E. C. WILEY.

VALVE MECHANISM FOR JARRING MACHINES.

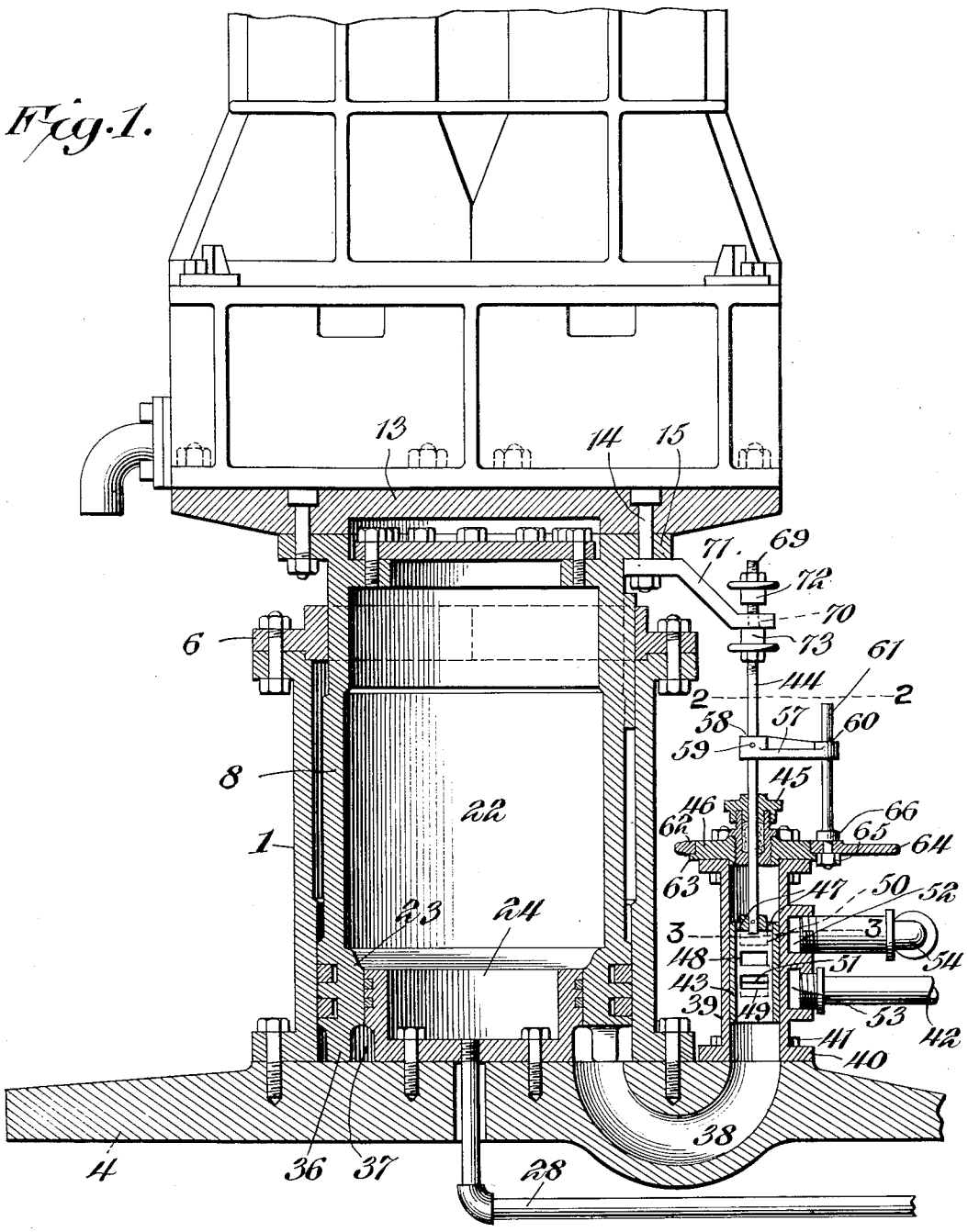
APPLICATION FILED OCT. 29, 1910.

1,039,678.

