W. C. NORCROSS.

SAND MOLDING MACHINE.

APPLICATION FILED JUNE 8, 1909.

954,399. Patented Apr. 5, 1910.

Fig. 1.

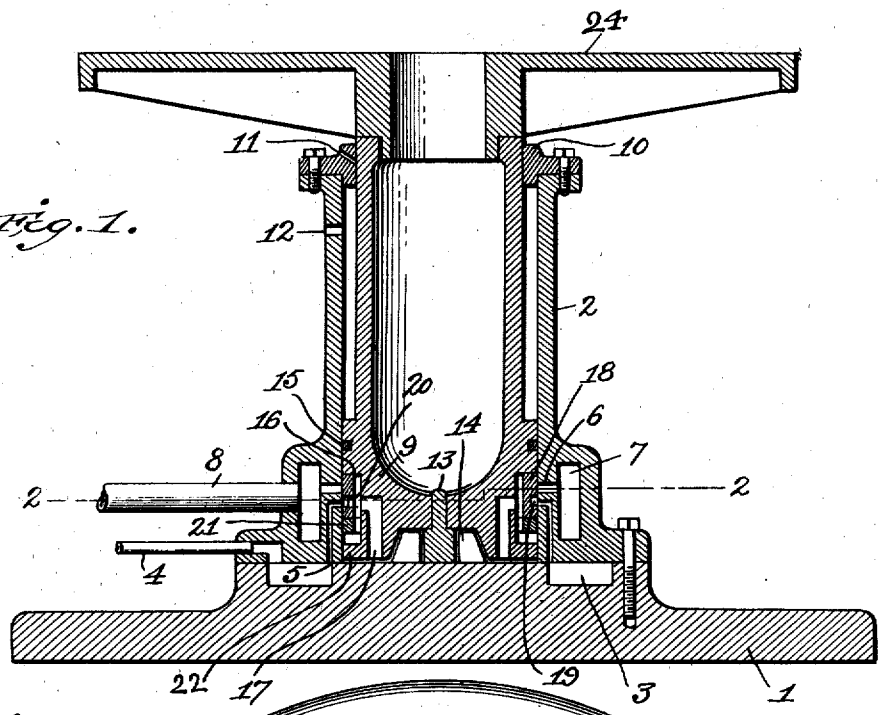
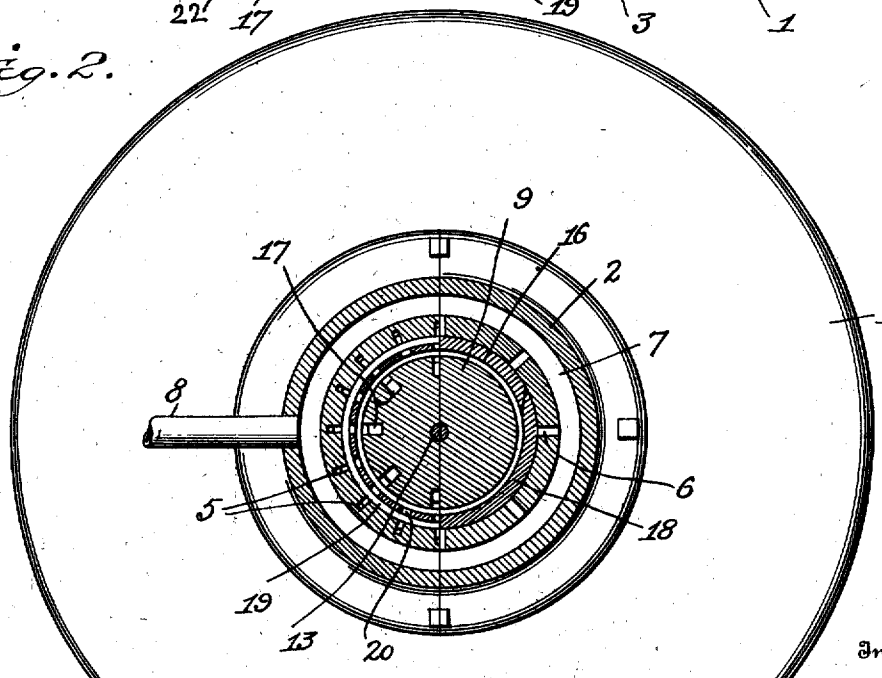


Fig. 2.



Witnesses

Inventor

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By

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UNITED STATES PATENT OFFICE.

WILLIAM C. NORCROSS, OF TERRE HAUTE, INDIANA.

SAND-MOLDING MACHINE.

954,399. Specification of Letters Patent. Patented Apr. 5, 1910.

Application filed June 8, 1909. Serial No. 500,814.

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 its object is to effect a rapid and thorough packing of the sand around the pattern by jarring or jolting the support on which the flask rests.

The device hereinafter set forth is a modification of the machine for which Letters Patent of the United States were granted to me on Dec. 10, 1907, No. 873,584, in which the jolting is produced by a piston reciprocating in an upright cylinder and striking the bottom of said cylinder at each reciprocation, the flask being carried on the upper end of said piston. In that patent the piston acts as the valve to control the admission and the exhaust of the compressed air or other fluid pressure which actuates the piston. In the present invention a separate valve is used, preferably annular and concentric with the piston, which strikes said valve at each end of its reciprocation and thus moves it from one position to another to effect the opening and closing of the admission and exhaust ports.

