May 6, 1930. R. E. MITTON 1,757,259

VALVE FOR CONTROLLING FLUIDS

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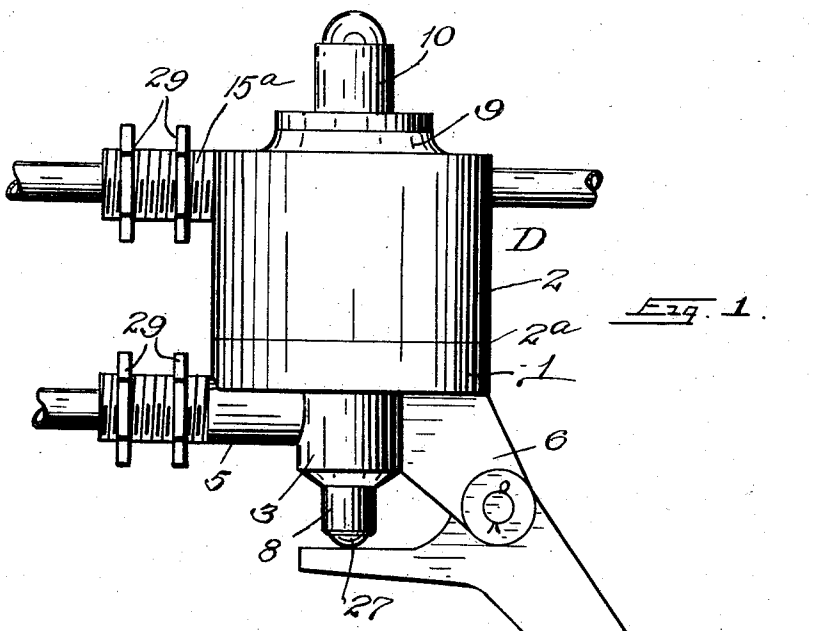



Fig. 1.

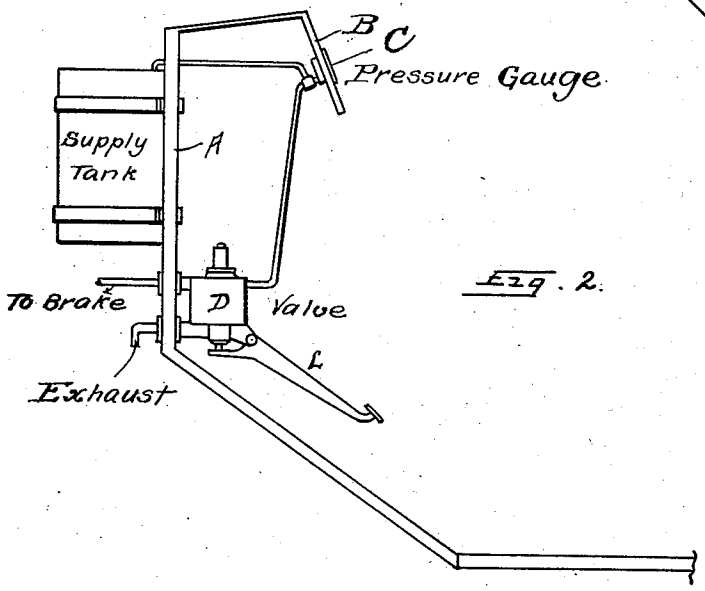



Fig. 2.

