Aug. 16, 1932. E. J. LATTNER 1,871,535

VALVE

Filed Aug. 15, 1930

FIG. 1.

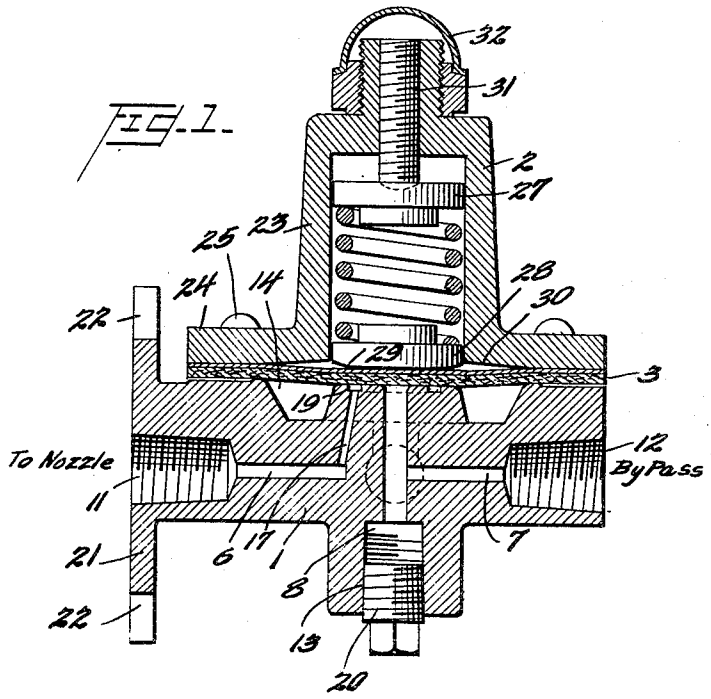


FIG. 3.

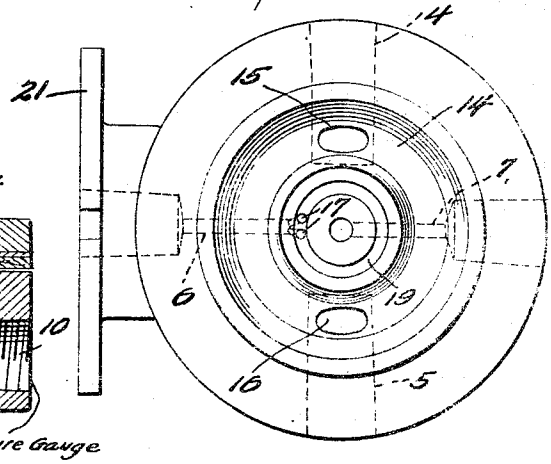
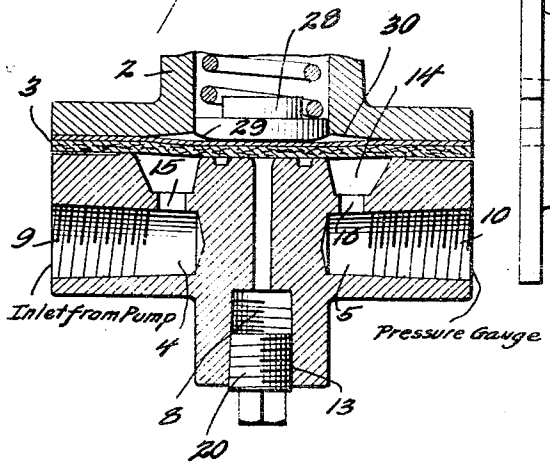


FIG. 2.



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VALVE

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This invention relates to a fluid pressure equalizing valve member and more particularly to valve members for the regulation of the flow of liquid fuel to a burner, especially an oil burner of the pressure atomizing type.

An object of the invention is to produce a valve member which regulates and maintains a predetermined pump pressure and controls the flow of fluid to a nozzle or other device within predetermined limits.

A further object is to produce a valve member which will maintain a constant pressure over a period of time even though the pump should wear and lose its normal pumping capacity, or, in other words, so long as the pump has a capacity equal to the orifice or nozzle capacity.

