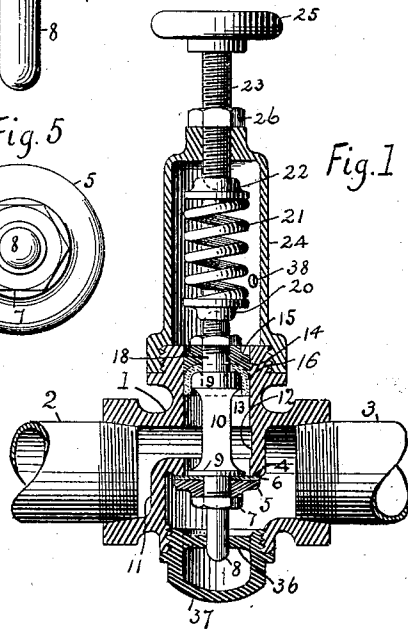
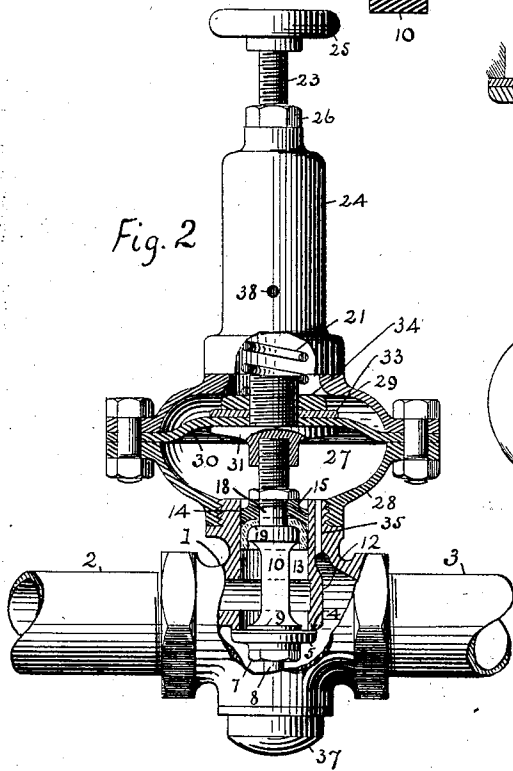
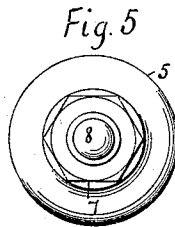
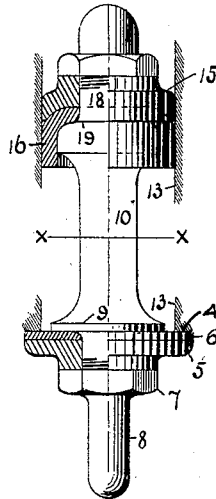
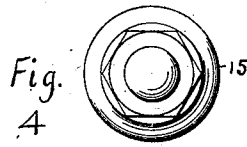


J. L. CHAPMAN.  
FLUID PRESSURE REGULATING VALVE.

APPLICATION FILED APR. 4, 1902.

NO MODEL.



Witnesses  
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# UNITED STATES PATENT OFFICE.

JOSEPH L. CHAPMAN, OF HADDONFIELD, NEW JERSEY, ASSIGNOR TO WATSON AND McDANIEL COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

## FLUID-PRESSURE-REGULATING VALVE.

SPECIFICATION forming part of Letters Patent No. 718,694, dated January 20, 1903.

Application filed April 4, 1902. Serial No. 101,307. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH L. CHAPMAN, a citizen of the United States, residing at Haddonfield, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Fluid-Pressure-Regulating Valves, of which the following is a specification.

My invention relates to reducing-valves for the control of fluid-pressure. By means of their use a high inlet-pressure may be reduced to a lower delivery-pressure. In household, factory, and office buildings where pipes are run to the various rooms the strain on the pipes, if carrying high pressure, causes leakages, expensive repairs, and the liability of heavy damage in case of flooding. The water-hammer under high pressure is very damaging to the pipe-joints whenever the water is suddenly shut off. A flow of water sufficient to supply all of the attachments of a building and no more with an even and steady flow will save much wasting and splashing, and where the water is served through a meter a great saving in charges will result, as the valve can be set to regulate a required supply.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a central vertical section of the valve and case as arranged for very high pressures. Fig. 2 is in part an elevation and in part a section of the valve as arranged for lower pressures. Fig. 3 is an enlarged view of the valve partly in elevation and partly in section. Fig. 4 is an upper end view. Fig. 5 is a lower end view. Fig. 6 is a section on line *x x*, Fig. 3.

Similar figures of reference indicate similar parts throughout the views.