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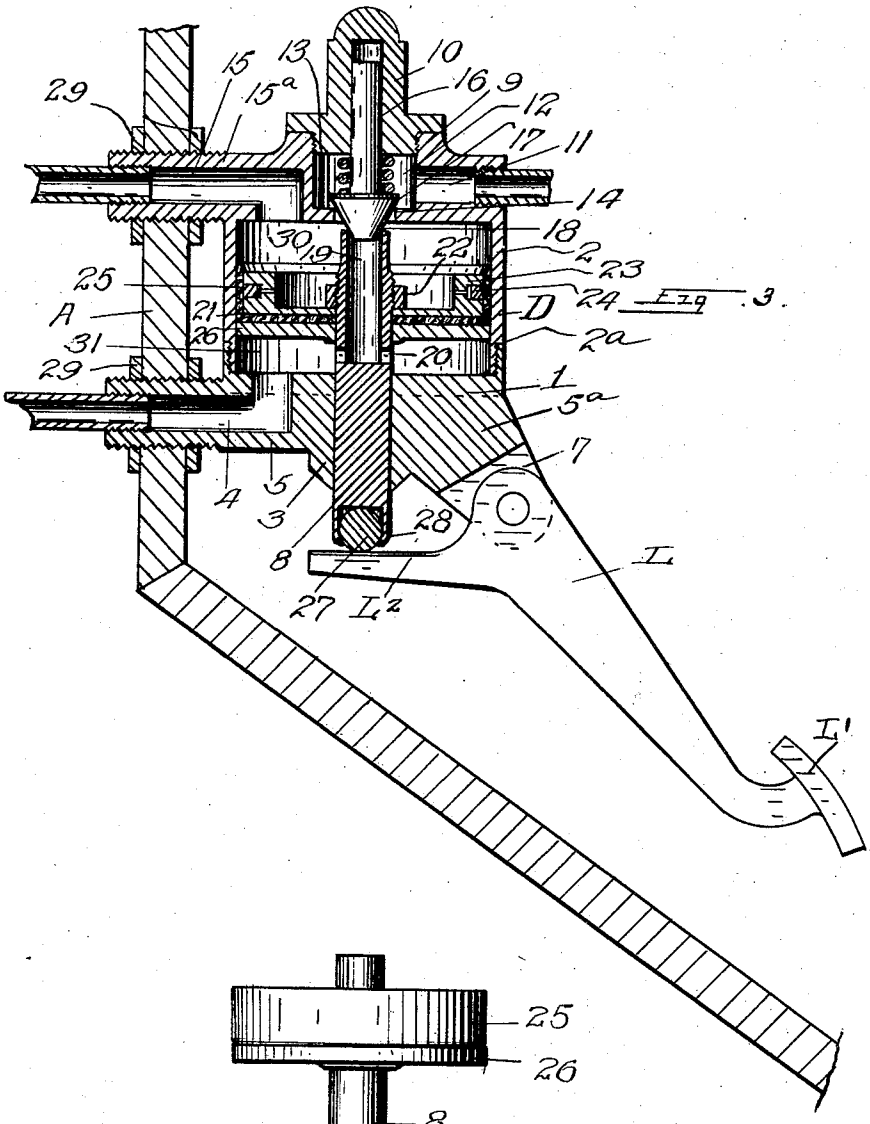



Fig. 3.

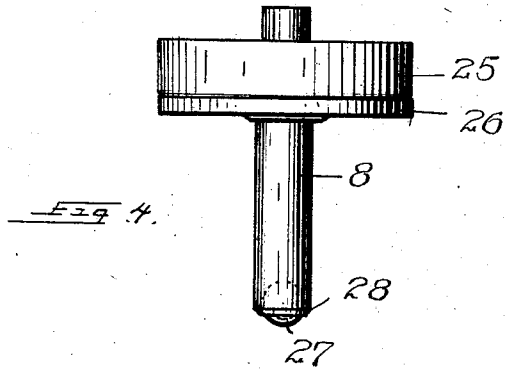



Fig. 4.

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# UNITED STATES PATENT OFFICE

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## VALVE FOR CONTROLLING FLUIDS

Application filed January 3, 1928. Serial No. 244,223.

My invention relates to valves, and particularly to fluid control valves, and has for its object to provide a new and efficient control valve for fluids which will be positive in its action yet will be accurate and will control the amount of pressure passing therethrough to the fraction of a pound.

A further object is to provide a control valve which will control the flow of fluids therethrough and will itself be actuated by the back pressure of the fluids to move the foot of the operator a sufficient amount to shut off the pressure from the source of supply and one in which the involved air or fluid pressure is controlled by the muscular action of the operator.

These objects I accomplish with the device illustrated in the accompanying drawing in which similar numerals and letters of reference indicate like parts throughout the several views and as described in the specification forming a part of this application and pointed out in the appended claims.

In the drawings, in which I have shown the best and most preferred manner of building my invention, Figure 1 is a side elevation of the valve. Figure 2 is a side elevation of the valve installed, showing the pressure gauge on the instrument board and the air supply tank. Figure 3 is a diametrical vertical section of the valve. Figure 4 is a side view of the piston which operates in the casing of the valve.

In the drawings, I have shown the dash board of the automobile as A, the instrument board as B, the pressure gauge thereon as C, and the valve is shown as D. The said valve D is made up of two castings 1 and 2, cylindrical in form, and with the casting 1 internally threaded and the casting 2 externally threaded so that when assembled they screw together, one within the other, as shown at $2^a$, Figure 3, forming a cylindrical casing with both ends closed. The said casting 1 is provided with a boss 3 on the bottom side thereof, and an outlet opening 4 is provided on one side of said boss in a cylindrical boss portion 5 of the casting 1 and another cylindrical boss $5^a$ is formed on the bottom of said casting at an angle to and adjacent the central boss 3. The extreme end of the said boss $5^a$ is bifurcated into two spaced apart arms 6 and 7, between which the operating lever L of the valve is carried. The said arms 6 and 7 are centrally bored to receive pivot pins on which the operating lever L is pivoted and supported. The said boss 3 is centrally bored to receive a piston rod 8 longitudinally movable therein. The said casting 2 is provided with a centrally positioned boss 9 on the top side thereof, which boss is centrally bored at 12 and internally threaded to receive a closure cap 10. An air inlet bore 11 is bored on one side of said casting 2 and an outlet hole 15 is bored through a cylindrical boss $15^a$ on one side of the top portion of said casting. The bore 12 is constricted, as at 13, to form a valve seat 14, and the cap 10 is centrally bored to carry a valve stem 16. A valve 17 is formed on the end of the said stem 16 and said head is longer than the usual type cone valve and is adapted to close the valve seat 14, and another valve seat 18 at the same time, making one valve close the two seats and control the passage of fluid through both valve seats. The said valve seat 18 is formed on the top end of the rod 8 and said rod is centrally bored through a portion of its length at 19, with lateral ports 20 therein at the bottom of the hole or bore 19 to allow passage of air therethrough. A piston 21 is secured to the said rod 8 by threads formed on the outer side of said rod, and a nut 22 holds said piston 21 in place on said rod 8. The said piston 21 is composed of a piston block 23, having an annular groove therearound in which an expanding piston ring 24 is carried and a cup leather 25 is carried in said casing between said block 23, the ring 24 and the inner face of said casing, so that expansion of the ring 24 will press the cup against the sides of the casing, preventing any passage of air thereabout. A plate 26 is provided to hold the said leather against the piston block 23. The lower end of the said rod 8 is centrally bored to receive a ball 27, which is adapted to rotate in said bore when the valve is being operated by the lever L. The outer edge 28 of the rod 8 is pressed inwardly around the ball to retain it in place. Nuts 29 are screwed onto the

