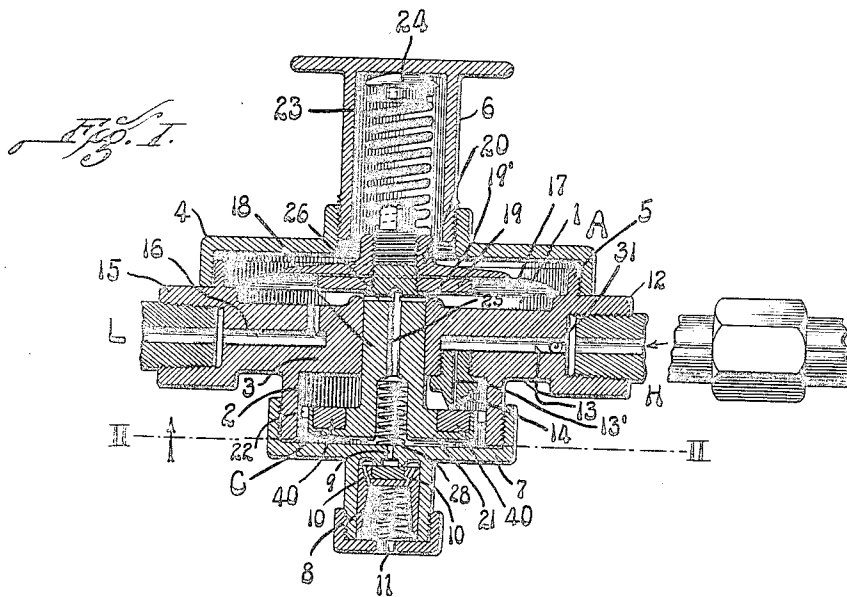
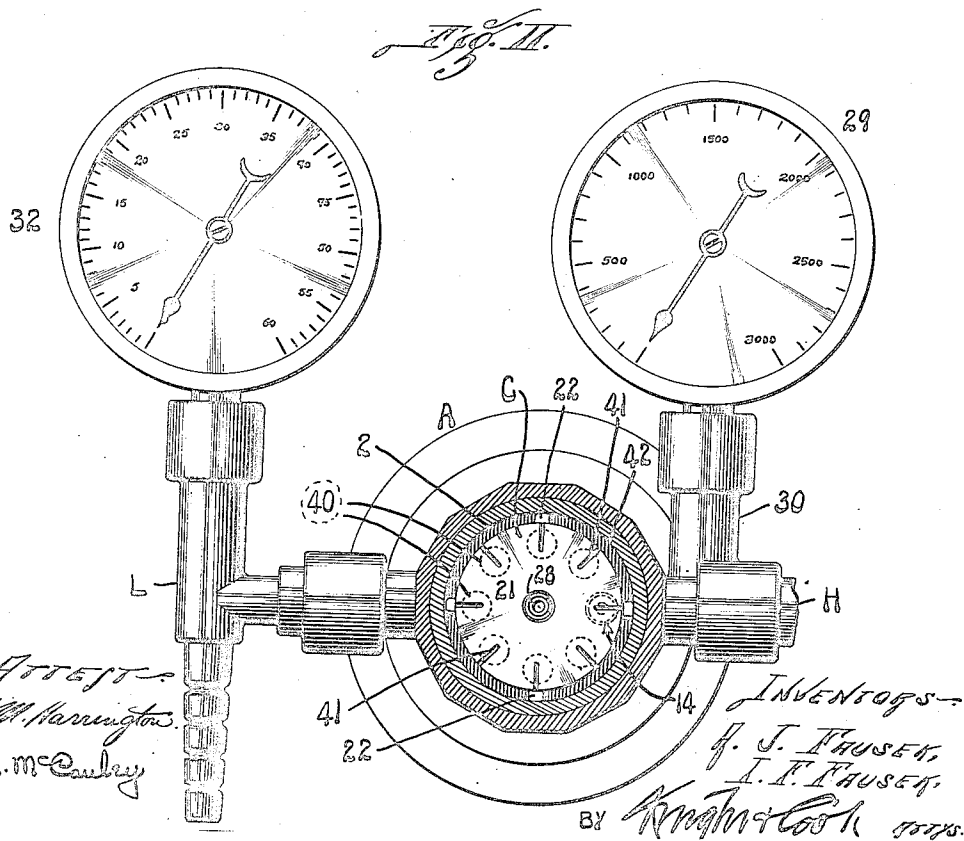


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REDUCING VALVE.
APPLICATION FILED DEC. 2, 1914.

1,214,445.

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REDUCING-VALVE.

1,214,445.

Specification of Letters Patent.

Patented Jan. 30, 1917.

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To all whom it may concern:

Be it known that we, ARTHUR J. FAUSEK and IRVING F. FAUSEK, citizens of the United States of America, residents of the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Reducing-Valves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to improvements in reducing valves, one of the objects being to provide a simple, efficient and inexpensive means for regulating the flow of fluid under pressure.

