June 15, 1937. B. L. MATTHEWS ET AL 2,083,789

FUEL CONTROL SYSTEM

Filed Dec. 13, 1933 2 Sheets-Sheet 1

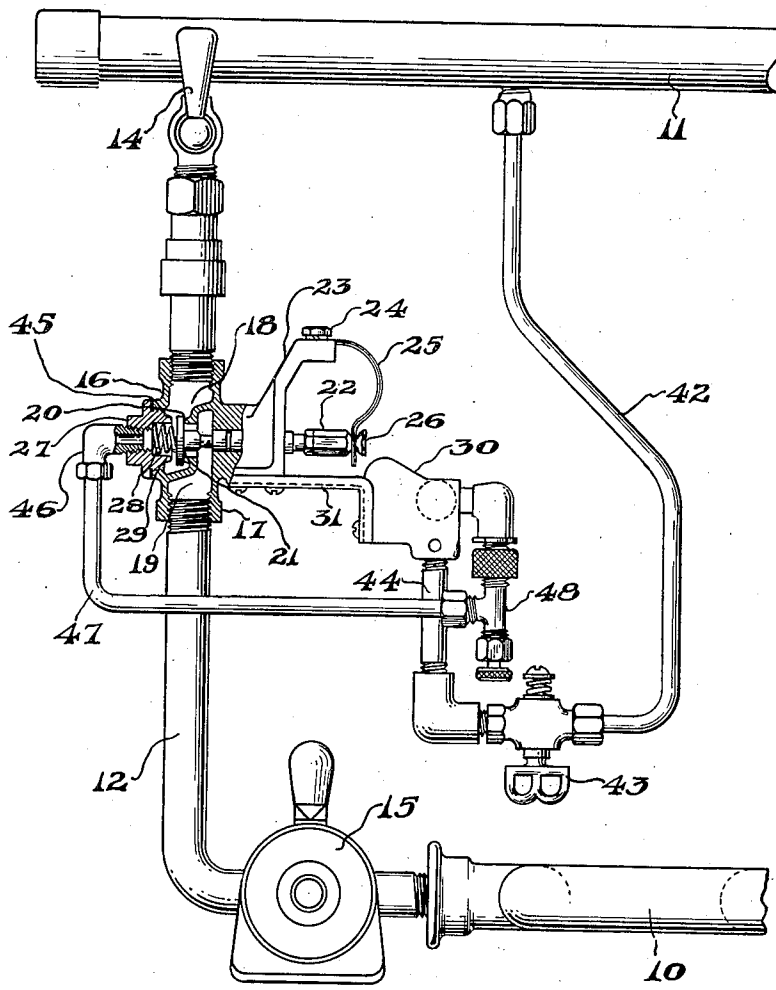


Fig 1.

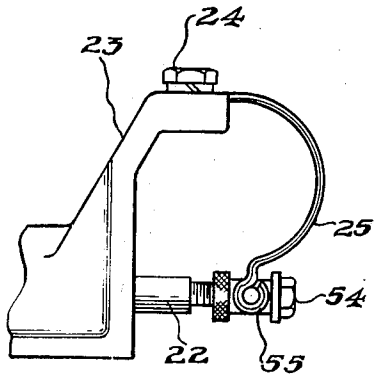


Fig 9.

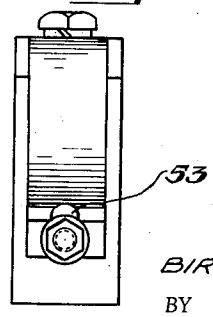


Fig 10.

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FUEL CONTROL SYSTEM

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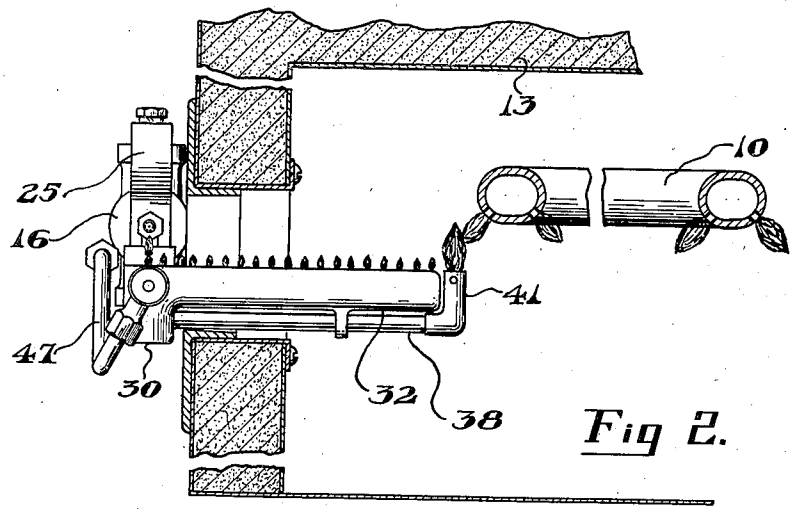


Fig 2.