Patented Sept. 24, 1912.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

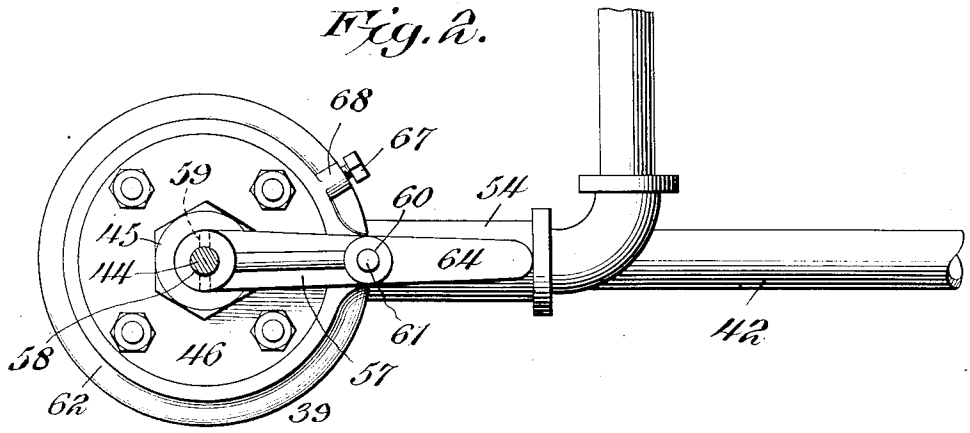


Fig. 4.

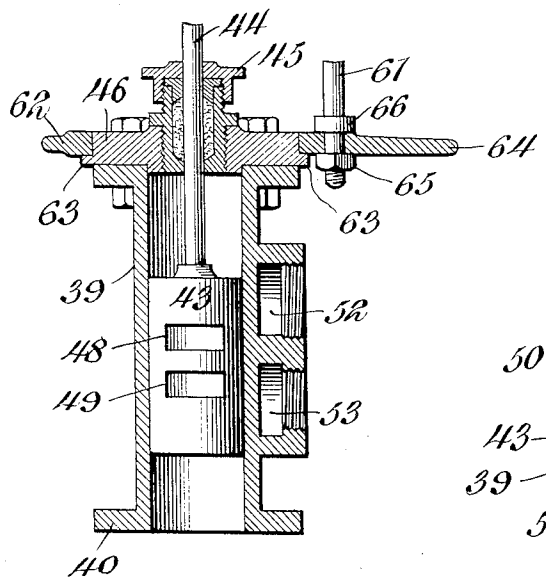
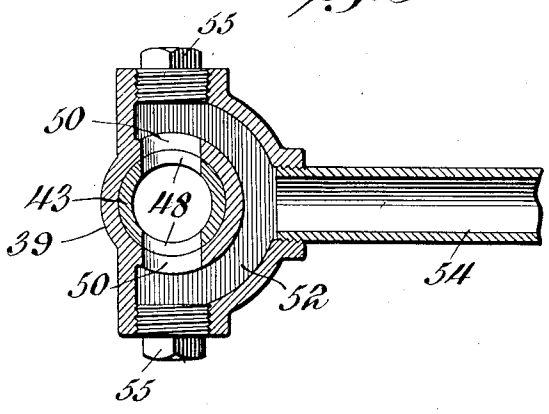


Fig. 3.



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UNITED STATES PATENT OFFICE.

EDGAR C. WILEY, OF LYNCHBURG, VIRGINIA, ASSIGNOR OF ONE-HALF TO LYNCHBURG FOUNDRY CO., OF LYNCHBURG, VIRGINIA, A CORPORATION OF VIRGINIA.

VALVE MECHANISM FOR JARRING-MACHINES.

1,039,678. Specification of Letters Patent. **Patented Sept. 24, 1912.**

Original application filed June 24, 1910, Serial No. 568,735. Divided and this application filed October 29, 1910. Serial No. 589,828.

To all whom it may concern:

Be it known that I, EDGAR C. WILEY, a citizen of the United States, residing at Lynchburg, in the county of Campbell and State of Virginia, have invented a new and useful Valve Mechanism for Jarring-Machines, of which the following is a specification.

The invention relates to a valve mechanism for jarring machines, and is a division of an application for patent for a machine for jarring sand molds, filed by me June 24, 1910, Serial No. 568,735.

