

A. J. DRONSFIELD.
PRESSURE CONTROLLING DEVICE.
APPLICATION FILED APR. 13, 1911.

1,020,641.

Patented Mar. 19, 1912.

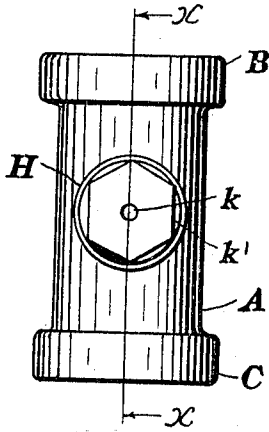


Fig. 2

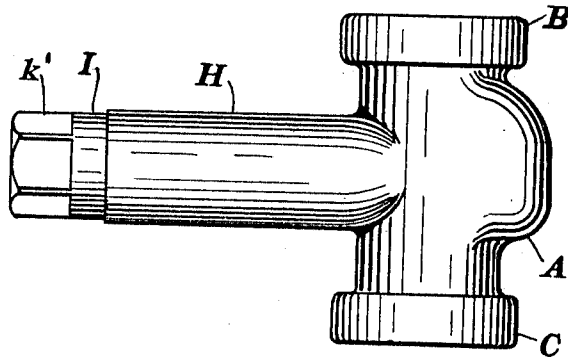


Fig. 1

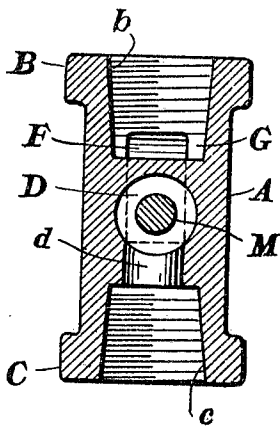


Fig. 4

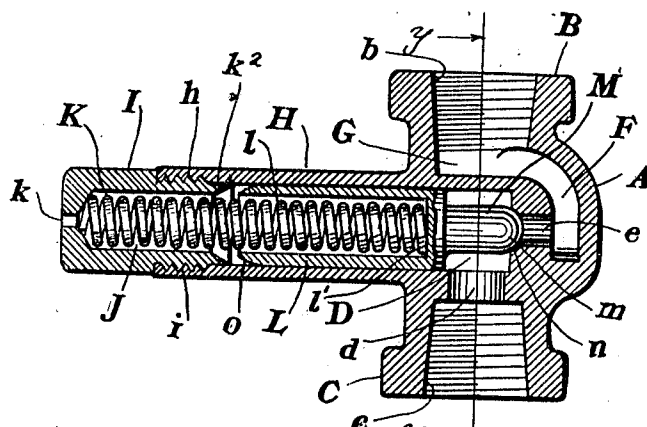


Fig. 3

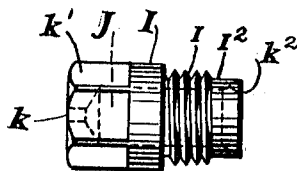


Fig. 5

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UNITED STATES PATENT OFFICE.

ALBERT J. DRONSFIELD, OF PROVIDENCE, RHODE ISLAND.

PRESSURE-CONTROLLING DEVICE.

1,020,641.

Specification of Letters Patent.

Patented Mar. 19, 1912.

Original application filed December 27, 1910, Serial No. 599,465. Divided and this application filed April 13, 1911. Serial No. 620,780.

To all whom it may concern:

Be it known that I, ALBERT J. DRONSFIELD, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Pressure-Controlling Devices, of which the following is a specification.

My invention relates to a pressure controlling device or valve adapted particularly for controlling the flow of a fluid or air in apparatus or systems wherein it is desired to raise, lower, start, stop, or otherwise modify or maintain the flow of the fluid under pressure, and is a division of my pending United States patent application Serial No. 599,465 filed December 27, 1910.

The essential objects of my invention are to render the device automatic in action by the pressure of air or fluid or liquid passing therethrough; to adjustably control the action of the device to cut off or admit the flow of the fluid at any predetermined degree of pressure; to prevent any leakage of the operating liquid or fluid which would build up a back pressure behind the piston; and to render the structure inexpensive to construct, and simple and efficient in operation.

To the above ends essentially my invention consists in such novel parts and arrangement and combination of parts, as fall within the scope of the appended claims.

In the accompanying drawings which form a part of this specification and in which like reference characters indicate like parts throughout the views, Figures 1 and 2 are side and end elevations respectively of my novel controlling device, Figs. 3 and 4, sections respectively on lines *x x* and *y y* of Figs. 2 and 3, and Fig. 5 a detail side elevation of the valve cap.

My device comprises a case A provided with vertically disposed tubular extensions B and C in alinement with each other to receive the ends of the pipes through which the operating fluid passes and provided respectively with interior screw threads *b* and *c* adapted to engage the ends of such pipes. The casing is provided with a central chamber D communicating through an opening *d* with the extension C and communicating through an opening *e*, at right angles to the opening *d*, with a passage F leading to a

chamber G in the upper extension B. The case A is provided with a horizontal extension or cylinder H provided with a central piston chamber constituting a part of chamber D. The outer end of the cylinder is provided with internal threads *h* engaging external threads *i* upon the reduced forward portion *i*² of a plug or cap I provided with an opening J in which is seated the outer end of a helical spring K. A central hole *k* in the end of the plug I opens into the chamber or opening J to form a free vent for the piston chamber. The exterior of the plug I is hexagonal as at *k*¹ to facilitate the use of a wrench. The forward end of the reduced portion *i*² is internally beveled as at *k*².

