COMBINED ROTARY, SAFETY AND IGNITOR GAS VALVES

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References Cited

UNITED STATES PATENTS
2,483,191 9/1949 Gauger 431/53 X
3,236,252 2/1966 Allingham 137/66
2,150,415 3/1939 Branche 431/192 X
2,443,892 6/1948 Caparone 431/48

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ABSTRACT

A manifold gas valve having a plug valve with main, pilot and ignitor gas passageways therein; a knob for rotating the plug valve, a pilot burner flame responsive safety valve upstream of the plug valve and a normally closed ignitor valve in the ignitor gas passageway. There is means on said knob arranged to actuate said ignitor valve and safety valve to their open positions, when the plug valve is in the position that permits gas flow to both a pilot burner and an ignitor burner for igniting the pilot burner from a remote position but permits no gas flow to the main burner, when the knob is moved axially with respect to the plug valve.

4 Claims, 6 Drawing Figures
COMBINED ROTARY, SAFETY AND IGNITOR GAS VALVES

The invention described in this specification lies in the combination of a conventional safety pilot gas valve of the type shown in Allingham U.S. Pat. No. 3,236,252 and an ignitor valve for temporarily supplying gas to an ignitor burner, such as the one shown in Furlong U.S. Pat. No. 1,991,609. While Strobel U.S. Pat. No. 2,707,517 and Caparone U.S. Pat. No. 2,443,892 each discloses a plug valve and separate safety and ignitor valves and Branche U.S. Pat. No. 2,150,415 discloses combined plug and ignitor valves, there is no prior art teaching of a combined plug, safety and ignitor valve in a single and compact manifold gas valve body, which reduces manufacturing and installation costs.

FIG. 1 of the drawing is a top or plan view of the manifold valve embodying the invention; FIG. 2 is a vertical sectional view of the manifold valve, taken along line 2—2 of FIG. 1; FIG. 3 is a fragmentary vertical sectional view of the invention, taken along line 3—3 of FIG. 1; FIG. 4 is a horizontal sectional view of the plug valve, with the knob removed, taken along line 4—4 of FIG. 3, and illustrating the valve in its "off" position; FIG. 5 is a view similar to that of FIG. 4 but with the plug valve in its "pilot" position; and FIG. 6 is a view similar to that of FIG. 4 but with the plug valve in its "on" position.

The valve body includes a lower housing 11 having a threaded inlet 12 and a threaded outlet 13 for connection with a main burner. The housing has a recess 14 in the top thereof which communicates with inlet 12 and a second recess 15 in the top thereof which communicates with outlet 13.

The body also has a top housing 16 that rests on the top of housing 11, with a sealing gasket 17 therebetween. A frusto-conical bore 17 extends downwardly and inwardly through the housing 16 to communicate with recess 14. A stepped bore 18—19 extends from the bore 17 transversely to the side of the housing. The housing also has a passageway 21 (See FIG. 4) extending from bore 17 to a filter chamber 22 and a passageway 23 extending from the chamber to an elbow 24 which is swivelly connected to the housing. A third passageway 25 extends from the bore 17 into a downwardly bore 26 which, in turn, connects with a transversely extending auxiliary outlet passageway 27. The housing also has a downwardly extending boss 16a (See FIG. 3) through which a pivot pin 28 extends. A vertically extending recess 29 and bore 29a has a conventional thermocouple-ennergizing electromagnet 30 therein and a vertically extending bore 16b connects stepped bore 18—19 with bore 15 and outlet 13. A needle valve 31 in bore 26 is manually adjustable to control the rate of gas flow from bore 26 to an ignitor burner when connected to outlet 27. The housing 16 is secured to housing 11 by means of a plurality of bolts 20.

A plug valve 32 having a conventional axially extending stepped bore with a large diameter portion 33a, beveled shoulder 33b, small diameter portion 33c and beveled shoulder 33d extending from the bottom to the top of the plug valve. Extending upwardly from the top of the plug valve is an annular boss 34 having vertically extending grooves 35 and 36 for an axially slideable but non-rotatable connection with ribs 37 and 38 on a knob 39. A large transversely extending opening 40 through the wall of the plug valve intersects bore 33a and is adapted to be aligned with bore 18 in the "on" position of the plug valve. An arcuate groove 41 extends from the opening 40 a distance sufficient to register with the passageway 21 when the plug valve is in its "on" position but not register with it in the "off" position of the valve. A second and smaller transverse bore 42 through the wall of the plug valve is located to register with the passageway 25 when the valve is in its pilot position. It is illustrated in the drawing as registering with the bore 18 in the "off" position of the valve but may be located closer to the groove 41 so as to be out of such registration by also relocating the adjacent end of passageway 25 farther away from bore 18.

