No. 697,702. Patented Apr. 15, 1902.

T. J. BUCKLEY & F. E. PLACE.

PRESSURE REGULATOR.

(Application filed Apr. 30, 1901.)

(No Model.)

Fig. 1.

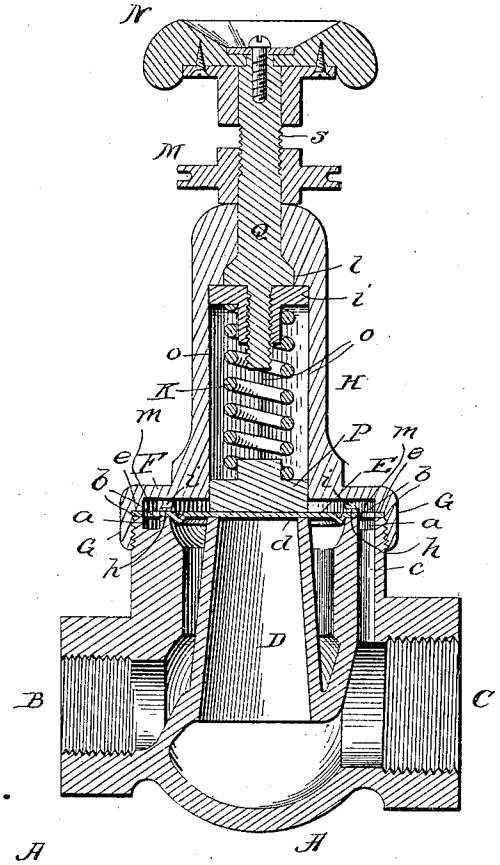


Fig. 2.

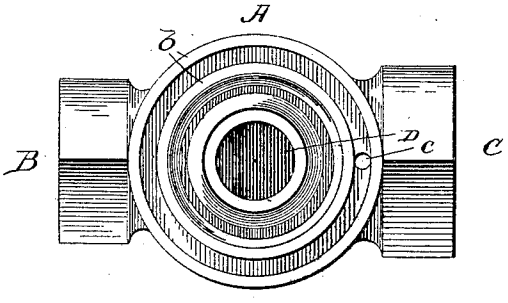
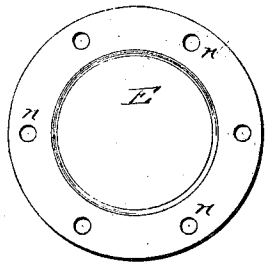


Fig. 3.



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UNITED STATES PATENT OFFICE.

THOMAS J. BUCKLEY AND FREDRICK E. PLACE, OF CHICAGO, ILLINOIS.

PRESSURE-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 697,702, dated April 15, 1902.

Application filed April 30, 1901. Serial No. 58,217. (No model.)

To all whom it may concern:

Be it known that we, THOMAS J. BUCKLEY and FREDRICK E. PLACE, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pressure-Regulators; 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.

Our invention relates to that class of regulators which are set to maintain a predetermined pressure upon the discharge side of the valve from a varying higher pressure on the inlet side of the valve.

Referring to the accompanying drawings, Figure 1 is a vertical section of the regulator; Fig. 2, a top view of the body of the valve with the cap and diaphragm removed, and Fig. 3 is a view of the diaphragm.

Like letters of reference indicate the same parts throughout the several figures, in which—

A is the shell of the valve, having the inlet B and outlet C. A cylindrical partition D is located between the inlet and outlet of the shell and extends nearly to the top of the shell A. The upper end of cylindrical partition is open and forms a seat *d* for the diaphragm E, which is moved by the varying pressure upon each side, causing the diaphragm to act as a valve to close more or less the opening between it and the seat *d*. The upper part of the case is faced off and is provided with a circular channel *a*, forming two circular seats *b b*, upon which the outer edge of the diaphragm is held by the cap F.

c is a passage connecting the discharge side of the valve with the channel *a*.

