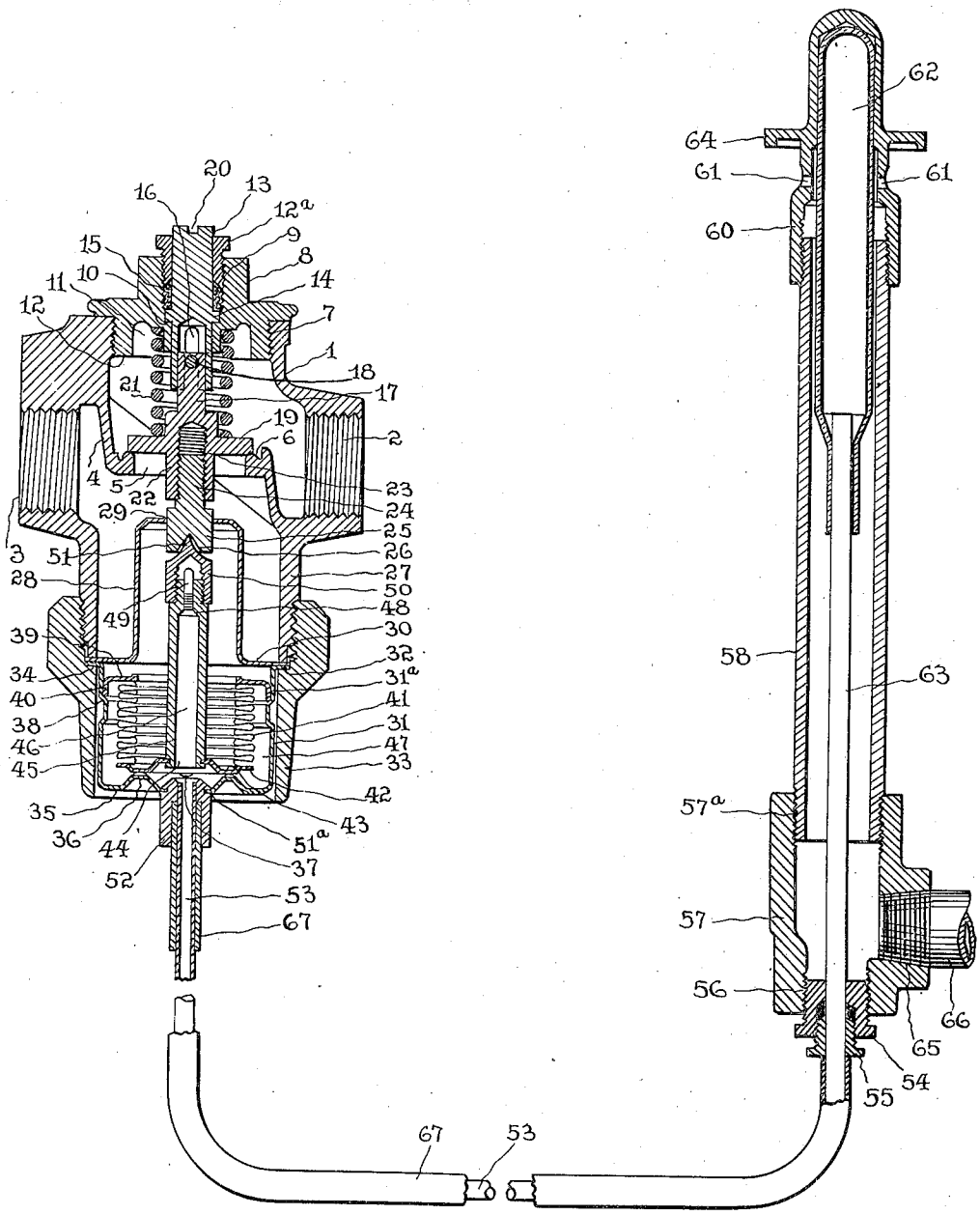
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BURNER CONTROL MEANS

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BURNER-CONTROL MEANS

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My invention relates to new and useful improvements in fuel burner control means, and more particularly to automatic pilot operated fuel valves.

An object of my invention is to provide control means for an oil or gas burner or the like.

Another object is to construct a novel valve and an automatic pilot control therefor.

A further object is to construct a fuel valve which will cut off the flow of fuel when the pilot light is extinguished.

A still further object is to provide a device which is simple in construction and efficient in operation.

The invention consists in the improved construction and combination of parts, to be more fully described hereinafter, and the novelty of which will be particularly pointed out and distinctly claimed.

In the accompanying drawing I have fully and clearly illustrated a preferred embodiment of my invention, to be taken as a part of this specification, and wherein—

The figure is a longitudinal, central, sectional view through my valve and pilot control means.