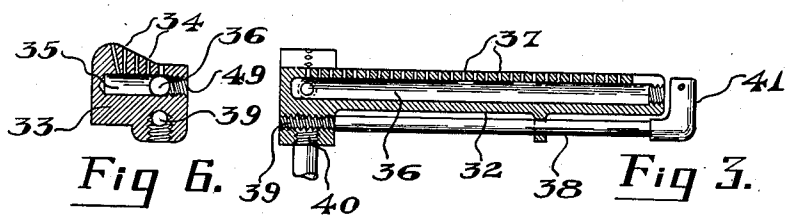


Fig 6. Fig 3.

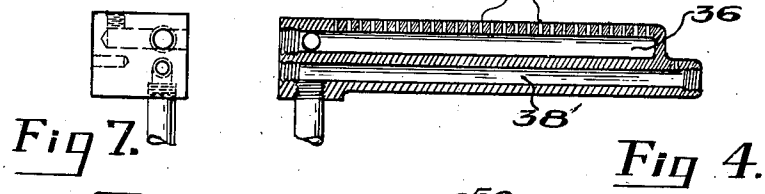


Fig 7. Fig 4.

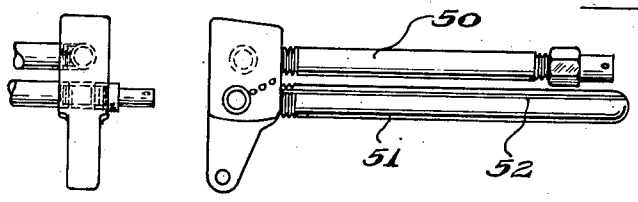


Fig 8. Fig 5.

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FUEL CONTROL SYSTEM

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Application December 13, 1933, Serial No. 702,162

2 Claims. (Cl. 158—117.1)

This invention relates to improvements in fuel control systems for gas burning appliances and in automatic valves for use in such systems.

An object of the invention is to provide an improved valve construction of the type in which the cessation of the flow of gas causes a positive interruption of the gas flow to the main burner.

Another object is to provide a valve assembly so constructed and arranged that it may be used for the ignition of the oven burner of a gas range with a constantly burning ignition pilot located inside the oven adjacent the main burner and with the moving parts of the valve disposed in an accessible position outside the oven.

Other objects and advantages of the invention will be readily apparent from the following description and accompanying drawings wherein:

Fig. 1 is a diagrammatic view partly in section showing a fuel control system incorporating a valve embodying our invention;

Fig. 2 is a view partly in section showing the valve in operating position with respect to the main oven burner of a gas range;

Fig. 3 is a view partly in section showing details of one form of the runner arm construction;

Fig. 4 is a view similar to Fig. 3 showing a modification of the runner arm construction;

Fig. 5 is another modification of the runner arm construction embodying a slotted tube;

Figs. 6, 7, and 8 are end views of Figs. 3, 4, and 5 respectively, and

Figs. 9 and 10 are side elevational and end views respectively of modified forms of the bi-metal attaching means.

Referring to the drawings for a detailed description of the invention, 10 designates the oven burner of a range which is supplied with gas from a manifold 11 through a conduit 12. A portion of the oven containing the burner is indicated in Fig. 2 by the numeral 13. A manually operated gas cock 14 is interposed in the conduit 12 as are a conventional oven thermostat 15 and our improved automatic gas controlling valve mechanism 16 which forms the subject matter of the present invention. In the present illustration the improved valve mechanism is disposed between the gas cock and the thermostat.

The valve mechanism 16 comprises a cast valve body 17 provided with an inlet port 18, an outlet port 19 and a seat 20. The valve proper comprises a circular head member 21 cooperating with the seat 20 and provided with a stem 22 projecting through one side of the valve body. Adjacent the stem the valve body is provided with an upwardly and outwardly extending flange 23 to which is attached as by a screw 24, one end of a curved bi-metal member 25. The other end of the bi-metal is attached to the outer end of the stem 22 by a screw 26. The side of the valve body opposite the valve head 21 is provided with a removable cap 27 having a recess 29 therein for carrying a spring 28. This spring bears against the valve head and tends to maintain it against the seat 20. The inner end of this cap also serves as a seat 45 for cooperating with the valve head 21 as hereafter described. The valve head is moved to its unseated position with respect to the seat 20 against the opposition of the spring 28 by the application of heat to the bi-metal 25.

The gas conveying mechanism 30 for supplying heat to the bi-metal is mounted on an L-shaped bracket 31 attached to the under side of the valve body 17. This mechanism comprises, in the embodiment shown in Figs. 2 and 3, an elongated tubular casting 32 having an enlarged end portion 33. This end portion is mounted adjacent the bi-metal 25 and is provided with a series of ports 34 which serve as the burner for heating the bi-metal. The ports 34 communicate with a passage 35 which in turn communicates with the tubular bore 36 of the casting 32. A series of ports 37 extend through the casting and communicate with the bore 36.