In the accompanying drawing, Figure 1 is a vertical sectional view of the improved machine, and Fig. 2 is a cross section on the line 2—2, Fig. 1.

On a suitable heavy metallic base-plate 1 is secured the upright cylinder 2. An annular air chamber 3 is located concentric with the cylinder and is preferably formed in the base-plate, as shown. Fluid pressure, such as compressed air, is supplied to said air chamber through a pipe 4. Ducts 5 lead upwardly from said chamber in the walls of the cylinder and open into said cylinder at a plurality of points around its inner circumference, at a uniform distance above the base-plate. Slightly above these inlet ports are the exhaust ports 6, preferably larger in area than the inlet ports and connecting the cylinder with an annular exhaust chamber 7 concentric with said cylinder and provided with an exhaust pipe 8 opening to the atmosphere.

In the cylinder is a heavy trunk piston 9, whose upper part does not fit the cylinder tightly but passes through a cap 10 secured to the upper end of the cylinder. An oil hole 11 may be formed in said cap and another one 12 is provided in the upper part of the cylinder to feed lubricant to the piston. The lower end of the piston is armed with a hardened steel plug 13 which strikes upon the base-plate when the piston reaches the bottom of the cylinder. In case the piston is countersunk, a filler 14 is placed upon the base plate around the plug to diminish the space to be filled by the compressed air.

The piston has one or more packing rings 15, and below said packing is a deep circumferential groove 16 including a considerable space both above and below the inlet and exhaust ports. Good sized passages 17 in the piston connect this groove with the space below the bottom of the piston. In said groove are two rings, the upper one 18 being the wider and having an external circumferential groove 19 from which holes 20 run through said ring. The thickness of this ring is less than the depth of the groove 16, so that there is always a space between the wall of said groove and the inner side of said ring, affording constant communication between the holes in the ring and the passages 17 in the piston. The ring is of such width that when its groove 19 registers with the inlet ports the exhaust ports are covered by the ring, and vice versa. The lower ring 21 is not so wide as the upper ring, and both of them are split so as to spring into the cylinder and have considerable frictional hold thereon.

The operation is as follows:—The parts being in the position shown, air enters the chamber 3 by which it is distributed evenly to all the inlet ports through which it passes to the groove 19 in the ring 18 and thence through the holes 20 and the passages 17 to the lower end of the cylinder, where it exerts a lifting effect upon the piston. When the piston has risen sufficiently for its lower flange 22 to strike the lower ring 21, both rings will be slid upwardly, the first effect of which is to cut off the air by closing the inlet ports, and the second is to open the exhaust ports when the groove 19 registers with them. The air can then escape suddenly, owing to the large area of said exhaust ports, and the piston will fall and its plug will strike the bottom of the cylinder.

Just before it strikes, the rings will be caught by the upper flange 23 of the piston and carried down to their original position.

It will be observed that the ring 18 is in effect an annular slide valve, which is actuated by the piston in its reciprocations, and that by using rings 21 of different widths, the lost motion between the piston and the rings can be varied, so as to give the piston more or less travel within certain limits. Ordinarily from one fourth to three eighths of an inch is sufficient to do effective work.

As in my former patent, the flask is supported upon the table 24 which is carried by the piston. The pattern having been put in place and the sand poured upon it, the action of the machine quickly jolts the sand firmly and evenly down around the pattern, packing it better than can be done by hand.

Having thus described my invention what I claim is:

1. In a machine of the class described, the combination of an upright cylinder having a set of inlet ports and a set of exhaust ports in its walls at different levels, an annular slide valve having a circumferential groove adapted to register with said sets of ports alternately, said valve having holes extending through it from said groove, a piston having a circumferential groove receiving said valve and affording a space between the wall of the groove and the inner side of the valve, and passages connecting the groove in the piston with the space below said piston.

2. In a machine of the class described, the combination of an upright cylinder having a set of inlet ports and a set of exhaust ports in its walls at different levels, a piston having a deep circumferential groove and passages connecting said groove with the space below said piston, a split ring in said groove having an exterior groove adapted to register with said sets of ports and provided with holes extending from said groove through said ring, and a second split ring of predetermined width below said grooved ring.

3. In a machine of the class described, the combination of a base plate having an annular chamber, an air pipe communicating therewith, an upright cylinder having ducts leading from said chamber to inlet ports in the walls of said cylinder, a set of exhaust ports of larger area than the inlet ports and arranged a little distance above the same, an annular exhaust chamber communicating with said exhaust ports, an annular valve in said cylinder having an exterior groove adapted to register with said ports, a narrower ring below the annular valve, a piston having a deep circumferential groove receiving both rings with a certain amount of lost motion, and holes and passages connecting the groove in the valve with the space below said piston.

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

WILLIAM C. NORCROSS.

Witnesses:

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S. M. THOMAS.