Referring to the drawing by characters of reference, 1 designates a hollow valve casing having an inlet port 2 and an outlet port 3, which is connected by suitable piping to a main burner (not shown). Within the valve casing 1 is a partition or web 4 separating the inlet from the outlet and having a passage or aperture 5 therein, which is provided with a valve seat 6. The side wall of casing 1 has an opening 7 therethrough which is closed by a plug 8, preferably threaded into said opening 7 and having an axial bore 9. Within bore 9 is a constriction 10 forming a supporting shoulder. The plug 8 is also provided with an annular recess 11 in its underside 12. Supported in bore 9 is a guide pin 13 having a flange 14 resting on the shoulder 10. The pin 13 is held in position in the plug 8 by a sleeve 12^a surrounding pin 13 and threaded in bore 9, and is hermetically sealed therein by suitable packing 15. The lower end of pin 13 projects beyond plug 8 and into the valve casing 1 and is of tubular form having diametrically opposed longitudinal guide slots 16, of which but one is shown. Slidable in the tubular portion of pin 13 is a valve stem 17 having pins 18 projecting into said slots 16 to permit rotation of the stem 17 and valve head 19 carried thereby, by means of a slot 20 in the outer end of pin 13, in order that the valve may be ground, and to insure free working movement thereof. Positioned in the casing 1 and supported by the valve head 19, is a coil spring 21 surrounding stem 17 and seated under compression with its other or upper end in the recess 11. The spring 21 normally tends to close the valve and maintain it on its seat 6. The under face of valve head 19 has a boss 22 which projects through passage 5, and which is hollow and internally threaded, as at 23. Adjustably carried by threaded engagement with boss 22 is an adjustment and contact member 24 having a head 25 which is polygonal in cross-section, and preferably square. The head 25 has a conical socket 26 in its free end.

Directly opposite the opening 7 the valve casing 1 has a depending flange, preferably in the form of a cylindrical wall 27 which opens into the valve casing 1. Within the flange 27 is a guide member 28 having a polygonal guide opening 29, preferably square, within which the square head 25 of contact member 24 slides and which also serves to prevent rotation of the member 24. A lateral extension 30 on member 28 overlies the end of wall 27 and supports the same within the wall 27.

The open outer end of flange 27 is sealed to a depending cup-shaped container 31, preferably formed of sheet-metal and having a circumferential lip 32 on the side wall 31^a which abuts the extension 30 and overlies the wall or flange 27. A protecting sleeve and fastening means 33 surrounds the side wall 31^a of the container 31, and has an internal shoulder 34 which cooperates with the end of the wall 27 to lock the guide member 28 and container 31 in position. The sleeve 33 is preferably threaded on the wall 27 so that it may be drawn up tight to hermetically seal the cas-

ing 1. The base 35 of the container 31 is provided with an internal annular stop 36 having radial depressions 37 across the stop 36, which serve as ports, as will be described. Within the container 31 and formed in the side wall 31ª, is an internally projecting circumferential supporting ledge 38 which supports an annular plate 39 having a peripheral depending flange 40 which abuts the ledge 38. The flange 40 is hermetically sealed by any well known medium, such as solder, to the side wall 31ª. Along the inner circumference of the plate 39 is sealed one end of a longitudinally expansible-collapsible member, preferably in the form of a cylindrical metallic bellows 41, which extends into the container 31 and terminates adjacent the stop 36. The free end of bellows 41 is closed by a head or plate 42 having an annular abutment 43 opposed to the stop 36 and adapted to contact the same to limit the downward movement or expansion of bellows 41. The center portion of head 42 has an opening 44 in which is fixed a push rod 45 having a hollow open ended bore 46. At its lower end the bore 46 opens through head 42 into the chamber 47 between the bellows 41 and container 31. At its upper end the bore is constricted at 48 and has a tube 49 which is sealed after a suitable expansive or volatile liquid, such as aniline, has been admitted to chamber 47 through tube 49, bore 46 and ports 37 and to the thermostat to be described. The sealed tube 49 is protected by a cap 50. The cap 50 is preferably threaded on the rod 45 and has a conical top 51 which engages the contact member 24, and is positioned by the socket 26 to insure operative relation between the parts.

The bottom 35 of container 31 has an opening 51ª within the annular stop 36, in which is fixed an apertured plug 52. A conduit or tube 53 of any suitable flexible material, and of any desired length, is fixed to and communicates through the apertured plug 52 with the interior of the chamber 47. Near its other end 63, the conduit 53 passes through a second apertured plug 54 which is provided with packing means 55 of any well known type which will prevent leakage of gas or liquid through the plug and around the conduit.

