E. J. FRIES & T. F. DICKEY.

FLUID LINE PRESSURE REGULATING VALVE.

APPLICATION FILED APR. 4, 1918.

1,298,195. Patented Mar. 25, 1919.

Fig. 1.

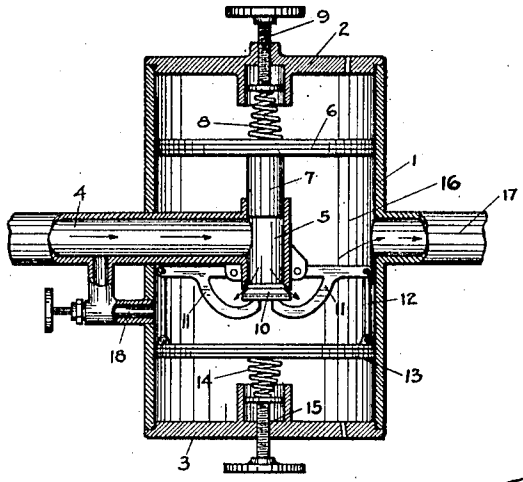
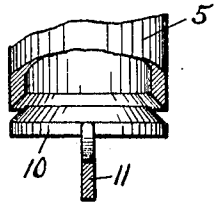


Fig. 2.



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UNITED STATES PATENT OFFICE.

EDWARD J. FRIES AND THOMAS F. DICKEY, OF TOLEDO, OHIO.

FLUID-LINE-PRESSURE-REGULATING VALVE.

1,298,195. Specification of Letters Patent. Patented Mar. 25, 1919.

Application filed April 4, 1918. Serial No. 226,632.

To all whom it may concern:

Be it known that we, EDWARD J. FRIES and THOMAS F. DICKEY, citizens of the United States, and residents of Toledo, in the county of Lucas and State of Ohio, have invented a certain new and useful Fluid-Line-Pressure-Regulating Valve; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to valves for fluid pressure lines, and particularly to a safety and pressure regulating valve of this type.

The primary object of our invention is the provision of a valve of the class described, which is provided with improved means for regulating the pressure of the gas or other fluid at the point of use relative to the line pressure.

A further object of the invention is the provision of improved means in connection with gas lines or the like, which is automatically operable to close such gas line when the pressure has been reduced a predetermined extent therein.

The invention is fully described in the following specification, and while, in its broader aspect, it is capable of embodiment in numerous forms, a preferred embodiment thereof is illustrated in the accompanying drawings, in which—

Figure 1 is a central sectional view of a valve embodying the invention, with parts in full, and Fig. 2 is an enlarged view of a portion thereof, with parts broken away.

Referring to the drawings, 1 designates a case, in the present instance, of cylindrical form, which is closed at its ends by the removable end members 2 and 3. A fluid inlet pipe 4 extends into one side of the case 1 substantially midway of its ends and terminates at its inner end adjacent to the center of the case in a T form of head 5, the arms of which are disposed longitudinally of the case and open therein. A plunger 6 is mounted in one end portion of the case 1 for movements longitudinally thereof and has a stem 7 projecting axially therefrom and fitting into the adjacent end of the head 5 for reciprocatory movements therein and is of sufficient length to extend across the pipe 4 and into the opposite end portion of the head 5 to serve as a valve for closing the outlet end of said pipe when the plunger 6 is moved toward the center of the case. A coiled compression spring 8 bears against the outer side of the plunger 6 to urge a valve closing movement thereof and the outer end of this spring has its thrust against a tension adjusting screw 9, that is threaded through the end 2. The valve 7 is maintained in open position by fluid pressure against the inner side of the plunger 6, as hereinafter described.

