

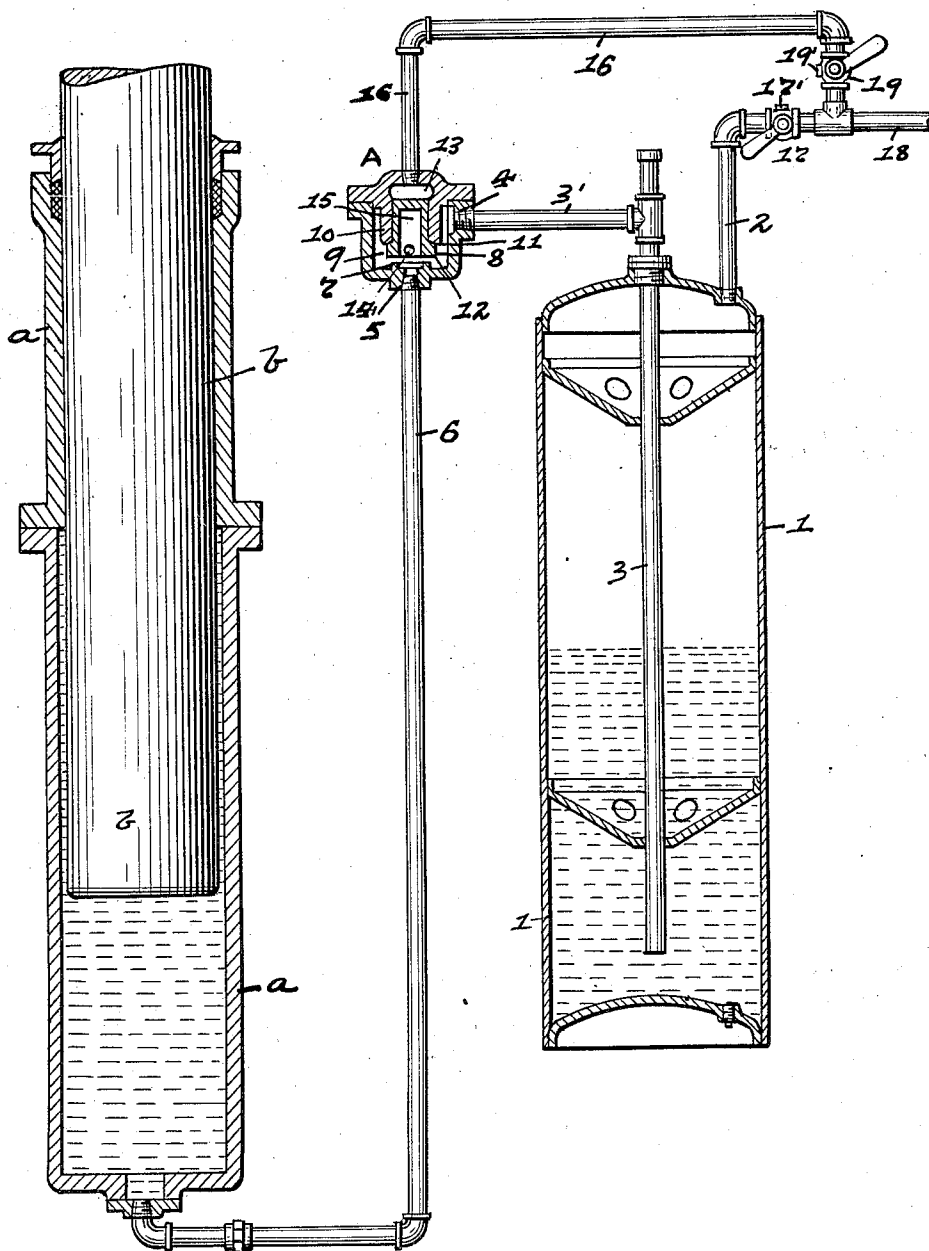
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1,452,848

R. F. RINGLE

CONTROL VALVE

Filed July 25, 1919



WITNESSES

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ROBERT F. RINGLE, OF ZELIENOPLE, PENNSYLVANIA, ASSIGNOR TO HERMAN PNEUMATIC MACHINE COMPANY, OF ZELIENOPLE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

CONTROL VALVE.

Application filed July 25, 1919. Serial No. 313,233.

To all whom it may concern:

Be it known that I, ROBERT F. RINGLE, a citizen of the United States, and a resident of Zelienville, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Control Valves; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to a control valve, which is used in controlling fluid, such as oil, and has special reference to its use in connection with the operation of a molding device or machine, such as is shown and described in United States Letters Patent granted on October 16, 1917, to Austin and Ringle No. 1,243,030 for turn over and pattern drawing device.