The plug 54 is threaded tightly into an opening 56 in a supporting union 57. Opposite the opening 56 is a second opening 57ª in which a burner tube 58 is threaded. Carried by the upper end of the burner tube 58 is a hollow cap 60 having burner apertures 61. Fixed in the hollow cap 60 and projecting therefrom into burner tube 58 in spaced lateral relation thereto, is a tubular thermostatic bulb 62 which telescopes the end 63 of conduit 53, and is sealed thereto by soldering, welding, or the like. The cap 60 is of sufficient internal diameter at the burner apertures 61 to permit the passage of fuel to the apertures. Adjacent the apertures 61 and slightly above the same, the cap 60 is provided with a laterally projecting flange 64 which is directly exposed to the heat of the pilot flame, which heat it transmits to the bulb 62 and enclosed expansive fluid. The union 57 also has a fuel admission port 65 in which is fixed a fuel-carrying pipe 66. The conduit 53 is preferably covered by a protecting and insulating coating or cover 67.

In operation, the pin 13 is rotated to adjust the member 24 to regulate the capacity of the chamber 47 so that expansion of the fluid in the bulb 62, due to the heat of the pilot flame, will act to open valve 19. The fuel issuing from the apertures 61 is ignited, which will heat the flange 64 and the bulb 62, causing the fluid within the bulb 62 to expand or gasify, thereby forcing fluid from the bulb through the conduit 53 into chamber 47. The pressure exerted by the fluid thus forced into the chamber 47 will act upon the head 42 to raise the same, collapsing the bellows 41. As the head 42 moves upwardly the rod 45 will move with it and lift the valve head 19 from its seat 6 against the action of the spring 21. As long as the pilot burns, the fluid in the bulb 62 will remain in expanded condition, holding the bellows 41 collapsed so that the valve will be maintained in open position; but if the pilot is extinguished for any reason the fluid in the thermostat bulb 62 will cool and contract, which will permit the spring 21 to function to force the fluid from chamber 47 and to seat the valve head 19 on its seat 6, thereby closing the valve and cutting off the flow of fuel to the main burner (not shown), and preventing the loss of unburned fuel.

It is evident that my invention may be used with any type of burner which utilizes liquid or gaseous fuel, and will both conserve fuel and prevent the escape of dangerous unburned gases when the ignition means fails to operate.

What I claim and desire to secure by Letters Patent of the United States is:—

1. In a device of the character described, a valve casing, a partition in said casing having an opening therethrough, a valve in said casing adapted to close said opening, a pilot burner tube having a burner aperture, fuel feed means for said tube, thermally expansible-contractible means in said tube adjacent said burner aperture, and means operatively connecting said thermal means to said valve.

2. In a device of the character described, a valve casing, a partition in said casing having an opening therethrough, a valve in said casing adapted to close said opening, said casing having an open hollow extension, an expansible-collapsible member sealing said extension, means carried by said member and extending into contact with said valve, a pilot

burner tube having a burner aperture, fuel feed means for said tube, thermally expansible-contractible means in said tube adjacent said burner aperture, and a connecting member between said thermal means and said expansible-contractible member.

3. In a device of the character described, a valve casing, a partition in said casing having an opening therethrough, a valve in said casing adapted to close said opening, means on said valve to normally seat the same, said casing having a hollow open extension, a contact member depending from said valve through said opening, guide means for said member, an expansible-collapsible member sealing said extension, means engaging said contact member and carried by said sealing member, a pilot tube having a burner aperture therein, thermally expansible-contractible means in said tube adjacent said burner aperture, and means operatively connecting said sealing member and said thermal means.

4. In a device of the character described, a valve casing, a partition in said casing having an opening therethrough, a valve in said casing adapted to close said opening, means on said valve to normally seat the same, said casing having a hollow open extension, an adjustable contact member depending from said valve through said opening, guide means for said member, a chamber sealing said extension, said chamber having a longitudinally expansible-contractible side wall, means engaging said adjustable contact member and carried by said side wall, a pilot tube having a burner aperture therein, thermally expansible-contractible means in said tube adjacent said burner aperture, and means operatively connecting said side wall and said thermal means.

5. In a device of the character described, a valve casing having a partition therein, said partition having an opening provided with a valve seat, a valve adapted to cooperate with said seat, said valve having a stem, a guide for said stem, said valve having a depending boss, said casing having a hollow open extension, a cup-shaped bellows closing said extension, a container member for said bellows supported by said extension, a push rod carried by said bellows and engaging said boss, a pilot tube having a burner aperture, fuel feed means for said tube, thermally responsive means within said tube adjacent said burner aperture, and power transmission means between said thermally responsive means and said bellows.

