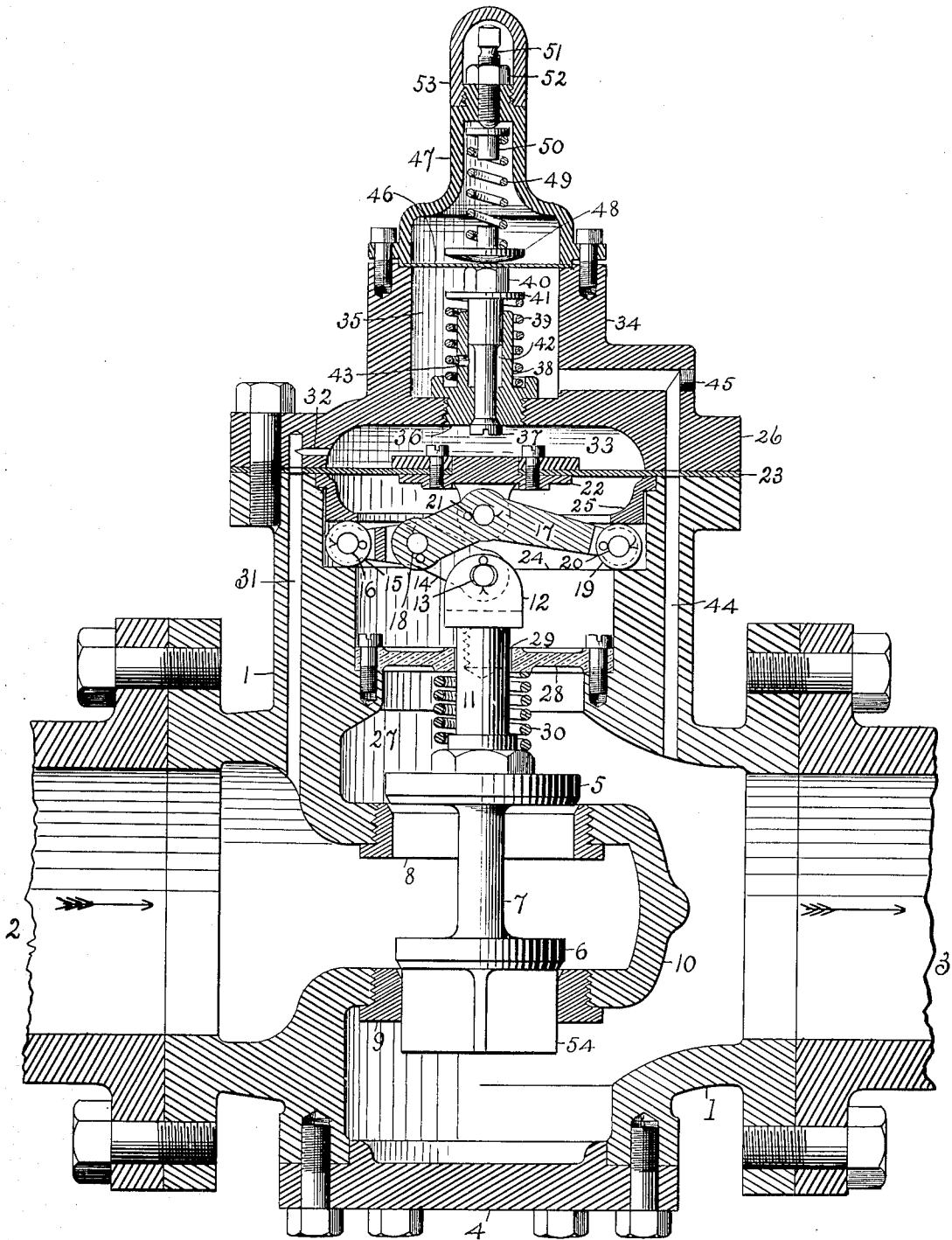


F. L. JAHN.
 FLUID PRESSURE REGULATOR.
 APPLICATION FILED JAN. 26, 1909.

925,812.

Patented June 22, 1909.



Witnesses.

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UNITED STATES PATENT OFFICE.

FREDERICK L. JAHN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO WATSON & McDANIEL COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

FLUID-PRESSURE REGULATOR.

No. 925,812.

Specification of Letters Patent.

Patented June 22, 1909.

Application filed January 26, 1909. Serial No. 474,274.

To all whom it may concern:

Be it known that I, FREDERICK L. JAHN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Fluid-Pressure Regulators; and I 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.

This invention relates to improvements in fluid pressure regulating valves wherein large double unbalanced valves are, by the use of compound levers, controlled by a comparatively small diaphragm, owing to the movement of the diaphragm, by the compounding of the levers, being less than the movement of the valve. Without the compounding a diaphragm of extremely large and practically prohibitive diameter must be employed, to obtain the slight movement which will not disintegrate the diaphragm, and also destroy its necessary sensitive action. To make the valve attachments free from friction the compound levers are mounted on rollers. The contained parts are readily removed from the case without breaking pipe joints, and the case, owing to the use of the small diaphragm is of convenient size. The valve, owing to lessened friction, is very sensitive to fluctuations upon the initial side, and also equally effective in delivering a uniformly predetermined pressure.

The invention is illustrated in the accompanying drawing, the figure being a central vertical section, wherein—

1 is the case, 2 the pressure inlet thereto, 3 the outlet and 4 the bottom cover. The main valve is formed of an upper part 5 and a lower part 6 connected by a neck 7, part 5 having a removable and renewable seat 8, and a similar seat 9 being provided for part 6, the seats being secured in a wall 10. Integral with parts 5, 6, 7 there is a stem 11 with a head 12 having a pin 13 securing it to the bifurcated bent lever 14, which has its opposite end carried by a roller 15 on a pin 16.