The object of the present invention is to provide for jarring machines a simple and efficient valve mechanism, adapted to vary the length of the stroke of the machine and the size of the port openings, and thereby control the suddenness of the discharge of the exhaust of compressed air and the consequent force of the jar produced by the machine.

Another object of the invention is to provide a construction in which the inlet port for the admission of compressed air will be closed prior to the opening of the exhaust port to prevent unnecessary escape of compressed air and to reduce to a minimum the loss resulting from exhausting the compressed air in the operation of the machine.

With these and other objects in view, the invention consists in the construction and novel combination of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended; it being understood that various changes in the form, proportion, size and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:—Figure 1 is a vertical sectional view of a jarring machine provided with valve mechanism, constructed in accordance with this invention. Fig. 2 is an enlarged horizontal sectional view on the line 2—2 of Fig. 1. Fig. 3 is a similar view on the line 3—3 of Fig. 1. Fig. 4 is an enlarged sectional view of the upper portion of the valve casing, illustrating the manner of mounting the adjusting ring.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

In the accompanying illustration the valve mechanism is shown applied to a jarring machine, forming the subject matter of the aforesaid application. The jarring machine includes a vertical cylinder 1, mounted upon a base or bed plate 4 and provided at its upper end with a guide ring 6, forming a guide for the upper portion of a vertically movable piston 8, which is also guided at its lower portion. The interior of the piston constitutes a pressure receiving counter-balancing chamber 22, and the lower portion 23 of the piston receives a combined sealing and guiding member 24, spaced from the walls of the cylinder. Compressed air is admitted thereto by means of a pipe 28. The pressure within the balancing chamber partially counter-balances the weight of the piston and the load carried by the same, and is adapted to enable a smaller area of the piston to be operated on by the actuating fluid to vibrate the piston. The lower end of the piston is equipped with an annular portion 36, operating in the annular space 37 between the combined guiding and sealing member 24. The base or bed plate is provided with a curved passage 38, communicating at its inner end with the annular space 37, and the outer end of the passage extends to a point exterior of the cylinder and communicates with the lower end of a cylindrical valve casing 39, having an interior diameter corresponding with the diameter of the curved passage 38. The valve casing, which is preferably provided at its lower end with a horizontal annular attaching flange 40, is secured to the base or bed plate by screws 41, or other suitable fastening means piercing the flange and engaging threaded apertures in the base or bed plate. The valve casing is provided at its lower portion with an air inlet opening.

A feed pipe 42, which is connected with a compressed air supply, communicates with the valve casing, but any other fluid pressure may be employed for actuating the piston. The fluid pressure entering the cylinder moves the piston upwardly and this upward movement continues until the piston controlled valve 43 exhausts the fluid pressure and causes the piston to drop to the bottom of the cylinder, whereby the flask 16 and the sand contained therein are jarred in the usual manner, and the sand caused

to pack around the pattern. The piston controlling valve 43, which is cylindrical, is rigidly connected at its upper end to a valve stem 44, extending through a stuffing box 45, mounted in a central opening of a valve casing head 46. The cylindrical valve 43 is open at its lower end, and is provided in its upper end with openings 47 to admit pressure to the upper side of the valve, whereby the latter is balanced. The opposite walls of the valve 43 are provided with upper and lower rectangular ports or openings 48 and 49, which are adapted to register with opposite exhaust and inlet ports or openings 50 and 51 of the valve casing. The opposite exhaust and inlet ports communicate with approximately semi-cylindrical chambers 52 and 53, provided each with three interiorly threaded openings for the reception of an exhaust pipe 54 and the feed pipe 42. The feed pipe is connected with one of the openings of the lower semi-cylindrical chamber 53, and the exhaust pipe is connected with one of the openings of the upper semi-cylindrical chamber 54, and the other openings of the two semi-cylindrical chambers are closed by suitable plugs 55, as clearly illustrated in Fig. 3 of the drawings. The threaded openings of the semi-cylindrical chambers enable the feed and exhaust pipes to be conveniently arranged to suit the requirements of the place where the machine is installed. The opposite exhaust ports are provided for the purpose of exhausting the fluid pressure at two sides of the valves and thereby relieving the latter of side pressure, and the inlet or feed ports admit the compressed air on the opposite sides of the valves and also eliminate side pressure.

