March 13, 1945. E. PAILLE 2,371,351

MANUAL RESET VALVE

Original Filed March 20, 1940

Fig. 1

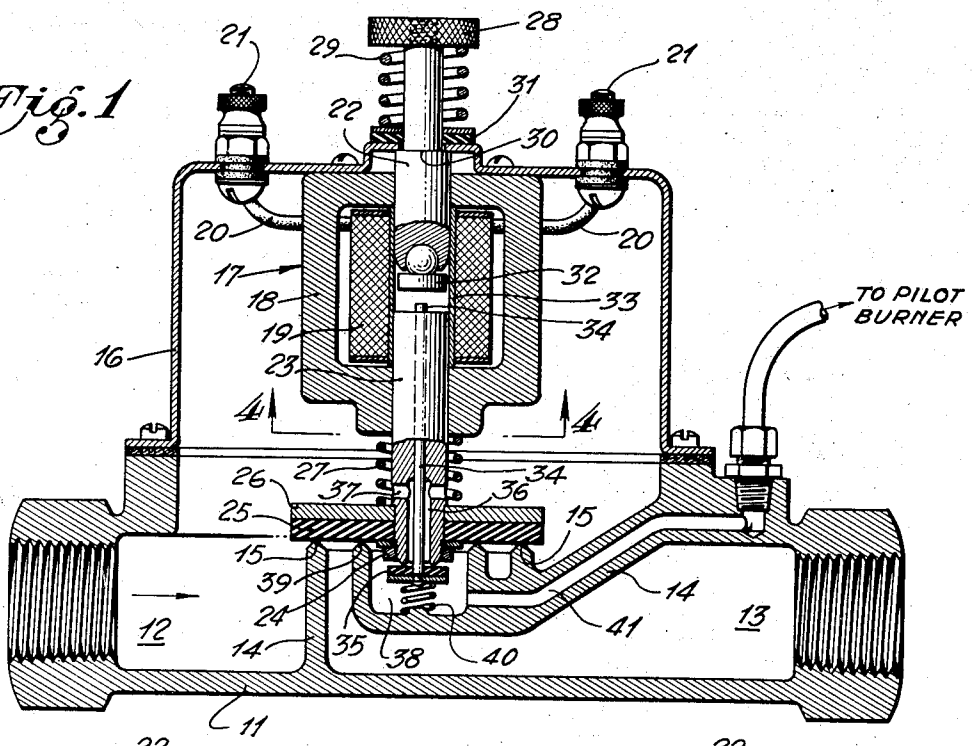


Fig. 2

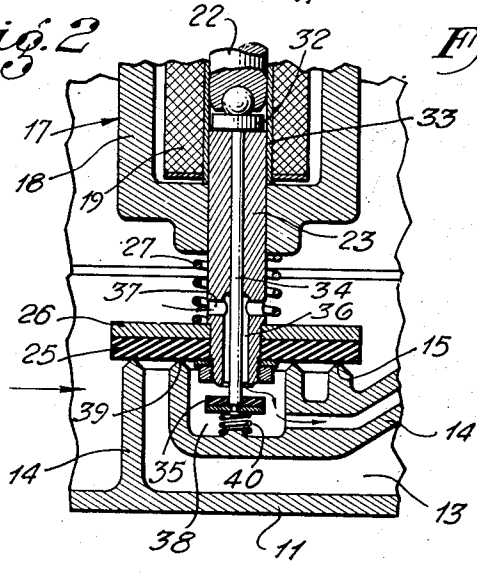


Fig. 3

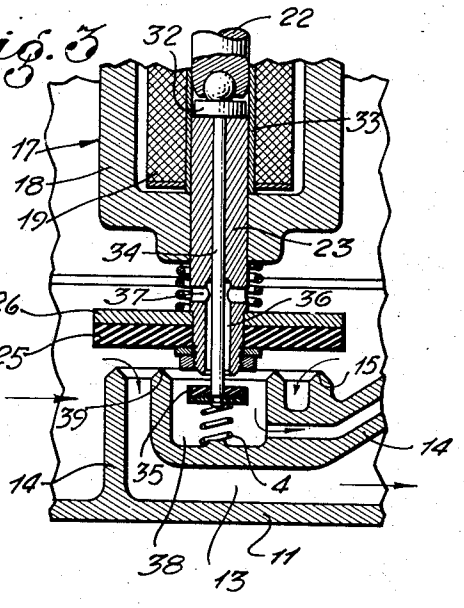
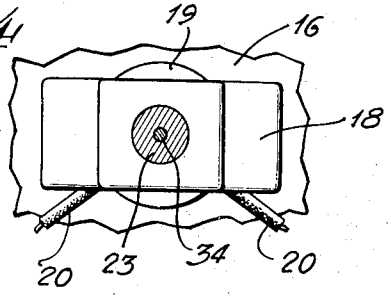


Fig. 4



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MANUAL RESET VALVE

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Original application March 20, 1940, Serial No. 324,993. Divided and this application April 9, 1943, Serial No. 482,402

2 Claims. (Cl. 137—144)

This invention relates to manual-reset valves of the multiple control type; the present application being a division of my copending application, Serial No. 324,993, filed March 20, 1940.