6. In a device of the character described, a valve casing having an inlet and an outlet, a partition in said casing between said inlet and said outlet, said partition having an opening provided with a valve seat, a valve adapted to engage said seat to close the opening, guide means carried by said casing, said valve having a stem reciprocable in said guide means, spring means normally urging said valve to its seat, said valve having a depending boss extending through said opening, a hollow open extension on said casing in axial alignment with said opening, a hollow open sleeve carried by said extension, pressure responsive means within said sleeve and sealing said extension, and a push rod carried by said pressure responsive means and abutting said boss.

7. In a device of the character described, a valve casing, a valve in said casing, contact means depending from said valve, a hollow open extension on said casing, a container sealing said extension, a bellows having a head and telescoping said container and sealed thereto, a hollow push rod fixed on said head and opening into said container, a filling tube at the top of said hollow rod whereby said container may be charged with a volatile liquid, and a cap member on said rod overlying said tube and abutting said contact member.

8. In a device of the character described, a valve casing, a partition in said casing having an opening therethrough, a valve in said casing adapted to close said opening, said valve having a stem and a depending boss, guide means for said stem, a hollow open extension on said casing in axial alignment with said opening, longitudinally adjustable means carried by said boss, means to prevent rotation of said adjustable means, means to rotate said valve to adjust said adjustable means, an expansible-collapsible chamber sealing said open extension, a push rod carried by said chamber and engaging said adjustable means, and a thermostat operatively connected to said chamber to actuate said valve.

9. In a device of the character described, a valve casing, a partition in said casing having an opening therethrough, a valve in said casing adapted to close said opening, spring means normally urging said valve to close said opening, said valve having a stem and a depending boss, guide means for said stem, a hollow open extension on said casing in axial alignment with said opening, longitudinally adjustable means carried by said boss, said adjustable means having a bearing socket, an expansible-collapsible chamber sealing said open extension, a push rod carried by said chamber and engaging the bearing socket of said adjustable means, a thermostat operatively connected to said chamber to actuate said valve, and means external of said casing to adjust said adjustable means to regulate the action of said thermostat.

10. In a device of the character described, a valve casing having an inlet and an outlet, a partition in said casing having a passage therethrough, a valve to close said passage, a hollow open extension on said casing in axial alignment with said passage, a sleeve carried

by said extension, a cup-shaped container opening into and sealing said casing and carried by said sleeve, a resilient longitudinally expansible-contractible member within said container and having a head adjacent the base of said container, means to seal the open end of said resilient member to the side wall of said container, plunger means carried by said head and operatively engaging said valve, a pilot burner tube having a burner aperture, a heat responsive medium within said tube, and means to transmit the expansive force of said medium to said head.

11. In a device of the character described, a valve casing having a valve therein, pressure responsive means carried by said casing, a push rod carried by said means and engaging said valve, a pilot burner tube having a fuel inlet, a cap on said tube having a burner aperture, a flange on said cap above said aperture, a bulb supported by said cap in the tube, a conduit connecting said bulb and said pressure responsive means, and a thermally expansive medium in said bulb and said conduit.

12. In a device of the character described, a valve casing having an inlet and an outlet and a valve port, a valve adapted to open and close said port, an expansible-collapsible chamber, means operatively connecting said valve and said chamber, a pilot burner tube having a burner aperture, a bulb within said tube adjacent said aperture, a conduit having one end fixed to and opening into said bulb and having the other end fixed to and opening into said chamber, a thermally expansible medium within said bulb, conduit and chamber, and fuel feed means for said burner tube.

13. In a device of the character described, a pilot burner tube comprising a coupling having a plurality of openings, a fuel feed pipe fixed in one of said openings, an apertured plug in another of said openings, an open tube carried by said coupling and fixed in another of said openings, a cap closing the end of said tube, a burner aperture in said cap, a thermal bulb mounted in said cap and extending into said tube in spaced relation to the side walls thereof, a pressure transmitting conduit sealed in said bulb and supported in said apertured plug, and a thermally expansive medium in said bulb and conduit.

14. In a device of the character described, a pilot burner tube comprising a coupling having a plurality of openings, a fuel feed pipe fixed in one of said openings, an apertured plug in another of said openings, an open tube carried by said coupling and fixed in another of said openings, a cap closing the end of said tube, said cap having a heat-absorbing flange, a burner aperture in said cap adjacent said flange, a thermal bulb mounted in said cap and extending into said tube in spaced relation to the side walls thereof, a pressure transmitting conduit sealed in said bulb and supported in said apertured plug, and a thermally expansive medium in said bulb and conduit.

In testimony whereof I have hereunto signed my name.

LEWIS W. EGGLESTON.