The cylindrical valve is capable of rotary adjustment to cause its ports or openings to register to a greater or less extent with the ports or openings of the valve casing to vary the size of the inlet and exhaust areas according to the weight of a pipe flask or other molding, which it is desired to ram by the desired process. The stem of the valve carries a horizontal arm 57, provided at its inner end with an opening 58 through which the valve stem passes, and the said arm 57 is rigidly secured to the valve stem by a pin 59, or other suitable means. The outer end of the horizontal arm 57 is provided with an opening 60, and is slidable on a vertical guiding rod or member 61, extending through the opening 60 and connected at its lower end to an adjusting ring 62. The adjusting ring 62, which is arranged horizontally, surrounds the upper portion of the periphery of the head 46 of the valve casing and is supported by a horizontal flange 63, extending from the lower portion of the periphery of the valve casing head 46. The said ring 62 is provided with an integral handle 64, which is pierced by the lower end of the guiding rod or member 61. The lower end of the guiding rod or member 61 is threaded to receive a nut 65, engaging the lower face of the handle 64 and co-acting with the collar 66, arranged at the upper face of the handle and suitably fixed to the guiding rod or member 61. The adjusting ring is adapted to be rotated on the bearing formed by the valve casing head 46, and it is secured in its adjustment by a clamping screw 67, mounted in a threaded opening of a boss or enlargement 68, adapted to engage the periphery of the valve casing head. After the ring has been adjusted to set the valve in proper position with relation to the ports of the valve casing, it is rigidly clamped in its adjustment by the screw 67.

The upper portion 69 of the valve stem is threaded and extends through an opening 70 of an operating rod 71, fixed at its inner end to the lower face of an exterior horizontal flange 15 of the piston 8 by a bolt 14 of a table 13, and extending downwardly and outwardly from the said flange 15. The operating arm is located between upper and lower nuts 72 and 73, equipped with hand wheels and forming adjustable stops. These nuts are adapted to either rigidly connect the operating arm with the valve stem or permit a limited movement of the operating arm independently of the valve stem, and by adjusting the nuts 72 and 73, the length of the stroke of the piston and the distance the piston drops may be controlled.

The machine is operated by a continuous inflow of fluid pressure, which is controlled by a throttle valve, the extent of the opening of the throttle valve being proportional to the load on the machine and the desired speed or force of the operation. The accumulated pressure of this influx of air or other fluid under the lower end of the piston forces the latter upwardly until the piston controlling valve uncovers the exhaust ports and releases the pressure on the piston with such suddenness that the piston drops, jarring the sand and closing the exhaust ports. The air inlet ports are covered or closed by the cylindrical piston controlling valve 43 prior to the opening of the exhaust ports, the elasticity of the air operating to complete the stroke of the piston and the closing of the inlet ports prior to the exhaust, preventing unnecessary waste of compressed air and reducing the escape or loss of the same through the operation of the machine to a minimum.

The jarring machine is susceptible of three adjustments; first, the adjustment through the throttle valve; second, the adjustment of the piston controlling valve and consequent variations of the area of the inlet and

exhaust ports or openings, which control the suddenness of the discharge of the exhaust and the drop of the piston, and third, the adjustment of the length of the stroke of the machine to vary the distance or the extent of the drop of the piston. These adjustments enable the machine to be arranged to suit the size, weight and character of the flasks to rammed, and a thorough uniform packing of the sand around the pattern is thereby secured.

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

1. A jarring machine comprising a cylinder, a piston operating within the cylinder, a valve casing communicating with the cylinder, a reciprocatory valve mounted for rotary adjustment within the valve casing, said valve casing and valve being provided with ports adapted to be varied in size by the said rotary adjustment, valve actuating mechanism for imparting reciprocatory motion to the valve, manually operable means for rotating the valve, and means for securing the latter means in its adjustment so as to provide a predetermined fixed adjustment of the valve and allow a continuous operation of the piston under such adjustment.