The object of my invention is to provide a cheap, simple and efficient control valve, which when used with such turn over and pattern drawing device, will allow the mold to move away from the pattern or the pattern to move away from the mold by a slow movement and as soon as the pattern is free from the sand in the mold will allow such valve to provide for a more rapid movement.

To these ends my invention consists, generally stated, in the novel arrangement, construction and combination of parts, as hereinafter more specifically set forth and described and particularly pointed out in the claims.

To enable others skilled in the art to which my invention appertains to construct and use my improved control valve, I will describe the same more fully, referring to the accompanying drawing, in which:

The figure shows a sectional view of my improved control valve connected to an oil supply reservoir and to the cylinder used for raising and lowering the mold and pattern on the machine.

Like symbols of reference herein indicate like parts in the figure in the drawing.

As illustrated in the drawing the raising and lowering cylinder for the mold and pattern is shown at *a*, and within which is the usual plunger *b*, which is adapted to be raised and lowered within said cylinder and at the upper end of which the mold and pattern (not shown) are supported so that the mold can be raised and lowered in the operation of forming such mold.

Adjacent to the cylinder *a* is the reservoir 1 for containing the operating fluid, such as oil, and which is held under pressure therein by means of air flowing through the pipe 2 into said reservoir and above said oil. Extending within the reservoir 1 and opening into the lower part of the same is the pipe 3, which passes through the upper end or head of said reservoir and communicates by a branch pipe 3' with one side of the control valve A through an opening 4 therein. A pipe 6 leads from the bottom of the valve A through an opening 5 in the said valve and communicates with the bottom of the cylinder *a*, and around said opening a valve seat 7 is formed with which the hollow plunger 8 is adapted to engage. This valve 8 is located within a chamber 9 formed in the valve A and slides within a depending wall 10 within such valve, the bottom or end of which forms a valve seat 11 with which the valve portion 12 on the lower end of the plunger 8 engages. A chamber 13 is formed in the valve A above the plunger 8 and a hole 14 opens through the wall of said plunger adjacent the valve portion 12 for communicating between the chamber 9 and the chamber or hollow portion 15 in such plunger. Leading from the upper end of the valve A and communicating with the supply pipe 18 leading from any source of supply, is the air pipe 16, which has a three-way valve 19 therein, and such supply pipe has a three-way cock or valve 17 connecting between said pipe and the pipe 2.

The use and operation of my improved control valve is as follows: Upon opening the valve 17 the air under pressure will flow from the pipe 18 into the reservoir 1 through the pipe 2 which forces the oil up through the pipes 3 and 3' into the chamber 9 of the valve A, past the seat 7 and thence through the pipe 6 into the cylinder *a*. During this movement of the oil the chamber 13 is at atmospheric pressure through the exhaust port 19' of the valve 19 and pipe 16 connecting therewith and on account of the valve 12 on the plunger 8 being seated against the valve seat 11 so that upon sufficient pressure of oil being obtained to lift such plunger, it would be lifted almost simultaneously as the pressure is being transmitted through such oil. The plunger *b* in

the cylinder *a* being at its lower position the oil thus passing into the cylinder will lift said plunger in a rapid manner and such plunger will be held up according to the pressure of the oil under the same.

In order to release the oil slowly from the cylinder *a* to lower the plunger *b* and the mold slowly from around the pattern, air under sufficient pressure is permitted to flow into the chamber 13 of the valve A, through the pipe 16 by opening the valve 19, which forces the plunger 8 in the valve down and holds the face of its valve portion 12 down against the seat 7. The pressure of the oil in the reservoir 1 is then reduced through the pipe 2 and the three-way valve 17 and a slow downward motion of the plunger *b* then occurs due to the oil in the cylinder *a* flowing back through the pipe 6 and hole 14 in the plunger 8 of the valve A into the chamber 9, so that such oil eventually reaches the reservoir 1 by passing from said chamber through the pipes 3' and 3 into said reservoir.

In order to secure a faster movement of the plunger *b* downward, the valve 19 is opened so that the air is exhausted from the chamber 13 through the pipe 16 and exhaust port 19' in said valve, which will permit the plunger 8 to be forced upward and allow the portion 12 thereon to seat itself against the seat 11, which will thereby permit an unrestricted flow of the oil from the cylinder *a* through the pipe 6 and pipes 3' and 3 to the oil reservoir 1 as long as there is a difference of pressure to hold such valve against such seat, or until the plunger *b* returns to its lowest position.

It will thus be seen that in the use of my improved control valve when applied to the formation of sand molds, the mold can be raised in a rapid and easy manner, and such mold can be slowly withdrawn from such pattern after the formation of such mold and in a straight line without liability of injury to such mold through the usual rapid withdrawing of the same or such pattern.