Manual reset valves, of the type to which this invention relates, preferably employ electromagnetic means for maintaining a main valve member in open position, against a bias, only after it has first been manually brought to that position. Such means has particular utility in the control of fuel to a fluid fuel burner; means responsive to the flame of the burner, or to a pilot burner therefor, usually then being provided for controlling the energization of the electromagnetic means. The flame responsive means may consist of a thermoelectric generating device or a thermal cut-out controlling a suitable source of electrical energy. Upon extinction of the flame, the electromagnetic means is deenergized and the valve closes; manual resetting of the valve then being required for subsequent operation of the burner.

An object of this invention is to provide, in a manual reset valve of the character described, supplemental valve means whereby, for example, a pilot burner can be supplied with fuel in the resetting operation of the main valve and before the same is opened.

Another object is to arrange the supplemental outlet chamber, normally controlled by the supplemental valve means, within the main valve port so that the fluid can pass thereinto, independently of the supplemental valve means, when the main valve is open.

Other objects and advantages of the invention will be found in the description, the drawing, and the claims; and, for full understanding of the invention, reference may be had to the following detailed description and accompanying drawing, wherein:

Figure 1 is a sectional view of a valve embodying my invention;

Figures 2 and 3 are fragmentary sectional views of the valve shown in Fig. 1, showing the parts in the positions which they assume in operation; and

Figure 4 is a bottom elevation taken along the line 4—4 of Fig. 1.

In the drawing, the numeral 11 indicates a valve casing having an inlet 12 and an outlet 13 separated by a ported partition 14 provided with an annular main valve seat 15. A housing 16, sealingly secured to the valve casing over an opening in the upper wall thereof, supports an electromagnet 17 comprising a generally rectangular core 18 having a central side opening for the reception of an energizing coil 19, the leads 20 of which are connected to terminals 21, insulatingly mounted in the top wall of the housing.

The core 18 has a vertical bore therethrough in which are reciprocable an upper 22 and a lower 23 plunger member, each of magnetic material. Secured to the lower end portion of the lower plunger 23, by a nut 24, and cooperable with the seat 15, is a valve member 25 of resilient material backed by a metal disk 26. A spring 27, compressed between the disk 26 and the bottom surface of the core 18, urges the plunger downward and the valve member to closed position. The reduced upper end portion of the upper plunger 22 extends through an opening in a raised central portion of the top wall of the housing and is provided with an operating button 28. A spring 29, compressed between this button and the housing, urges the upper plunger upward, its movement in this direction being limited by the shoulder 30. A sealing washer 31, interposed between the spring and the housing, prevents leakage of fluid around the plunger. The bottom end of the upper plunger is provided with a socket for the reception of the ball-shaped upper end portion of a member 32, the material around the mouth of the socket being spun around the ball so as to freely retain it therein. The member 32 is also of magnetic material, and its ball and socket connection permits very accurate alignment of its bottom surface with the top surface of the lower plunger when they are brought into engagement. The tubular coil support 33, in which the inner end portions of the plungers slide, is preferably of metal and is a close fit in the side opening of the core 18 so that the opposed surfaces of the member 32 and of the lower plunger are protected from dirt and from the fluid controlled by the valve.

Slidable in a central bore of the lower plunger is a rod 34 which carries on its bottom end a supplemental valve member 35 cooperable with a seat formed at the bottom of the plunger around an enlargement 36 of the bore, with the upper part of which lateral openings 37 communicate. A portion of the partition 14 extends within the main valve port and is provided with a cup-shaped recess 38, the side wall of which terminates in the same plane with the main valve seat 15 in an auxiliary seat or mouth 39, the main valve member 25 also cooperating with this seat to close the recess when the main valve member is in its normal or depressed position. Compressed between the bottom of the recess 38 and

the supplemental valve member 35 is a relatively weak spring 40 which urges this valve member to closed position and the rod 34 upward. Communicating with the recess 38 is a passageway 41 which provides a supplemental outlet for the valve.