2. A jarring machine comprising a cylinder, a piston operating within the cylinder, a valve casing communicating with the cylinder, a reciprocatory valve mounted for rotary adjustment within the valve casing, said valve casing and valve being provided with ports adapted to be varied in size by the said rotary adjustment, valve actuating means for imparting reciprocatory motion to the valve, manually operable means mounted on the valve casing for rotating the valve to adjust the same, and means for securing the latter means in its adjustment so as to provide a predetermined fixed adjustment of the valve and allow a continuous operation of the piston under such adjustment.

3. A jarring machine comprising a cylinder, a piston operating within the cylinder, a valve casing communicating with the cylinder, a reciprocatory valve mounted for rotary adjustment within the valve casing and provided with a stem, said valve casing and valve being also provided with ports adapted to be varied in size by the said rotary adjustment, valve actuating means for imparting reciprocatory motion to the valve, and manually operable means for rotating the valve including an arm extending from the valve stem, a guide receiving the arm, and an adjusting ring mounted on the valve casing and carrying the guide.

4. A jarring machine comprising a cylinder, a valve casing cummunicating with the cylinder, a reciprocatory valve mounted for rotary adjustment within the valve casing and provided with a stem, said valve casing and valve being also provided with ports adapted to be varied in size through the said rotary adjustment, valve actuating mechanism for imparting reciprocatory motion to the valve, and manually operable means for rotating the valve including an arm extending from the valve stem, an adjusting ring mounted on the valve casing, a guiding member carried by the ring and receiving the arm of the valve stem, and means for securing the ring in its adjustment.

5. A jarring machine comprising a cylinder, a valve casing communicating with the cylinder and provided with a head having a peripheral bearing portion, a valve mounted for rotary adjustment within the valve casing, said valve and casing being provided with ports adapted to be varied in size by the said rotary adjustment, a valve stem connected with the valve, valve actuating means for imparting reciprocatory motion to the valve, and manually operable means for rotating the valve including an arm carried by the valve stem, an adjusting ring mounted on the peripheral bearing portion of the head and provided with a handle, and a guiding rod connected with the ring and receiving the arm.

6. A jarring machine comprising a cylinder, a piston, a valve casing provided with a head having a peripheral bearing portion and provided at the bottom thereof with a supporting flange, a valve mounted for rotary adjustment within the casing, said valve and casing being provided with ports adapted to be varied in size through the said rotary adjustment, a valve stem connected with the valve, valve actuating means for imparting reciprocatory motion to the valve, and manually operable means for rotating the valve including an adjusting ring mounted on the peripheral portion of the casing and supported by the flange thereof, an arm extending from the valve stem, and means carried by the adjusting ring for guiding the said arm.

7. A jarring machine comprising a cylinder, a piston operating in the cylinder, a valve casing communicating with the cylinder, a valve mounted for rotary adjustment in the casing, said valve casing and valve being provided with ports adapted to be varied in size by the said rotary adjustment, a valve stem connected with the valve, valve actuating means for imparting reciprocatory motion to the valve, manually operable means for rotating the valve including a rotary adjusting ring, and guiding means carried by the adjusting ring and connected with the valve stem.

8. A jarring machine including a cylinder, a base plate upon which the cylinder is

mounted having a passage communicating with the cylinder and extending to a point exteriorly of the same, a piston operating within the cylinder, a valve casing mounted upon the base plate and communicating with the outer end of the said passage and provided with an exhaust port, a valve reciprocating in the casing and connected with and actuated by the piston and arranged to cover and uncover the exhaust port and also adjustable to cover or partially cover the exhaust port to vary the size of the exhaust area, and a feed or supply pipe connected with the valve casing.

9. A jarring machine including a cylinder, a piston operating within the cylinder, a valve casing communicating with the cylinder, a reciprocatory valve mounted for rotary adjustment within the valve casing, means for adjustably actuating the valve in the reciprocation thereof to regulate the admission and exhaust of fluid pressure to the cylinder, separate manually operable means for rotating the valve to adjust the same to vary the extent of the exhaust, and means for securing the valve in its adjustment so as to allow a continuous operation of the piston under such adjustment.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

EDGAR C. WILEY.

Witnesses:
L. H. McWane,
W. W. Coffey.