external threads of the boss $15^a$ and the boss 5 to secure the said valve D in its entirety to the dash board A. The said lever L is made as shown in Figure 3, with the foot engaging portion $L^1$ formed on one end thereof and turned upwardly so that the foot of the operator will not engage with the body of the lever when it is being operated and the other end of the said lever has a protruding flat portion $L^2$ thereon which is adapted to be brought against the bottom side of the ball 27 to actuate the valve.

The operation of my device is as follows:

The valve is mounted on the dash board of the automobile as shown in Figure 1, and the fluid lines connected which lead to the application. A T-connection T is provided in the bore 11 and one line $T^1$ connects the valve with the source of fluid supply, while the other line connects the valve and the source of air supply with the instrument board pressure gauge. With the valve mounted, as shown, the operator to operate the valve presses down upon the lever L, which forces the flat portion $L^2$ against the ball 27 and forces the rod 8 and the piston 21 upwardly. The rod 8, being the lower end of the valve seat 18, forces the valve 17 upwardly, opening the valve seat 14 and allowing the fluid to enter the chamber 30 above the piston 21. The chamber 30 being in open connection with the hole 15, the fluid passes out to the application of the brakes. When sufficient back pressure has been built up in the brakes and brake lines, the piston 21 will be moved downwardly by such pressure and the muscles of the leg of the operator will give sufficiently to allow the valve 17 to close the seat 14 and no more fluid will be allowed to enter the chamber 30. To release the brakes and the pressure in the lines, the operator moves his foot up from the lever L and the force of the fluid in the chamber 30 will force the piston 21 downwardly sufficiently for the rod 8 to be moved and the valve seat 18 moved away from the valve 17, allowing the fluid in the chamber and lines to pass out through the bore 19, the ports 20 into the chamber 31 below the piston 21, and the chamber 31 being in open connection with the exhaust or outlet opening 4, the fluid escapes to the open air. The operation may be repeated as desired.

The involved fluid pressure in the chamber 30 and the lines to the application is the pressure which actuates the muscles of the operator sufficiently to close the valve seat 14 and the release of the lever L by the operator in any degree which he desires regulates the amount of pressure allowed to pass out of the application chamber to the exhaust or outlet into the open air.

Having thus described my invention I desire to secure by Letters Patent and claim:

1. In a fluid control valve the combination of a cylindrical casing; an exhaust and an application connection therewith; a portion provided in the top end thereof forming a valve seat therein; an inlet connection in the space above said valve seat; a piston operable within said cylinder, having a hollow stem therein with ports in the bottom end of said hollow in open connection with the chamber below said piston; a valve seat formed on the top end of said stem; a lever to move said piston and stem; and a valve adapted to seat in both of said valve seats to close one or both, as necessary.

2. In a fluid control valve the combination of a cylindrical casing having inlet application and exhaust openings therein; a piston operable within said casing, having the top end of the piston rod hollow and in open connection with the space above and below said piston; means to manually move said piston and rod; a valve seat formed in the top end of said casing between the intake opening and the interior of said cylinder; and a valve adapted to close both said valve seat and the top end of the piston rod as necessary to control the flow of fluid to the application and the exhaust.

3. A fluid control valve comprising a casing; a piston slidably carried in said casing; intake and exhaust valves controlled by the movement of said piston under fluid pressure and opposed to the direct muscular tension of the operator.

4. A fluid control valve comprising a casing; a piston slidably carried therein, having a valve seat in its center and an exhaust port therethrough; a single intake valve adaptable to seat on exhaust and intake ports simultaneously; and means to automatically operate said valves by the involved fluid pressure to direct varying pressures according to the variable direct muscular tension of the operator.

In testimony whereof I have affixed my signature.

ROBERT E. MITTON.