The operation of the valve hereinabove described is as follows: Assuming that the inlet 12 of the valve is connected to a gas supply, the main outlet 13 to a main burner and the supplemental outlet 41 to a pilot burner for the main burner, when the parts are in the positions as shown in Fig. 1 gas flow to both of the burners is obstructed by the closed valve members 25 and 35. If the upper plunger 22 is now moved downward by pressure on the button 28, the rod 34 will be depressed and the member 32 brought into engagement with the top surface of the lower plunger, as shown in Fig. 2. The supplemental valve member 35 now being open, gas can flow through openings 37, bore 36, recess 38 and passageway 41 to the pilot burner, where it may be lighted. Assuming that a thermo-electric device, electrically connected to the coil 19, is positioned so as to be heated by the flame of the pilot burner, after a short period of time current will be generated by the device in an amount sufficient to energize the core 18 to cause the plungers to be magnetically held in engagement with each other (the member 32 being considered as part of the upper plunger) so that when the button 28 is released, the lower plunger will be moved upward with the upper plunger, against the force of spring 27 which obviously must be considerably less than that of spring 29; the parts assuming the positions shown in Fig. 3. It is to be understood that there will be a magnetic force tending to resist the sliding of the plungers in the core, but that force is slight in comparison with the force tending to hold the abutting surfaces of the plungers together. Also, it will be understood that the magnetic force employed is insufficient to move the plungers from their normal positions.

With the main valve member 25 now in elevated position, fuel can flow through the main port to the main burner where it will be ignited by the pilot burner flame. Fuel can also now flow through the open mouth of the recess 38 to the pilot burner, rather than through the bore 36.

If the pilot burner flame is extinguished, upon cessation of current generation by the thermo-electric device, the electromagnet is deenergized and the lower plunger falls under the force of spring 27, closing the main valve. Pressure on the rod 34 being released, the supplemental valve member 35 also closes. Fuel supply to both the main and the pilot burner is thus obstructed; resetting of the valve, as hereinbefore described, being required to initiate further operation of the burner system.

It will be noted that, if the electromagnet is not energized, the upper plunger may be manually moved both downward and upward without affecting the condition of the main valve. Only when the pilot burner is alight, and thus a safe condition exists, can the main valve be opened.

While I have herein shown and described a specific embodiment of my invention as applied to the control of a valve for fluid fuel burners, it is obvious that my invention has other uses and that modifications may be made without departing from the spirit thereof. I intend therefore to be limited only by the scope of the appended claims.

I claim as my invention:

1. In a fluid control valve: a casing having an inlet and a main outlet and a partition separating the same, said partition having a port opening therethrough provided at the inlet side of the partition with a valve seat, a valve member cooperable with said seat and biased to closed position, said valve member including a portion of magnetic material, electromagnetic means cooperable with said portion, means extending to the exterior of said casing for mechanically moving said electromagnetic means, said electromagnetic means when energized being effective to magnetically hold said valve member when moved into engagement with said portion so that when the electromagnetic means is subsequently retracted the valve member is moved therewith to open position against the force of said bias, said casing also having a supplemental outlet, means within said port opening defining a cup-shaped recess communicating with said supplemental outlet, the mouth of said recess being so arranged that when said valve member is in engagement with said seat the mouth is closed thereby, the portion of the valve member which then closes said mouth having a passage therethrough communicating with the inlet of the casing and providing a supplemental valve seat, a supplemental valve member cooperable with said supplemental seat and biased to closed position, and means engageable by said electromagnetic means in its movement toward said main valve member for moving said supplemental valve member to open position and for maintaining it in that position while the electromagnet is energized.

2. In a fluid control valve: a casing having an inlet and a main outlet and a partition separating the same, said partition having a port opening therethrough provided at the inlet side of the partition with a valve seat, a valve member cooperable with said seat and movable away from and toward the same, means biasing said valve member to closed position, an electromagnet fixed with respect to said casing and comprising a core and an energizing coil therefor, said core having a bore therethrough axially aligned with said valve member, a first magnetic plunger connected to said valve member and having a portion reciprocable in the adjacent end of said bore, a second magnetic plunger reciprocable in the other end of said bore, manual means operable exteriorly of the casing for moving said second plunger into engagement with said first plunger, said core being adapted when energized to cause said plungers to be magnetically held together so that when said second plunger is subsequently retracted said valve member is moved to open position, said casing also having a supplemental outlet, means defining a supplemental valve port arranged within said first-mentioned port opening and communicating with said supplemental outlet, and supplemental valve means associated with said first plunger for controlling fluid flow from said inlet to said supplemental valve port and operated to open position by the movement of said second plunger toward said first plunger and maintained in that position while the plungers are magnetically held together.

EUGENE PAILLE.