A more specific object is to produce a valve of this kind having a diaphragm through the medium of which the flow of fluid is regulated, in combination with means for choking or shutting off the fluid supply when the diaphragm becomes ineffective. The last mentioned means is in the nature of a safety device for preventing the escape of fluid under a high degree of pressure when the diaphragm is accidentally ruptured or otherwise rendered ineffective.

Our valve preferably includes a closure member which may be adjusted to prevent leakage when a portion of the closure becomes worn or mutilated, the object being to avoid the necessity of renewing or refinishing the closure member. With this object in view the closure member is preferably so constructed that it includes a plurality of closures any one of which is adapted to cooperate with the closure seat.

The invention also includes certain specific details of construction, and a specific combination and arrangement of parts which will be hereinafter described.

Figure I is a vertical section of our reducing valve. Fig. II is a section taken approximately on line II—II, Fig. I, and includes the high pressure gage and the low pressure gage in elevation.

A designates a casing having a diaphragm chamber 1, a valve chamber 2, and a partition 3 between said chambers. A diaphragm cover 4 is screwed onto an annular flange 5 and an adjustable cap 6 is screwed into said cover 4.

7 designates a cap screwed onto the valve chamber 2, said cap preferably containing a spring pressed safety valve 8 adapted to open when the pressure in the valve cham-

ber 2 rises to a predetermined degree. When the safety valve 8 opens in response to the high pressure in the valve chamber 2, the fluid is permitted to escape through a port 9 in the cap 7, through ports 10 in the safety valve and through a port 11 below the safety valve.

H designates a high pressure conducting pipe screwed into a socket 12 and communicating with an inlet passageway 13 formed in the partition 3. A valve seat member 14, screwed into the partition 3, is provided with a passageway 13' which forms a continuation of the inlet passageway 13 leading to the valve chamber 2.

A low pressure conducting pipe L, screwed into a socket 15, communicates with a discharge passageway 16 formed in the partition 3. The discharge passageway communicates with the diaphragm chamber 1.

17 designates a diaphragm arranged in the diaphragm chamber 1 and having its marginal edge soldered to the housing A so as to prevent the escape of fluid at said marginal edge.

A closure member C, arranged partly within the valve chamber 2 and partly within the diaphragm chamber 1, preferably comprises a stem 18 passing through and slidably fitted in the partition 3, said stem having a threaded upper end which passes through the diaphragm 17.

19 designates a valve member secured to the stem 18 below the diaphragm 17, and 20 designates a flange nut screwed onto the stem 18 above the diaphragm, the latter being clamped between the nut 20 and the valve member 19.

The closure member C also includes a head 21 at the lower end of the stem 18, said head being provided with guide lugs 22 which engage the wall of the valve chamber 2. A spring 23 arranged in the cap 6 lies between the nut 20 and a spring seat 24, the latter being provided with a convex face which engages the adjustable spring cap 6. It will be apparent that the spring cap 6 may be adjusted to vary the degree of pressure on the nut 20 secured to the closure member C.

The spring 6 tends to force the closure member C away from the valve seat member 14, and the fluid pressure in the diaphragm chamber tends to force said closure member into engagement with the valve seat

member 14. Fluid passing from the high pressure pipe H flows through the inlet passageway 13, through the ported valve seat member 14 and into the valve chamber 2, from which it escapes to the diaphragm chamber by passing through a longitudinal passageway 25 and transverse passageways 26 formed in the stem 18. The fluid escapes from the diaphragm chamber through the discharge passageway 16 which communicates with the low pressure pipe L. When the pressure in the diaphragm chamber rises to a predetermined degree, the diaphragm is deflected with the result of compressing the spring 23 and moving the closure member C into engagement with the flat bottom face of the ported valve seat member 14. This closes communication between the inlet and discharge passageways, and when the pressure drops to a predetermined degree the closure member C recedes in response to the pressure of spring 23. The pressure of the spring 23 is opposed by the fluid pressure on the diaphragm, and the closure member reciprocates in response to these counteracting pressures so that the pressure in the low pressure pipe is maintained at the predetermined degree. The downward movements of the closure member C are preferably resisted by a light spring 28 which serves as a shock absorber, said spring being seated upon the bottom wall of the valve chamber 2.

A high pressure gage 29 is attached to a tubular member 30 having a passageway 31 which communicates with the inlet passageway 13.

32 is a low pressure gage secured to the low pressure pipe L.

When the automatic valve device is accidentally rendered ineffective by reason of leakage through or around the diaphragm, the flow of fluid is automatically retarded or shut off. The safety device for accomplishing this includes the valve member 19 carried by the stem 18 and adapted to engage a valve seat 19' on the partition 3. When the diaphragm becomes ineffective, the spring 23 forces the closure member C downwardly, forcing the valve member 19 onto its seat, and at the same time closing the transverse passageways 26 in the stem 18. These passageways 26 normally lie above the partition 3, but when the closure member C is shifted to an abnormal position by the spring 23, said passageways are closed by the partition 3. The parts may be so constructed that a leakage of fluid will occur at the valve member 19 when said valve member is forced onto its seat, or, if desired, they may be accurately finished to produce an absolutely tight closure which will positively prevent the escape of fluid when the diaphragm is accidentally rendered ineffective. If the valve member 19 is

so constructed as to prevent leakage when it engages its seat, it will be necessary, in starting the flow of fluid through the valve, to relieve the pressure of the spring 23 by adjusting the spring cap 6. The valve member 19 will then open in response to the pressure of the counterbalance spring 28.

