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H. F. RODLER

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PRESSURE EQUALIZING VALVE

Filed May 14, 1926

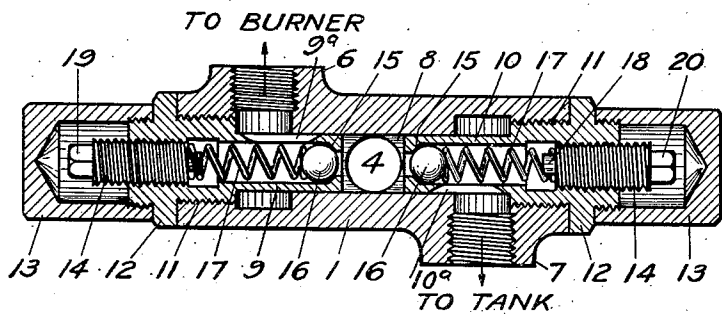


FIG-1

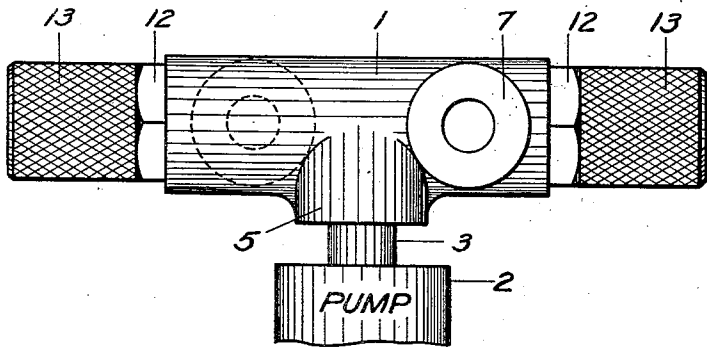


FIG-2

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PRESSURE-EQUALIZING VALVE

Application filed May 14, 1926. Serial No. 109,139.

My present invention relates more especially, though it is not limited to such use, to a valve designed to maintain a constant pressure upon a fuel being delivered to an oil burner apparatus. Broadly, it pertains to a construction capable of permitting a liquid to flow under constant pressure through a fluid carrying pipe. Among the objects of this invention are to provide means whereby fluid flowing from a source of supply to a point of consumption may be delivered at a constant pressure; to provide mechanism whereby fluid flowing from a source of supply to a point of consumption may be delivered at a constant pressure and the excess supply of fluid will be carried back to a storage reservoir; to provide means of the character indicated in which there is provision for adjusting the pressure at which the fluid will be delivered; and such objects, advantages and capabilities as will hereafter appear and as are inherent in the construction disclosed herein. My invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawing and, while I have shown therein what is now considered a preferred form of embodiment of my invention, I desire the same to be understood as illustrative only and not as limiting said invention.

In the drawing annexed hereto and forming a part hereof, Figure 1 is a longitudinal central horizontal section through a device constructed in accordance with my invention, and Figure 2 is an elevation thereof showing the same attached to the delivery end of a pump.

Referring more in detail to this drawing, numeral 1 designates the body portion or section of this device, 2 the delivery end of a pump for supplying oil and 3 a pipe connecting the pump with the inlet opening 4 extending substantially centrally through the boss 5 on the body 1. Other bosses, 6 and 7, are arranged upon opposite sides of the body 1 and have their axes at right angles to the axis of boss 5. These bosses are perforated substantially axially as shown in Figure 1 and provided with threads whereby they may be connected, respectively, to an oil burner

and to a storage tank. While I have shown these bosses as extending in opposite directions, it will of course be understood that they may be extended in any desired direction, either that shown, or in the same direction, or in any intermediate direction.

The body 1 is perforated axially and has a compartment 8 with which the opening 4 communicates. Casing members 9 and 10 slotted, respectively, at 9a and 10a extend longitudinally into the ends of the body member, being seated in the perforation therein and preferably are connected to the body member 1 by screw threading, as shown at 11. These valve members are provided with angular flanges as shown at 12 whereby they may be screwed into place in the body 1. Each casing member is provided with a cap 13 which serves to cover and protect the adjusting screw 14 mounted in each of the casing members 9 and 10.

The casing members 9 and 10 are axially perforated and are provided with seats 15 against which the balls 16 may be pressed by the springs 17 which rest at one end against the balls 16 and at their other end against the inner extremities of the screw-threaded plugs 14. These plugs, as clearly shown in Figure 1, are provided with projections 18 whereby the springs may be held properly positioned. If it is desired to change the pressure at which the valves open to permit the flow of oil therethrough the caps 13 are removed and a wrench is applied to the head 19 or 20, as desired, and the plug is screwed in or out to secure the proper adjustment, which may be tested in any desired way.