F is the cap, provided with the flange G, which is screw-threaded in its inner side to fasten it to the casing. A shoulder *e* is formed on the inner side of the cap next to the flange G, and another flange *h* on the cap a short distance inside of flange, which forms between them a channel *m*. On screwing the cap on the shell the diaphragm is clamped between the shoulder *e*, the flange *h*, and shell A. The diaphragm being of copper, a steam-tight joint is made between the cap and shell.

To permit the back pressure to act on the upper side of the diaphragm, a series of perforations *n n* are made through the same, which connects the two channels *a* and *m*. A series of perforations *i* are also made in the flange *h*. Thus the back pressure can pass through passage *c* into the channels *a m* and through flange *h* and there act on the diaphragm.

Projecting from the cap F is a hollow neck H, provided with four longitudinal guide-grooves *o o* for the nut I. Upon the diaphragm is a plate P, provided with an extension, around which one end of the spiral spring K is placed. The other end of the spring is placed around a similar extension on the bottom of the nut I. This arrangement keeps the spring in place.

A stem Q on its outer end is provided with a handle N, secured in any well-known manner, and below this handle the stem is screw-threaded, as S, for the jam-nut M. The other end of the stem passes into and through the nut I, that portion being screw-threaded. The stem is also provided with a collar *l*, its conical face being in contact with a similar face on the inner and upper part of the neck, whereby a steam-tight joint is made. The regulator is set for a given pressure by turning the jam-nut up on the stem, thus permitting the stem to turn. This causes the nut I to reciprocate in the neck to increase or decrease the pressure of the spring, which directly acts on the plate P. When the proper spring-pressure is obtained, the jam-nut is turned down on the neck, thereby preventing the turning of the stem and nut.

The high-pressure steam is admitted in the inlet B and acts on the under side of the diaphragm, raises it, and passes through the cylindrical extension D and outlet C. Here the pressure also goes through the passage *c*, into the channel *a*, through the many perforations in the diaphragm, into channel *m*, and through the perforations in the flange *h*. This pressure is assisted by the spring to close the opening in the cylindrical partition by forcing the diaphragm to close the opening against the high pressure and the diaphragm.

It might be well to state here that in regulators generally the reduced pressure works from the bottom side of diaphragm with

screw and spiral spring on top, whereas in our device the reduced pressure works from the top of diaphragm and merely equalizing the pressure, which reduces the liability of diaphragm breaking, and whereby disperses with many parts which are necessary to get the same results in other regulators now in existence.

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

1. In a pressure-regulator, the combination of the shell provided with a channel in its upper surface, a passage leading into it from the discharge side of the same, and a cylindrical partition with a diaphragm for controlling the opening in said partition, and also provided with openings registering with said channels whereby the reduced pressure controls from the top the movement of the diaphragm, substantially as described.

2. In a pressure-regulator, the combination with the shell and cap for the same provided with adjoining channels separated by a diaphragm, said diaphragm being perforated between the channels, one side of the channel in the cap being also perforated, a passage leading from the discharge side of the casing into said channels, and means for admitting fluid under the diaphragm substantially as described.

3. In a pressure-regulator, the combination of a casing provided with an inlet and outlet ports, a channel in the upper surface, a passage leading from the outlet into the same with a diaphragm, an opening in the shell controlled by the diaphragm, openings in the diaphragm opposite the channels, and a regulating-spring on the back of the diaphragm, substantially as described.

4. In a pressure-regulator, the combination of a casing provided with a channel on its upper surface with a cap having a channel in its under surface, a diaphragm held between the two surfaces formed by the channels, perforations in said diaphragm between the channels and a passage leading from the discharge side of the regulator through the channels to the back of the diaphragm, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

THOMAS J. BUCKLEY.
FREDRICK E. PLACE.

Witnesses:
EDMUND A. GRAY,
WILLIAM GRAY.