It will be evident that my improved control valve can be used in withdrawing the pattern from the mold and in connection with other forms of apparatus for the formation of sand molds, as well as with other fluid than oil, while various other modifications and changes in the design and construction of the same may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

What I claim as my invention and desire to secure by Letters Patent is:

1. In a molding machine operating device of the class described, comprising a cylinder having a fluid actuated plunger therein for raising and lowering the mold and pattern, a fluid reservoir containing fluid under pressure for operating said plunger, valve means

between said cylinder and reservoir and partially operated by said fluid for permitting the mold to be withdrawn from the pattern by a slow movement of said plunger, and other fluid operated means for partially controlling the valve means.

2. In a molding machine operating device of the class described, comprising a cylinder having a fluid actuated plunger therein for raising and lowering the mold and pattern, a fluid reservoir containing fluid under pressure for operating said plunger, valve means having but two operative positions between said cylinder and reservoir and operated to one position by said fluid and other means for maintaining the valve in the other position, the valve means permitting the mold to be withdrawn from the pattern by a slow movement of said plunger and for permitting a faster movement of said plunger when the mold is freed from the pattern.

3. In a molding machine operating device of the class described, comprising a cylinder having a fluid actuated plunger therein for raising and lowering the mold and pattern, a fluid reservoir containing fluid under pressure for operating said plunger, valve means having two passages of different sizes therein between said cylinder and reservoir and partially controlled by said fluid for permitting the mold to be withdrawn from the pattern by a slow movement of said plunger and for permitting a faster movement of said plunger when the mold is freed from the pattern, and other fluid operated means for partially controlling the actuation of the said valve means.

4. The combination with a molding machine operating device including a cylinder having a fluid actuated plunger therein for moving the mold and withdrawing it from the pattern and a fluid reservoir communicating with the said cylinder containing fluid under pressure for operating the said plunger, of means having but two operative positions between said cylinder and reservoir operated by said fluid for permitting the mold to be withdrawn from the pattern by a slow movement of said plunger and for permitting a faster movement of said plunger when the mold is moved free of the pattern, and said means being partially actuated by the pressure of the fluid in the cylinder and reservoir and partially actuated by manually controlled means.

5. The combination with a molding machine operating device including a cylinder having a fluid actuated plunger therein for moving the mold and withdrawing it from the pattern and a fluid reservoir communicating with a valve between said cylinder and reservoir, said valve having a wide open operative position permitting rapid movement of the piston in either direction, and a partially closed position permitting

slow mold withdrawing movement of the plunger and adapted to be held in wide open position by pressure in the reservoir and the cylinder, means to hold the valve in partially closed position in opposition to the said other fluid pressure by fluid pressure, and means for controlling the last named fluid pressure whereby the valve may be moved to control the operation of the said plunger.

6. The combination with a molding machine operating device including a cylinder having a fluid actuated plunger therein for moving the mold and withdrawing it from the pattern, of a fluid reservoir communicating with said cylinder for containing the fluid for operating said plunger, and means for supplying the reservoir with other fluid under pressure, said means being provided with a valve adapted to close the pressure supply and open said reservoir to the atmosphere, a second valve between the cylinder and reservoir having a wide open operative position permitting rapid movement of the plunger in either direction and a partially closed position permitting slow movement of the plunger and adapted to be held in wide open position by the pressure of the fluid in the cylinder and reservoir, and other means acting in opposition to the fluid in the cylinder and reservoir for maintaining the valve in its partially closed position, said means being effected when the reservoir is open to the atmosphere.

7. Means for operating the plunger of a molding machine comprising a cylinder in which the plunger operates, a reservoir connected with the cylinder, a valve in said connection for controlling the passage of fluid between the cylinder and the reservoir, such valve having an open passage and a restricted passage whereby the flow of fluid there-

through may be free or retarded, and pressure controlled means for controlling the operation of said valve.

8. Means for operating a molding machine comprising a fluid operated plunger and a piston in which one end of the plunger is adapted to be operated, a reservoir connected with the cylinder, a valve in the connection having two passage ways there-through of different sizes, and a reciprocating member controlled by fluid pressure for rendering one or the other of the passages inoperative.

9. Means for operating a molding machine comprising a fluid operated plunger and a piston in which one end of the plunger is adapted to be operated, a reservoir connected with the cylinder, a valve in the connection having two passage ways there-through of different sizes, and a reciprocating member for rendering one or the other of the passages inoperative, said reciprocating member adapted to be held in one position by the pressure in the cylinder and reservoir, and other fluid actuated means independent of the fluid pressure in the cylinder and reservoir for holding the reciprocating member in the other position.

10. In combination with a fluid pressure cylinder and a reservoir, a pipe connecting them, means for supplying fluid under pressure to the reservoir, a valve in the pipe having an open passage and a restricted passage, and means communicating with the supply means for controlling the operation of the valve.

In testimony whereof, I have hereunto set my hand.

ROBERT F. RINGLE.

Witness:

J. M. GEOGHEGAN.