In practice, a pipe 3 is screwed into opening 4 and is connected with the pump delivery opening and then pipes leading to the burner and to the storage tank are connected with the openings in the bosses 6 and 7. Now, when the pump is started, oil will be forced through pipe 3 and opening 4 into chamber 8. From here, oil will pass out through the openings in casings 9 and 10 closed by the balls 16, when the pressure in the chamber 8 exceeds the pressure for which the valves are set. For example, if it is desired to feed oil to the burner at a pressure

of two pounds, the plugs 14 are adjusted until the desired pressure is delivered in the burner pipe and then the oil will flow through the valves only when the pressure reaches the predetermined amount and will flow under a constant pressure to the burner so long as a pressure equal to or exceeding that selected is maintained in said chamber. Thus oil is fed to the burner head at a constant pressure and this can not be accomplished when the valves are located a wide distance apart in the independent pipes leading to the burner and to the storage tank.

The return valve, because of the less pressure of its spring 17, moves back away from its seat some distance before the other valve opens, and then, owing to the slot in the side of member 10, there is substantially unrestricted flow of oil to the return pipe while the flow through the other valve remains restricted, since ball 16 has not yet backed away from its seat far enough to permit unrestricted flow through the valve, the slot not yet being uncovered by the ball moving backward. In other words, when the balls move away from their seats there is a slow increase in the rate of flow until the ball of the return valve uncovers the slot in sleeve 10. There is then a sudden increase in the flow aperture and carrying capacity on this side of the regulator which results in taking care of the surplus oil. Any slight increase in pressure, then, upon the two sides of the device will increase the flow aperture in the return line so much faster than in the burner line that there cannot be any marked increase in flow to the burner or increase in pressure in the burner feed pipe.

Back pressure from the burner valve upon the ball 16 on the burner side of this device tends to neutralize the pressure effect from chamber 8, thus preventing this ball from moving away from its seat farther than necessary to provide flow space to supply the oil which the burner valve will permit to pass through the pipe. On the return side there is substantially no resistance and therefore no back pressure tending to hold ball 16 against its seat (other than the spring 17). Regardless of the pressure in chamber 8, the ball 16 on the burner side of the device will not move away from its seat unless there is opportunity for oil to escape from this side—that is, opportunity for flow. The opening pressure on this ball will be the difference between forward pressure and back pressure, the latter being composed of two elements—the pressure of spring 17 and the back pressure of the oil. If the burner valve is closed so that no oil can escape, then the back pressure of the oil (when oil is flowing through the device) will equal the forward pressure of the oil, and the total back pressure will exceed the forward pressure and the valve will not open. However, so soon as the burn-

er valve is opened the oil begins to flow and its back pressure is decreased to a point such that the regulator valve on the burner side opens simultaneously therewith and permits oil to flow.

It is of course understood that the specific description of structure set forth above may be departed from without departing from the spirit of my invention as set forth in this specification and the appended claims.

Having now described my invention I claim:

1. A structure of the character indicated including a casing having an internal cavity, an inlet port opening into said cavity and outlet ports opening therefrom and adapted to be connected to delivery pipes for the carrying of fluid passing through said structure, said casing having a pair of valve members controlling the passageways between the inlet and the outlets, said valve members having slots to be opened in varying amounts as the valve closure means is moved backward from the seats.

2. A pressure regulator of the character indicated comprising a body having an internal cavity into which opens an inlet port, said body having exit ports through the lateral walls thereof, the connections between the cavity and the exit ports being controlled by pressure check valves which are adjustable to open at various pressures, and which prevent back pressure from causing them to be unseated.

3. A pressure equalizing valve comprising a longitudinally apertured body having lateral inlet and exit ports extending from the surface of the body to the aperture therein, casing members extending into the longitudinal aperture and having threaded connection with the body member, said casing members each having an inlet slot and a valve opening leading therefrom whereby fluid may pass from the inlet port through the casing members to the exit ports, spring pressed valve elements within said casing members and closing the valve openings, and adjustable means for varying the tension on the springs to vary the pressure at which the valves will open.

4. In a valve, a longitudinally apertured body having a plurality of openings extending laterally from the longitudinal aperture through the wall of the body, inlet and exit pipes connected to said openings, hollow casing elements extending lengthwise into the longitudinal aperture and independently removable therefrom, said casing elements having therein resiliently seated check elements, and means in the casing elements for adjusting the opening pressure of the check elements.

5. A pressure regulator of the character indicated comprising a longitudinally apertured body, a valve assembly extending

lengthwise into each end of the aperture in the body and each removable independently of the other, the valve assemblies comprising longitudinally apertured body elements having valve seats at their inner ends, check
5 elements resting against said seats, springs resiliently holding the check elements against their seats, and means for adjusting the pressure of the springs.

6. A pressure regulator of the character indicated comprising a longitudinally apertured body, a valve assembly extending
10 lengthwise into each end of the aperture in the body, the valve assemblies comprising longitudinally apertured body elements having
15 valve seats at their inner ends, check elements resting against said seats, springs resiliently holding the check elements against their seats, and means for adjusting the pressure of the springs, said longitudinally extending
20 body elements of the valve assemblies having laterally directed openings by means of which the flow through the valves may be increased rapidly by the unseating
25 of the check elements from their seats.

In witness whereof, I hereunto subscribe my name to this specification.

HILMER F. RODLER.

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