Practically midway of lever 14 there is attached a bent lever 17 by a pin 18, with a roller 19 at the outer end of the lever, on a pin 20, and at the central line of the valve lever, 17 is connected by a pin 21 to a plate 22 secured to the high pressure diaphragm 23. Rollers 15, 19 rest upon a seat 24, en-

circling case 1, and are vertically secured by a ring 25 under the diaphragm 23, which in turn is secured by a cover 26. The main valve, part 5, opens into a chamber 27 having a removable top 28 freely surrounding stem 11, and leaving a slight annular space 29 for fluid flowing to the underside of high pressure diaphragm 23. A spring 30 is seated between top 28 and part 5 of the valve to close the valve when not in use.

At the inlet side of the case there is a high pressure passage 31 into cover 26, and a restricted passage 32 into the high pressure chamber 33 over diaphragm 23. Cover 26 has a neck 34 inclosing a low pressure chamber 35 with a seat 36 for the controller valve 37 opening into the high pressure chamber 33, the valve being guided in an upwardly extended neck 38 surrounded by a spring 39 controlled by a nut 40 and a washer 41 to normally hold the controller valve 37 closed. An annular passage 42 around the upward extension of valve 37 is in communication with the low pressure chamber 35 by an opening 43. There is also a low pressure passage 44 from chamber 35 to the delivery side 3 of the valve case, with an exterior exit 45 which may be closed or used, according to the service required by the valve.

Mounted above chamber 35 there is a low pressure diaphragm 46 secured by a casing 47 wherein is a round faced spring seat 48 carrying a spring 49 with an upper seat 50 controlled by a screw 51 having a lock nut 52, the spring 49 being set by screw 51 to determine the pressure to be delivered from the pressure outlet, and a cover 53 incloses screw 51. The part 6 of the valve has rings 54 as guides.

The operation is as follows: High pressure fluid flows in at 2 and into passage 31 and in a restricted degree through passage 32 to the high pressure chamber 33, and as the pressure increases diaphragm 23 will be downwardly deflected, and, owing to the larger diameter of the diaphragm and its excess of pressure owing to its larger area than the valve 5—6 the valve will be closed. Then to adjust the valve to deliver the desired pressure at outlet 3 screw 51 will be turned to compress spring 49, press down low pressure diaphragm 46 against nut 40, compressing spring 39 and opening controller valve 37 to permit the pressure in chamber 33 to escape much faster than it enters

through passage 32, reducing the pressure which downwardly deflects diaphragm 23 to a less degree than the pressure against part 5 of the valve which will then be opened for the passage of a reduced flow to outlet 3, also through annular space 29 under diaphragm 23, through passage 44 to low pressure chamber 35 and against its diaphragm 46. During the continuance of an even low pressure delivery, the parts described will remain inactive, but in the event of an excess of low pressure being delivered it will cause low pressure diaphragm 46 to recede, the controller valve 37 to close and high pressure to again accumulate in chamber 33, causing high pressure diaphragm 23 to close valve 5-6 and restrict the pressure delivery. Controller valve 37 is very sensitive in its actions, and its slightest movement is sufficient to instantly regulate the desired degree of low pressure to be delivered, consequent upon the action of the low pressure diaphragm as subjected to an excess or decrease of low pressure.

25 I claim—

1. In a fluid pressure regulator, a case, an inlet and an outlet therefor for fluid flowing, a double seated unbalanced valve controlling the passage from the inlet to the outlet, and seated against the pressure, renewable seats for the valve, lower guiding means for the valve, an upper stem for the valve and means for its free guidance; a high pressure diaphragm, a system of compound levers connecting the diaphragm and the valve stem, and whereby the movement of the diaphragm is less in degree than the movement of the valve, a high pressure chamber above the high pressure diaphragm, and a diminutive high pressure inlet thereto; a low pressure chamber and a low pressure diaphragm therefor; a controller valve between the high and low pressure chambers, resilient means to depress the low pressure diaphragm and open the controller valve and thereby cause the high pressure diaphragm to open the main valve; and a passage from the outlet to the low pressure chamber and the low pressure diaphragm whereby fluctuations of low

pressure actuate the low pressure diaphragm to cause the opening and closing of the controller valve. 50

2. In a fluid pressure regulator, a case with a high pressure inlet and a low pressure outlet, an unbalanced valve intercepting the passage through the case, and formed of an upper disk part and a lower part with guiding wings; a removable seat for each part; a stem above the upper part, a free guide therefor, and resilient means to normally close the valve; a high pressure diaphragm and a system of compound levers with roller supports connected to the stem and the diaphragm; a high pressure chamber above the high pressure diaphragm, and in communication with the inlet; a low pressure chamber and a low pressure diaphragm above the low pressure chamber, with resilient means for the depression of the diaphragm; a passage between the high pressure and the low pressure chambers, and a controller valve therein with resilient means for its closure; and a passage from the outlet to the low pressure chamber and under its diaphragm whereby fluctuations of low pressure control the movement of the diaphragm to open and close the controller valve. 55 60 65 70 75

3. In a fluid pressure regulator, in combination, a double seated unbalanced valve, a diaphragm actuated by high pressure, a connection from the valve to the diaphragm by which the diaphragm is moved in less degree than the valve; a low pressure diaphragm, resilient means for its depression, a controller valve located between the high pressure and low pressure diaphragms, opened by the depression of the low pressure diaphragm and having resilient means for its closure, and means whereby the low pressure diaphragm is actuated to permit the closing of the controller valve upon an excess accumulation of pressure at the delivery side of the valve. 80 85 90

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

FREDERICK L. JAHN.

Witnesses:

RANSOM C. WRIGHT,
WILLIAM C. STOEVER.