ramming molding machine comprising in combination a cylinder having a port and an opening in its wall above the said port, a vertically movable plunger in said cylinder adapted to uncover said opening, and a valve for controlling the supply of fluid pressure and allowing its admission into said cylinder to raise the plunger, said valve being held in open position by the fluid pressure flowing to the machine and governed as to its closing movement by the uncovering of said opening by the plunger as it moves upwardly.

2. In a jolt ramming mechanism, in combination with a vertically movable plunger arranged to move down by the action of gravity alone and to be moved upward by air pressure, of a cylinder for the plunger provided in its wall with an exhaust port uncovered by the plunger as it moves upward and approaches its upward extreme of movement, and a valve for controlling the admission of air to the cylinder, held open by air pressure during the upward movement of the plunger and governed as to its closing movement by the uncovering by the plunger of the said exhaust port, the said exhaust port constituting the only means of escape of the air from beneath the plunger.

3. In a jolt ramming mechanism, in combination with a vertically movable plunger arranged to move down by the action of gravity alone and to be moved upward by air pressure, of a cylinder for the plunger provided in its wall with an exhaust port uncovered by the plunger as it moves upward and approaches its upward extreme of movement, and an admission valve positively opened by the plunger as it descends, the said valve being held open by air pressure during the upward movement of the plunger and governed as to its closing movement by the unbalanced pressure induced by the uncovering of the exhaust port.

4. In combination in a jolt ramming machine, a cylinder, a piston provided with a passage leading from the side to the lower end thereof, an inlet passage through the side of the cylinder adapted to register with the passage in the piston when the latter is in lower position, an exhaust port through the side of the cylinder adapted to register with a portion of the passage in the piston when the latter approaches upper position, and a valve in one of the passages normally held in open position and adapted to be closed by the unbalanced air pressure induced when the exhaust port is brought into communication with the said passage in the piston.

5. In combination a jolt ramming machine, a cylinder, a piston provided with a passage leading from the side to the lower end thereof, an inlet passage through the side of the cylinder adapted to register with the passage in the piston when the latter is in lower position, an exhaust port through the side of the cylinder adapted to register with a portion of the passage in the piston when the latter approaches upper position, and a valve in the inlet passage normally held open during the upward movement of the piston and adapted to be closed by the unbalanced air pressure induced when the exhaust port is brought into communication with the said passage in the piston.

6. A jolt ramming molding machine comprising in combination a cylinder having a port and an opening in its wall above the said port, a vertically movable plunger in said cylinder adapted to uncover said opening, a valve casing in communication with said port, and a vertically movable valve in said casing controlling the admission of fluid pressure to said cylinder to raise the plunger, said valve being normally held in open position admitting fluid pressure to the port and cylinder by the incoming fluid pressure and being governed as to its closing movement by the uncovering of said opening by the plunger as it moves upwardly.

In testimony whereof we have hereunto signed our names in the presence of the two subscribed witnesses.

EDGAR H. MUMFORD.
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."