The closure member C is very frequently thrown into engagement with the ported valve seat member 14, and this closure member is also subjected to the action of the fluid under high pressure escaping from said member 14. Therefore, the portion of the closure member which engages the valve seat member 14 soon becomes worn or mutilated. To avoid the necessity of renewing or refinishing the closure member C, it is preferably constructed to constitute a series of closures, any one of which is adapted to close the valve seat member 14. The closure member C is secured to the diaphragm by the nut 20, and by loosening this nut the closure member may be turned to different positions wherein its annular head 21 lies below the valve seat member 14. Manifestly, different portions of the closure member C are adapted to cooperate with the valve seat member 14, and these different portions are preferably provided with inserts 40 formed of some material that is well adapted to withstand the shocks it receives in service.

In adjusting the valve member C the caps 6 and 7 are removed from the casing; the nut 20 is loosened and the closure member is turned to the desired position. Thereafter the nut 20 is tightened to securely lock the closure member to the diaphragm.

An indicator for showing the position of the closure member C, is formed by a series of notches 41 in the bottom face of the head 21, and a single notch 42 in the circular wall of the housing.

We claim:—

1. A valve comprising a casing having inlet and discharge passageways, and a valve device for controlling communication between said passageways, said valve device including a valve seat member and a closure member movable to present different portions thereof to the same face of said valve seat member.

2. A reducing valve comprising a casing having inlet and discharge passageways, and an automatic valve device including a closure member different portions of which are adapted to open and close communication between said passageways, said closure member being adjustable to different positions wherein only one of said portions is positioned to serve as a closure.

3. A valve comprising a casing having inlet and discharge passageways, and a valve device for closing communication between said passageways, said valve device including a valve seat member and a closure mem-

ber having a series of closures each of which is adapted to contact in common with the same face of said valve seat member.

4. A reducing valve comprising a casing 5 having an inlet passageway and a discharge passageway, and an automatic valve device for opening and closing communication between said passageways, said valve device including a ported abutment member and a 10 closure member, different portions of which are adapted to contact with said ported abutment member to close communication between said passageways, said closure member being adjustable to different positions 15 wherein only one of said portions is adapted to serve as a closure.

5. A reducing valve comprising a casing having inlet and discharge passageways, a diaphragm secured to said casing, a closure 20 member having a plurality of closure elements each of which is adapted to close communication between said passageways, said closure member being adjustable to substitute one of said closure elements for another, and means for securing said closure 25 member to said diaphragm so as to maintain any one of said closure elements in its operative position.

6. A reducing valve comprising a casing 30 having inlet and discharge passageways, a diaphragm secured to said casing, a rotatable closure member having a plurality of closure elements arranged about its axis, each of said closure elements being adapted 35 to close communication between said passageways, said closure member being adjustable to substitute one of said closure elements for another, and means for securing said closure member to said diaphragm so 40 as to maintain any one of said closure elements in its operative position.

7. A valve comprising a casing having inlet and discharge passageways, a valve device for closing communication between said 45 passageways, said valve device including a valve seat member and a closure member having a series of closures each of which is adapted to contact in common with the same face of said valve seat member, and

an indicator denoting the position of said 50 closures.

8. A reducing valve comprising a casing having an inlet passageway and a discharge passageway, an automatic valve device for opening and closing communication between 55 said passageways, said valve device including a ported abutment member and a closure member, different portions of which are adapted to contact with said ported abutment member to close communication between 60 said passageways, said closure member being adjustable to different positions wherein only one of said portions is adapted to serve as a closure, and an indicator for showing the position of said closure member 65 with respect to said ported abutment member.

9. A reducing valve comprising a casing having a partition, a diaphragm chamber and a valve chamber at opposite sides of said 70 partition, said casing also having an inlet passageway leading to said valve chamber and a discharge passageway leading from said diaphragm chamber, a diaphragm operable in response to fluid pressure in said 75 diaphragm chamber, a valve device operable in response to movements of said diaphragm, said valve device including a closure member, in the valve chamber, adapted to close 80 said inlet passageway, a stem passing through said partition member and connecting said closure member to said diaphragm, said stem being provided with a passageway which communicates with both of said 85 chambers and which terminates at a point adjacent to said partition, said valve device being movable to an abnormal position wherein the closure member occupies its open position and the passageway in said stem is closed by said partition member, and 90 a spring tending to move said valve device to said abnormal position.

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In the presence of—
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A. J. McCAULEY.