The bore 42 has a restriction 42a that provides a valve seat for a ball valve 43. The ball valve is biased against the seat 42a by a coil spring 44 which, at its other end, is retained in compression in the bore 42 by a washer 45. The ball valve extends sufficiently far into the bore 43, when seated on seat 42a, as to be biased open by the safety valve resetting means in its resetting position.

The safety valve 46 is connected to one end of lever 47 while the other end of the lever is connected to the armature stem 30a of the electromagnet 30. A coil spring 48 extends between the electromagnet and an abutment on the stem to normally pivot the lever clockwise so as to close the valve 46 against the open end of plug valve 32. Only when the electromagnet is energized by a conventional pilot burner heated thermocouple, to hold the magnet's armature, will the spring be rendered ineffective to so bias the lever.

The resetting means for the safety valve includes a stem 49, to which the knob 39 is attached, and a coil spring 50 that is weaker than spring 48 but which holds valve 46 open and against lever 47. The spring surrounds a reduced diameter portion 49a of the reset stem and extends between the valve 46 and an annular abutment on stem portion 49b. An O-ring lines between the abutment and the beveled surface 33b to provide a gas seal. The portion 49a preferably has a frusto-conical shoulder portion 49c where it joins the stem portion 49a a short distance above ball valve 43 for actuating the ball valve to its open position when the knob is depressed. A coil spring 51 extends between the knob and a washer biasing an O-ring against bevelled surface 33d to normally hold the knob and stem in their outermost positions.

A plug valve retainer plate 52 is secured to housing 16 with a coil spring 53 between it and the valve 32. The plate has an upwardly extending portion 52a with a transversely extending arm 52b. The arm extends between an arcuate abutment shoulder 39a and a ring secured to the lower inner edge of the knob. The ring prevents the lifting of the plug valve off of its seating surface while the shoulder is shaped in a well known manner to prevent inward movement of the knob when it and the plug valve are in their "on" positions but permits inward movement of the knob in the "pilot" position thereof to reset the safety valve and light the pilot burner.

By installing the invention described above in a heating system by having a main burner connected to the outlet 13, a pilot burner for the main burner connected to the elbow 24, an ignitor burner for the pilot burner connected to the outlet 27, the inlet 12 connected to
a gas supply, the plug valve in its "off" position and the electromagnet de-energized but connected to a thermocouple positioned to be heated by the pilot burner, the system including the invention may be put into operation. This is done by rotating the plug valve to the "pilot" position, depressing the knob to open ball valve 43 and safety valve 46 to supply gas to both the pilot burner and the ignitor burner, then while holding the knob depressed, lighting the gas at the outer end of the ignitor burner, which causes a flame to carry to the pilot burner and to ignite the pilot burner, and after allowing time for the thermocouple to become heated to hold the safety valve open, releasing the knob to return to its outermost position, closing the ball valve. This places the system in operation to the extent that the safety valve is held open and the pilot burner is burning, a possible summer time operation. However to enable the main burner to be ignited by the pilot burner, the knob and plug valve must be rotated to their "on" positions. The operation of the main burner may be controlled solely by the manual operation of the plug valve or may be controlled by a supplemental thermosstatically controlled valve, (not illustrated) down stream of the plug valve. Should the pilot flame become extinguished, the safety valve will close, shutting off all gas flow.

The embodiments of the invention in which an exclusive property or right is claimed are defined as follows:

1. In a manifold gas valve of the type including a body having a manually rotatable valve for controlling the flow of gas to main and pilot burners, a safety valve in series with said rotatable valve and upstream thereof, an axially-slidable knob non-rotatably connected to said rotatable valve, means for resetting said safety valve by axial movement of said knob and means for preventing axial movement of said knob in the valve position providing gas flow to the main burner; the improvement comprising an auxiliary outlet in the body of said manifold gas valve for connection with an ignitor burner; a passageway in said rotatable valve registrable with said outlet only in the rotary valve position permitting gas to flow to the pilot burner, and valve means located in and controlling flow in said passageway and arranged to be actuated by the means for resetting said safety valve when the knob is moved axially to provide gas flow to the pilot and ignitor burners.

2. The combination of claim 1 wherein said rotary valve is a hollow plug valve and said valve means is located in a side wall of the plug valve.

3. The combination defined in claim 1 wherein said valve means is in the form of a ball valve.

4. The combination of claim 3 with said ball valve being arranged to be actuated to its open position by a shoulder on said resetting means.

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