

1,031,084.

The drawing consists of two views of a mechanical assembly, labeled Fig. 1 and Fig. 2.

Fig. 1 (Side View): This view shows a cross-section of the device. A central vertical component, labeled 9, is shown in a dashed outline, indicating its internal structure or a different state. It is surrounded by a housing or frame, labeled 1. The housing has a top flange, labeled 10, and a base, labeled 11. A horizontal rod or shaft, labeled 12, passes through the base. A vertical rod or shaft, labeled 13, is positioned to the right of the central component. A spring, labeled 14, is shown at the bottom right, connected to a component labeled 15. A component labeled 16 is shown at the bottom left, connected to a component labeled 17. A component labeled 18 is shown at the bottom right, connected to a component labeled 19. A component labeled 20 is shown at the bottom right, connected to a component labeled 21. A component labeled 22 is shown at the bottom right, connected to a component labeled 23. A component labeled 24 is shown at the bottom right, connected to a component labeled 25.

Fig. 2 (Top View): This view shows the top of the device. It features a central rectangular component, labeled 9, with a circular opening in the center. The opening is surrounded by a ring, labeled 17. A horizontal rod or shaft, labeled 18, passes through the center of the opening. A vertical rod or shaft, labeled 19, is positioned to the right of the central component. A component labeled 20 is shown at the bottom right, connected to a component labeled 21. A component labeled 22 is shown at the bottom right, connected to a component labeled 23. A component labeled 24 is shown at the bottom right, connected to a component labeled 25.

Witnesses



Inventor
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by Geo. P. Whittelsey
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UNITED STATES PATENT OFFICE.

WILLIAM C. NORCROSS, OF TERRE HAUTE, INDIANA.

SAND-MOLDING MACHINE.

1,031,084.

Specification of Letters Patent.

Patented July 2, 1912.

Application filed July 29, 1911. Serial No. 641,363.

To all whom it may concern:

Be it known that I, WILLIAM C. NORCROSS, a citizen of the United States, residing at Terre Haute, in the county of Vigo and State of Indiana, have invented new and useful Improvements in Sand-Molding Machines, of which the following is a specification.

This invention relates to sand molding machines and is an improvement on the sand molding machines set forth in Letters Patent of the United States granted to me December 10, 1907, No. 873,584 and April 5, 1910, No. 954,399.

The object of the present invention is, more particularly, to improve upon the valve mechanism of the invention set forth in Patent No. 954,399 and to provide a new segment valve, spring seated in a new manner, whereby leakage of the fluid pressure is minimized and by which the machine is rendered more efficient and economical in the consumption of the fluid pressure, air being the fluid pressure most usually employed in the machines of my aforesaid patents and in the present machine.

In the accompanying drawings:—Figure 1 is a vertical section; and Fig. 2, a detail front elevation of the valve.

As in my patents aforesaid, the present machine has a base 1, upright cylinder 2, table 24, trunk piston 9 which carries the table, and cap 10. Oil holes 11 and 12 may be employed for the feed of lubricant to the piston. In the present machine, the cap 10 is preferably made in two or more sections to permit of suitable adjustment to properly fit the piston 9, and I also preferably provide a guide pin 25 on the table 24 sliding through an opening in the cap 10 to prevent the table from turning. A chamber 3 in the base 1, receives the air or other motive fluid through a pipe 4. In the present machine, the chamber 3 is in only one part of the base; the exhaust muffler chamber 7 is on only one side of the cylinder 2, and there is but one valve which is located at one side of the piston. The exhaust pipe appears at 8.

