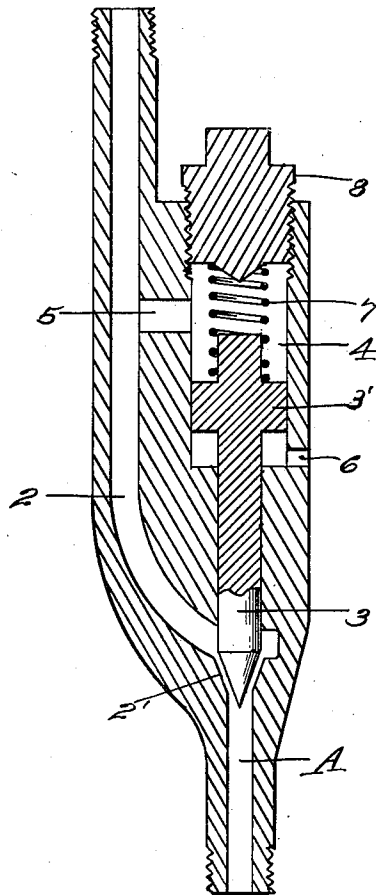


B. I. HOXSIE.
AUTOMATIC PRESSURE REDUCING VALVE.
APPLICATION FILED NOV. 10, 1914.

1,173,518.

Patented Feb. 29, 1916.



WITNESSES:

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BEN I. HOXSIE, OF NEVADA CITY, CALIFORNIA.

AUTOMATIC PRESSURE-REDUCING VALVE.

1,173,518.

Specification of Letters Patent.

Patented Feb. 29, 1916.

Application filed November 10, 1914. Serial No. 871,286.

To all whom it may concern:

Be it known that I, BEN I. HOXSIE, a citizen of the United States, residing at Nevada City, in the county of Nevada and State of California, have invented new and useful Improvements in Automatic Pressure-Reducing Valves, of which the following is a specification.

This invention relates to pressure reducing valves, and particularly to an automatic, differential fluid pressure operated needle valve.

The object of the invention is to reduce any high pressure to a lower pressure, and to keep and maintain the lower pressure unvaryingly.

A further object is to provide an automatic valve which is simple and very compact in structure.

The invention consists of the parts and the combination and construction of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which the figure is a longitudinal section through the valve.

The device comprises a body with an inlet or high pressure end A laterally offset from which is a discharge chamber 2 with an intervening ground valve seat 2'. Upon this is adapted to seat a needle valve or shutter 3 having an enlarged body or differential piston part 3' movable in a chamber 4 opening at a duct 5, behind the piston into the low pressure or discharge chamber 2, so that fluid pressure therefrom acts on that side of the piston 3' to move it, toward the seat 2', in opposition to the high pressure on its face. Any back pressure on the inactive face of the piston 3' is eliminated by an open relief or "bleed" port 6 from the chamber 4. The proportion of reduction of pressure is governed entirely by the ratio of the area of the faces of the valve member 3—3' to the high and the low pressure. Reacting against the piston 3' and in chamber 4 is a coil spring 7 the pressure of which is variable by means of a nut 8 mounted in the end of the valve body. This spring acts with the low pressure.

Structurally the valve is very simple and inexpensively manufactured for the reason that the high pressure chamber A, piston chamber 4, seat 2' and the nut threads are all axial and readily cut or formed. The valve is made compact by arranging the discharge chamber 2 parallel and close to the

piston chamber. Thus I have provided a valve including a member with differential areas subject to high and low pressure, and operative by changes of either to open or close, as the case may be, to maintain the predetermined ratio of pressures.

In operation, if it was desired to reduce 100 lbs. pressure entering the valve to 10 lbs. pressure leaving the valve, the desired reduction would be obtained by constructing the valve piston with a diameter as much greater than the diameter of the high pressure entrance, as the reduction requires, working on the idea of reducing 100 lbs. to 10 lbs. As the high pressure enters the valve it forces back the needle valve and enters chamber 4, where pressure is brought to bear upon the piston head, which being of much greater surface in square inches than the high pressure opening, the piston is forced forward and closes the needle valve in its seat, thus excluding the high pressure from chamber 4 until such time when the low pressure is reduced by drawing from the low pressure outlet, when the high pressure forces the needle valve back and enters chamber 4 until the low pressure is raised to its required amount, when it closes the needle valve, thus working automatically. In other words, when the piston head is built in proportion to the high pressure opening to reduce 100 lbs. to 10 lbs., as soon as there is 10 lbs. pressure past the needle valve, the needle valve closes automatically, due to the power of the low pressure upon a greater number of square inches surface than the needle valve contains, where the high pressure has its bearing, and as soon as the low pressure is slightly reduced, the high pressure overcomes the low pressure and forces its way past the needle valve until 10 lbs. pressure has again accumulated in chamber 4 when the valve closes automatically.

Having thus described my invention what I claim and desire to secure by Letters Patent is—

1. In a pressure reducing valve, a body having an inlet at one end with a discharge passage leading from said inlet, a valve seat at the juncture of the inlet and passage, said body having a chamber arranged at one side of the passage and having a duct extending from the passage into the chamber at a point central of the length of the latter, a differential piston having one

- end engageable with the valve seat and having an enlargement operable in said chamber and located in spaced relation to the opposite end of the piston, a coil spring extending across said duct and surrounding said opposite end of the piston and seating at one end on the piston enlargement, and a nut above the upper end of the piston in spaced relation thereto and threaded into the outer end of the chamber and engaging the opposite end of the spring, said discharge passage extending beyond the chamber to one side of and spaced from the chamber.
2. In a pressure reducing valve, a body having an inlet at one end with a discharge passage leading from said inlet, a valve seat at the juncture of the inlet and passage, said body having a chamber arranged at one side of the passage and having a duct extending from the passage into the chamber at a point central of the length of the latter, a differential piston having one end engageable with the valve seat and having an enlargement operable in said chamber, said discharge passage extending beyond the outer end of the chamber in spaced relation to and independent of the chamber, and means for closing the outer end of the chamber whereby to have access to the chamber independent of the discharge passage.
- In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.
- BEN I. HOXSIE.
- Witnesses:
CHARLES E. McLEAN,
E. D. BEEDLE.