A further object is to produce a valve member which permits the obtaining of both the above mentioned objects by a readily accessible single adjustment means which duly controls the opening pressure and the by-pass pressure.

A further object is to construct a valve member of such design that any sediment collected will settle in a portion of the device where it will not hinder operation and which may be easily cleaned or flushed by entrance through an aperture normally closed by means of a plug.

Other and further objects and features of novelty will be apparent from the following specification when read in connection with the accompanying drawing in which one embodiment is illustrated by way of example.

In the drawing:

Figure 1 is a section view through the center of the valve;

Figure 2 is a section view of the base portion of the valve taken through the center at right angles to the view shown in Fig. 1; and

Figure 3 is a top plan view of the base portion as it appears after removal of the cap portion and the diaphragm.

Referring to the drawing in detail, the valve is preferably cylindrical and is composed essentially of a base portion 1, a cap portion 2 and a diaphragm 3, each hereinafter further described.

The base portion is constructed with five ports 4, 5, 6, 7 and 8, all of which are threaded at their outer ends as indicated by numerals 9 to 13. Inlet port 4 is adapted for connection to the high pressure side of a pump or other fluid delivery device (not shown) and communicates with a deep annular groove 14 situated in the face of said base portion as indicated at 15.

A pressure gauge (not shown) is attached to the base in the threaded portion 10 of port 5. Port 5 communicates with groove 14 at 16 directly opposite from opening 15.

Port 6 is an outlet port and is adapted for connection to a nozzle or other fluid outlet and communicates at its inner end in two small orifices 17 with the small annular groove 19 concentric with respect to groove 14 and also in the face of the base portion 1.

Port 7 is a by-pass port situated opposite outlet port 6 whereby fluid under excess pressure may be led to the low pressure side of the aforementioned pump, in a manner later to be described. This port communicates with the face of the base section 1 substantially at the center and within the annular grooves 14 and 19.

Port 8 communicates with port 7 as illustrated and is provided with a removable plug 20.

The base portion 1 is provided with a mounting bracket 21 with slots 22. It is obvious that other means may be provided for supporting the device, and that the disclosed means may be an extension from the cap 2 rather than from the base portion 1.

The cap portion 2 comprises a cylindrical casing 23 having an annular flange 24 adapted to be attached to the base portion 1 by means of several machine screws 25. Within the casing, there is a compression spring, preferably of steel, supported between two cylindrical buttons 27 and 28, preferably of brass, adapted for vertical movement within the cap 2. Cap 28 is slightly rounded at its bottom face as at 29 and yieldingly rests upon the diaphragm 3. Likewise the inside edge of said annular flange 24 is rounded as at 30.

Above said button 27 and in contact therewith is a pressure adjusting screw 31 thread-

ed into the top of the casing 2. An acorn nut 32 is provided to cover the screw 31.

The flexible diaphragm 3 is situated between the base 1 and the cap 2 and is held against the face of base 1 by means of the screws 25. It is composed of an upper sheet preferably of metal such as phosphor bronze and a lower sheet of a resilient composition which is impervious or substantially impervious to the fluid passing through the valve.

It should be noted that the diaphragm 3 is a single valve member serving to control flow of fluid through each of the ports 4, 6 and 7 and that the rim portions of the grooves 14 and 19 at the face of the base 1 and the inlet end of the port 7 each serve as valve seats.

When the valve is in operation as in an oil line leading to a nozzle in an oil burner, the oil is forced by means of a pump into the inlet port 4 and passes through the orifice or opening 15 into annular groove 14. The fluid pressure is indicated by a pressure gauge inserted in port 5 in communication with groove 14. When the pressure reaches a predetermined amount, the diaphragm is lifted to a certain extent by the oil which passes over the inside rim of groove 14 into groove 19 from whence it travels through port 6 to the nozzle. If the pressure is in excess of that desired, a portion of the oil will pass over the inside rim of groove 19 into the by-pass port 7 and finally back to the inlet side of the pump or to the storage tank. In this manner a constant pressure is automatically maintained at the nozzle.