By reference to Figs. 1, 2 it will be seen there is a valve-case 1, having an inlet or supply pipe 2 and an outlet or delivery pipe 3, and within the case a flat seat 4 is formed, under which seats a soft disk 6, of leather or other suitable material, forming a compressible seat for the valve 5, to which it is removably secured by nut 7 on stem 8 against plate 9, formed on the rectangular part 10 of the valve-stem. This enables the renewal of the soft disk and insures a tight valve. The case

has partitions 11 12, which separate the pipes 2 3. Water-passage 13 is bored between the partitions, and thereunder the valve already described controls the water-passage. Above passage 13 is a cylindrical part 14, within which is a piston 15, surrounding part 18 of the stem and provided on its under side with a soft cupped packing 16, of leather or similar material. Cup 16 rests upon a shoulder 19, formed on the stem, and the lower edges of the cup pass below the shoulder on which it rests, in order to allow pressure to bear within its lower edges to press them to the cylinder and prevent leakage. Piston 15 is formed cup-shaped on its under side, so that it may press snugly on the cup. Above piston 15 a spring-seat 20 is supported on the stem and carries a spring 21. Above spring 21 is mounted a seat 22, receiving a screw 23, which is screwed through the top of cover-case 24, the cover being screwed to case 1 at its lower end. A hand-wheel 25 is the means employed to increase or decrease the tension on spring 21, and thereby overcome the equilibrium of valve 5 and piston 15 and open valve 5, and whenever the pressure under valve 5 exceeds the pressure of spring 21 the valve will close, and this is the means to regulate the delivery-pressure beyond the valve, and a nut 26 locks the adjustment.

The mechanism just described is my arrangement of the valve for very high pressures. For low pressures I interpose between case 1 and cover 24 a chamber 27, composed of a lower part 28 and an upper part 29, and therein place a diaphragm 30, made of a flexible material, and secure it between a lower plate 31, secured to the valve-stem and having an upward projection passing through the diaphragm and an upper plate 33, with a nut 34 for securing the parts to the diaphragm. Above the nut 34 is placed spring 21 and seat, and these parts are operated, as already described, for the valve as when arranged for high pressure. A passage 35, formed in case 1, permits pressure to pass to chamber 27 to press diaphragm 30 upward against spring 21. In both instances the valve-stem 8 is guided through a bar 36 in cap-nut 37, the cap being screwed to case 1 and being of sufficient diameter to admit the valves to the case. As

the valve is balanced the adjustment of the spring overcomes the balance-pressure on the inlet side and holds the valve open until the pressure on the outlet or delivery side accumulates sufficiently to overcome the pressure exerted by the spring, when the valve will close. By increasing the tension on the spring the pressure will be correspondingly increased on the delivery side of the valve, and vice versa. An air-hole 38 is formed in cover-case 24.

I claim—

1. In a fluid-pressure regulator, a case, an inlet thereto, an outlet therefrom, a disk valve having a soft face, and a cupped piston having a soft packing, the piston and valve being fixed to a stem having guiding means below the disk valve, and means coacting therewith, to limit the flow past the disk valve.

2. In a fluid-pressure regulator, a case, an inlet thereto and an outlet therefrom, a valve and a piston connected and coacting in the case, one being a flat disk with a soft disk face, and one being a cupped piston with a soft packing, a guide for the connection of the valve and piston and located below the disk valve, and means connected to and controlling the valve and piston in manner to limit the pressure of the fluid passing the disk valve.

3. In a fluid-pressure regulator, a case having a fluid-entrance and a fluid-exit, a disk valve having a soft face and located to intercept or permit the flow, and removably connected to a piston on the same stem, and adapted to balance the pressure exerted on the disk valve, a lower guide for the stem, and means connected to the valve and piston to counteract a predetermined pressure under the valve and permit any excess of such predetermined pressure to close the disk valve and the flow to the exit aforesaid.

4. In a fluid-pressure regulator, a case having a fluid entrance and exit, a soft-faced disk valve located to intercept or permit the flow, a piston removably connected to the disk valve on a common stem and adapted to balance the pressure on the disk valve, a guide at the lower end of the stem, and means connected to the valve-stem to counteract a predetermined pressure under the disk valve, and permit any excess of such predetermined pressure to close the disk valve and the flow to the exit aforesaid.

5. In a fluid-pressure regulator, a case, a fluid-entrance thereto, a fluid-exit therefrom, a soft-faced disk valve and a piston coacting to intercept the exit, removably joined to each other, and put in equilibrium by the inflowing pressure, a spring arranged and adapted to press upon the valve and piston and open the fluid-passage against pressure on the delivery side, and means for the adjustment of the spring to regulate the amount of flowing, and a guide below the lower valve.

6. In a fluid-pressure regulator, a case, a fluid-entrance thereto, a fluid-exit therefrom, a soft-faced disk valve and a cupped piston coacting to intercept the exit, removably joined to each other by a common stem guided at its lower end, a chamber above the case, a flexible diaphragm in the chamber, a fluid-passage from the case to the chamber and under the diaphragm, a spring adapted to press down the diaphragm and the valve, and means for its adjustment.

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

JOSEPH L. CHAPMAN.

Witnesses:

RANSOM C. WRIGHT,  
WILLIAM C. STOEVER.