The fluid outlet end of the head 5 is adapted to be closed by a valve 10 seating thereagainst, and this valve is carried, in the present instance, by two levers 11, which are pivoted to and project radially from the head 5 at opposite sides thereof and have arms which engage under the valve 10 in supporting relation thereto. The outer end of each lever 11 is connected by a rod 12 to the adjacent edge portion of a plunger 13, which is mounted in the associated end of the case 1 and is normally urged to move toward the valve by a coiled compression spring 14, which is disposed between the outer side of the plunger and an adjusting screw 15, that is threaded through the case end 3. When the plunger 13 is in normal position the levers 11, 11 are in position to permit the valve 10 to stand open and when a sufficient quantity of gas has entered the chamber 16 of the case between the plungers 6 and 13 to overcome the tension of the spring 14, the plunger 13 will be forced outward and move the levers 11, 11 to close the valve 10, thus stopping the flow of fluid into the chamber 16 from the line 4.

An outlet conduit 17 leads from the chamber 16 and a valve controlled by gas 18 is provided between the supply line 4 and the chamber 16.

The operation of the invention is as follows: As the pressure in the chamber 16 becomes reduced by the use of the gas therefrom the plunger 13 will move inward under the influence of the spring 14 and effect an opening of the valve 10, thus permitting fluid from the line 4 to enter said chamber. When a sufficient quantity of gas has entered the chamber for the pressure thereof to overcome the tension of the spring 14 the plunger 13 is moved outward and the valve 10 is closed. In this manner the pressure of the gas in the chamber 16 is regulated to a nicety

and may be reduced to any desired extent from the pressure of the gas in the supply line 4. Should the gas in the supply line be shut off for any reason the plunger 6 will be permitted to move inward under the tension of the spring 8, due to the absence of pressure within the chamber 16, and will move the stem 7 into the head 5 a sufficient distance to close the communication between said head and the supply line 4. When the pressure has again been turned into the supply line the stem or valve 7 may be opened by opening the communication between the supply line and chamber 16 through the by-pass 18 so that pressure is admitted to said chamber to act against the plunger 6 and move it outward against the tension of the spring 8.

We wish it understood that our invention is not limited to any specific construction, arrangement or form of the parts, except in so far as such limitations are specified in the claims.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a device of the class described, a casing forming a chamber, a supply-pipe extending into said chamber through a side thereof and terminating adjacent to the center of the chamber with its discharge opening lengthwise of the chamber, a valve for closing said discharge opening, and means embodying a diaphragm and connecting levers normally permitting an opening of said valve under line pressure and operable by a predetermined fluid pressure in said chamber to effect a closing of said valve, and an outlet pipe for said chamber.

2. In a fluid pressure pipe line, means forming a chamber having communication with said line, a plunger movably mounted in said chamber and having a valve-stem adapted to enter and close said line, said plunger and stem being held in open position by fluid pressure in said chamber, and adjustable means yieldingly urging a movement of said plunger and stem to close the pipe line.

3. In a device of the class described, means forming a chamber, a fluid pressure supply line entering said chamber and having a discharge head of T-form at the central portion of said chamber, a plunger mounted in said chamber and having a valve-stem movable in said discharge head to close the supply line, said plunger and stem being maintained in open position by fluid pressure in said chamber, and adjustable means for imparting a closing movement to said plunger and stem when the pressure within said chamber has been reduced a predetermined extent.

4. In a device of the class described, means forming a chamber, a fluid pressure supply line entering said chamber and having its discharge into the chamber lengthwise thereof, a valve within the chamber for closing said line and adapted to open under internal line pressure, a plunger mounted in said chamber and normally movable in one direction lengthwise thereof and movable in the opposite direction by internal pressure from said line, levers connecting said valve and plunger and operable to communicate a closing movement to the valve from a fluid pressure actuated movement of said plunger and adapted to permit an opening of the valve when the plunger is moved in the opposite direction, the fulcrum pivots of said levers being fixed relative to said means.

In testimony whereof we have hereunto signed our names to this specification.

EDW. J. FRIES.
THOMAS F. DICKEY.

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