Leading upwardly from the bottom of the base 9^a of the cylinder is the admission port 5 which opens into the cylinder near the bottom thereof, and immediately above this port is the exhaust port 6 affording communication between the cylinder and the exhaust muffler chamber 7. In the side of

the piston is a chamber 15 which has a port 16 leading to the lower face of the piston 9. The piston is provided with a striker 13. Located in the chamber 15 and of not quite the length thereof, is the segment valve 17 which, also, is of somewhat less height than the height of the chamber 15 so that it may have a limited vertical, as well as lateral, play therein. This valve has an elongated port 18 extending therethrough from one side to the other which may register with port 5 or port 6 according to the position of the valve. The valve has a shoulder 19 which may be completely circular or in sections. A coil spring 20 is seated in a frusto-conical radial socket 21 in the piston and has its outer end bearing against the back of the valve 17 and retained against displacement by the shoulder 19. The spring 20 holds the valve 17 snugly against the side of the cylinder 9 and, owing to the fact that the socket or recess 21 is sufficiently large, this spring can flex or bend, without shifting the valve 17, as the piston plays up and down and carries the inner end of said spring to and fro. The main function of the spring is to hold the valve seated against the side of the cylinder.

In operation, the mold to be rammed or jolted is placed on the table 24 and motive fluid, such as compressed air, is admitted through the pipe 4 into the chamber or reservoir 3. A suitable valve will be provided to control the admission of the pressure through the pipe 4. Assuming that the parts are in the position shown, the air passes upwardly through port 5, port 18 and through port 16 and exerts its pressure against the base 1 below the piston. In consequence, the pressure raises the piston, the spring 20 flexing to permit this action, until the shoulder 22 on the piston strikes the lower edge of the valve 17, whereupon the valve is quickly shifted upwardly with the piston. On such upward shifting of the valve, the port 18 is brought into alinement with the port 6, whereupon the pressure exhausts from chamber 15 through ports 18 and 6 into the muffler exhaust chamber 7 and out through pipe 8, the lower solid portion of the valve meanwhile covering the exit of port 5. The valve remains in this position until the piston, being deprived of pressure to actuate it upwardly, drops suddenly downward and brings the shoulder 23 against the upper edge of the valve, where-

upon the valve is carried downwardly until the port 18 is opposite the port 5, whereupon the upper solid portion of the valve closes the port 6, but after this occurs, the
 5 part 13 impactively strikes the base 1 imparting a shock or jolt to the table 24, and in consequence, to the mold carried thereby, thus settling the sand in the mold. Immediately the port 18 comes opposite the port
 10 5, pressure is re-admitted below the piston so that immediately succeeding the blow just described, the piston is again forced upwardly and the operation is repeated.

The coil spring 20 being flexible, performs the two-fold function of firmly holding the valve 17 against the cylinder 2 and flexes with the movements of the piston to and fro so that the valve is shifted only by the striking of the shoulders 22 and 23 there-
 20 against. The valve mechanism of the present invention is very efficient in preventing leakage of the compressed air and insures the economical use of the air in the operation of the machine.

25 It will be understood that my invention is not restricted to the use of a single cylinder and piston, as a plurality of cylinders and a plurality of pistons connected to the table at different points thereof, may be
 30 employed. Nor is my invention restricted to the use of one valve on a given piston, as one or more valves may be used on the pis-

ton, whether in a continuation of the same chamber or in another chamber in said piston. When the invention is used in a large
 35 machine it may be preferable to use two or more valves on the piston, thus reducing the air travel.

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

In a machine of the class described, the combination with a cylinder having admission and exhaust ports, of a piston having a valve chamber, a radial recess connecting
 45 therewith, and a port extending from said chamber to the space in the cylinder at the end of the piston, a valve loosely positioned in said chamber and adapted to control the inlet and exhaust ports aforesaid, and a coil
 50 spring seated in said recess in said piston and abutting against the back of said valve, said coil spring being adapted to keep the valve seated when kicked by the piston, and to flex when its inner end is carried to and
 55 fro during the movements of the piston, without shifting the valve by said flexing.

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

WILLIAM C. NORCROSS.

Witnesses:

HARRY J. BAKER,
 STELLA M. THOMAS.

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