Slidably mounted in the chamber D is a piston L provided with a counterbored chamber *l* to receive the inner portion of the spring K whose inner extremity presses against the inner face *l*¹ of the piston L. Integral with the forward end of the piston L is a head M of reduced diameter provided with a rounded or hemispherical end, *m*, adapted to abut against a conical seat *n* in the case A concentric with the passage *e* and adapted to close the same. The rear end of the piston L is provided with an external bevel or rounded portion *o* adapted to engage the beveled end *k*² of the plug I. When thus engaged the bevel *k*² forms a stop for the outward travel of the piston and also cuts off the passage of any fluid that may travel along the exterior of the piston. The spring K normally presses the head M into the seat *n*. The strength of this spring is determined by the degree of fluid pressure which may be desired to operate the valve.

The operation of my device is as follows. The fluid passes upwardly through the inlet or extension C and the opening *d* into the chamber D where its advance is cut off by the end *m* of the piston, held in its valve seat *n* by the spring K thereby closing the opening *e*. At a certain determined pressure the fluid in the chamber D overcomes the tension of the spring K and moves the piston outwardly until its end *o* engages the surface *k*² of the plug I thereby withdrawing the head M from its seat and allowing the fluid to traverse opening *e* and passage F into chamber G and out of the outlet extension B. Immediately upon the opening

of passage *e* the pressure in chamber *G* is equal to the pressure in the inlet extension *C*. Immediately upon the falling of the fluid pressure in said extension the piston head under pressure of the spring closes the opening *e*, shutting off the further flow of fluid through the passage *F* and thus preventing continuation of the action of the fluid at any degree less than the pressure determined as the minimum. The fluid is admitted to the upper chamber or outlet at and above the pressure at which the valve is opened, so that the pressure therein equals the pressure in the inlet. Not only is an equal pressure maintained in the inlet and outlet, but this equalization of pressure occurs immediately upon the opening of the agent, *m*. This equalization of pressure is because the force of the fluid acts on the valve piston in a direction other than its normal course. The pressure acting upon the closing agent is independent of the pressure directed in a normal course into the chamber or outlet, and said agent is not reacted on by the fluid in said chamber, but is controlled by a yielding device of desired strength normally tending to close the passage. Reaction of the fluid is prevented because at no time does the fluid in the chamber *G* have access to the rear of the closing agent *L*.

The avoidance of any differential in pressure distinguishes the present valve from check valves, flap valves, and other valve structures. In the latter types of valves the pressure on the discharge side acting upon the rear face of the valve, plus the force or agency tending to close the valve, equals the pressure in the inlet and upon the receiving face of the valve. That is to say, the fluid pressure on the rear face is less than the pressure upon the receiving face measured by the degree of pressure exerted by the closing agent.

My valve is of particular utility in liquid and other discharging systems, and in oxy-acetylene welding torches wherein the gas must be maintained at a predetermined pressure to prevent the flame from running back and exploding the tank; also in oil burners for the generation of steam wherein the oil is drawn from a supply pipe, atomized, and discharged into a furnace by a jet of air or steam. In such systems or apparatus my piston will open at a determined pressure from the source of supply admit the fluid to the discharging device at the same pressure as that maintained in the source of supply, and automatically closing when, the

liquid or fluid in the source of supply falls below the determined pressure, and preventing the flow from the source of supply to the discharging device until the determined or greater pressure is exerted.

What I claim is,—

1. As a new article of manufacture, a pressure controlling device comprising a casing having an inlet and an outlet and a passage uniting said inlet and outlet and a reciprocating closing agent in the casing controlling said passage and adapted to be moved in one direction only by fluid pressure, said closing agent being wholly exposed to the pressure in the inlet to open, yielding means which the action of the fluid pressure does not supplement in closing and single means for limiting the movement of the piston and at the same time preventing escape of fluid exteriorly past the piston.

2. As a new article of manufacture, a pressure controlling device comprising a casing having an inlet and an outlet and a passage uniting said inlet and outlet, a reciprocating closing agent in the casing controlling said passage and adapted to be moved in one direction only by fluid pressure, said closing agent being wholly exposed solely and directly to the pressure in the inlet to open, spring means acting on said closing agent for moving it in the opposite direction said spring means being not supplemented by the fluid pressure in closing of the valve, and single means for limiting the movement of the piston and at the same time preventing escape of fluid exteriorly past the piston.

3. As a new article of manufacture, a pressure controlling device comprising a casing having a lateral extension, a plug closing the outer end of said extension and having a vent hole, said casing being provided with an outlet and with an inlet and a piston chamber extending into said extension and opening into the inlet and outlet through openings, a piston mounted in said extension with its rear end normally interspaced from the forward end of said plug, a spring in the plug and piston chamber pressing against the piston to close the same, said piston being exposed to pressure upon the inlet side to be moved only in one direction by such pressure.

In testimony whereof I have affixed my signature in presence of two witnesses.

ALBERT J. DRONSFIELD.

Witnesses:

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GEORGE N. McLAUGHLIN.