Within the pressure range of the pump, any pressure can be obtained at the nozzle by merely adjusting the force of the diaphragm against the face of the base portion 1 by means of adjustment screw 31.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a fluid pressure regulating valve having inlet, outlet and by-pass ports, valve seats associated with said outlet and by-pass ports, a flexible diaphragm constituting a valve member so situated with respect to said ports as to permit flow from said inlet port to said outlet port only while said incoming fluid is at a pressure above a predetermined amount and to permit flow through said by-pass port only while excess pressure conditions prevail, and adjustable spring means for yieldingly holding said diaphragm against said seats.

2. In a fluid pressure regulating valve, in combination, a base portion including an inlet passage communicating with an annular groove in said base portion, an outlet passage communicating with a second annular groove concentrically disposed with respect to said first mentioned groove and a by-pass passage having its inlet end positioned within said annular grooves, and a flexible diaphragm yieldingly positioned against the face of said grooves and said inlet end of said by-pass passage.

3. A valve according to claim 2 in which said diaphragm is composed of two sheets, one of a metallic nature and the other of a resilient nature.

4. A valve according to claim 2 wherein means is provided for yieldingly holding said diaphragm against said grooves and said inlet end of said by-pass passage.

5. A valve according to claim 2 wherein an adjustable compression spring means is provided for holding said diaphragm against said grooves and said by-pass passage.

6. A fluid pressure regulating valve comprising a base portion including inlet, outlet and by-pass ports opening therein, a flexible diaphragm, and a cap portion enclosing adjustable means to yieldingly press said diaphragm against said ports.

7. A fluid pressure regulating valve, comprising a cylindrical base portion having an inlet and an outlet port in communication with grooves in a face of said base portion and a by-pass port also opening into said face of said base portion, a flexible diaphragm and a cap member adapted to yieldingly hold said diaphragm against said grooves and said by-pass port.

8. A fluid pressure regulating valve, comprising a base portion having in its upper face two annular concentric grooves and the inner end of a by-pass port, an inlet port in communication with said outer groove and an outlet port in communication with said inner groove, a flexible diaphragm and a cap portion adapted for attachment to said base portion and to hold said diaphragm against the said upper face of said base portion.

9. A fluid pressure regulating valve, comprising a base portion having in its upper face an annular groove in communication with an inlet port, a second annular groove within said first mentioned groove in communication with an outlet port, of less capacity than said first mentioned groove, and the inlet end of a by-pass port, a flexible diaphragm including a sheet of resilient material and a cap portion so positioned as to yieldingly hold said diaphragm against said grooves and said by-pass port.

10. A valve according to claim 9 wherein said cap portion includes an adjustable compression spring.

11. A fluid pressure regulating valve, comprising a base portion, an upper cap portion and a diaphragm therebetween, said base portion including an inlet port and a port for insertion of a pressure gauge both communicating with an annular groove centrally located at the top of said base portion, an outlet port communicating with a second groove concentrically located within said first groove, a by-pass port communicating with the top of said base portion at a point within

said annular grooves, and a cleanout port provided with a plug, communicating with said by-pass port, said cap portion including an annular flange adapted for securing said diaphragm and for attachment to said base portion, and an adjustable compression spring adapted to exert pressure on said diaphragm in a direction tending to maintain said diaphragm in contact with said base portion, said diaphragm including an upper flexible metallic sheet and a lower sheet of an impervious resilient material.

12. In a fluid pressure regulating valve having inlet, outlet and by-pass ports, a boss formed on the base portion of said valve, said by-pass port being disposed centrally of said boss, an annular groove formed in said boss and adapted to surround said by-pass port, said outlet port opening into said groove, valve seating surfaces on said boss surrounding said by-pass port and said groove, a flexible diaphragm adapted to cooperate with said valve seats to close said ports, and adjustable spring means for yieldingly holding said diaphragm against said seats but to allow the diaphragm to flex so as to permit flow through said outlet port only while the incoming fluid is at a pressure above a predetermined amount, and to allow further flexing to permit flow through said centrally located by-pass port beyond a further predetermined pressure.

In testimony whereof I hereunto affix my signature.

EMERT J. LATTNER.