The underside of the casting 32 supports a tube 38. One end of this tube communicates with a drilled opening 39 provided in the enlarged portion 33, and which in turn communicates with a port or passage 40 extending through to the underside of the enlarged portion 33. The other end of tube 38 carries a burner tip 41 which terminates adjacent the outer of the series of ports 37.

Gaseous fuel is supplied to the pilot burner 41 directly from the manifold 11, through a conduit 42, manually operated shut-off valve 43, conduit 44, port 40, opening 39 and tube 38. This pilot therefore burns constantly regardless of the position of the fuel control devices interposed in the conduit 12, leading to the main or oven burner 10.

The fuel supply for the graduating or bi-metal heating pilot burner 34 and runner arm 37 is obtained through the fitting 46 which extends through the cap 27, conduit 47, needle valve 48, port 49 and bores 35 and 36.

In the operation of the device, assume that the oven is cold and the gas cock 14 has been turned to the open position. The pilot burner 41 is constantly lighted. The bi-metal 25 being cold, the valve head 21 is against seat 20 so that no

fuel passes to the burner 10. However, fuel passes seat 45 and through fitting 46 as previously described to ports 34 and 37. The gas issuing from those ports 37 adjacent the pilot 41 is ignited and from the other ports successively until the fuel issuing from ports 34 is ignited whereupon heating of the bi-metal 25 begins. When the bi-metal is sufficiently heated it causes the head 21 to move away from seat 20 whereupon fuel is supplied to the main burner 10 and is ignited by the pilot 41. As the heating of the bi-metal increases the head 21 moves toward the seat 45 and thereby decreases the supply of fuel to the ports 34 and 37. Thereupon the bi-metal 25 cools somewhat and the supply of fuel to ports 34 and 37 is again increased. The movement of the valve head between the seats 20 and 45 is so arranged that despite the alternate cooling and heating of the bi-metal 25 the supply of fuel to the main burner is not diminished beyond the maximum capacity of the burner, thus insuring constant operation of this burner except as regulated by the oven thermostat. However, should the gas supply fail in the manifold 11, so that the graduating burner 34 becomes extinguished, the bi-metal 25 will cool sufficiently to permit the head 21 to contact seat 20, and when the gas supply is restored no fuel will pass through the main burner until the pilot burner 41 is re-ignited.

It will be noted from Fig. 2, that the valve body 16, bi-metal member 25 and all moving parts are located outside the oven with only the runner arm and constant burning pilot 41 inside. This accessibility presents an advantage from the service and replacement standpoint.

Fig. 4 represents a construction in which the tube 38 of Fig. 3 is replaced by a bore 38' cast integrally with the runner arm 37.

In the modification shown in Fig. 5, 50 denotes a tube for conveying fuel to a constantly burning pilot such as 41 in Fig. 3 and 51 is a tube having a slot 52 therein which may be used instead of the ported runner arm 37 of Fig. 3.

Figs. 9 and 10 show another manner of attaching the lower end of the bi-metal member 25 to the end of stem 22. The bi-metal is slotted as indicated at 53 and a nut 54 threaded on the end of the stem 22 fits in this slot. The nut carries two oppositely extending pins 55 about each of which one of the bi-furcated ends of the bi-metal is bent.

While we have shown and described several embodiments of the invention it is obvious that other forms might be adopted, all coming within the scope of the appended claims.

We claim:

1. A device of the character described, an oven enclosure, a main burner within the same, a source of fuel supply for said main burner, an automatic valve in said fuel supply line for controlling the supply of fuel to the main burner, heat responsive means operating said valve, said valve and said heat responsive means being located outside said oven; a constantly burning pilot within said oven and in ignitable relation to the main burner, an elongated auxiliary burner extending through an opening in the wall of said oven enclosure, a fuel supply connection between said valve and said auxiliary burner, said auxiliary burner having the end within the oven in ignitable relation to said constant pilot, and the other end outside the oven in operating relationship to said heat responsive means, said auxiliary burner operating through said heat responsive means to open said valve to supply fuel to the main burner, means associated with said valve and operating to effect a reduction in the fuel supply to said auxiliary burner upon the opening of said valve, said auxiliary burner, heat responsive means and valve operating to close off the fuel supply to said main burner upon extinguishment of said auxiliary burner.

2. In combination, an oven, a main burner therein, a source of fuel supply, a constantly burning pilot within the oven and in ignitable relation to said burner, a valve controlling the fuel supply to the main burner, heat responsive means operating said valve, said valve and said heat responsive means being located exteriorly of the oven; and means comprising an auxiliary burner extending through an opening in said oven from a point outside the oven to a point adjacent said pilot whereby to be ignited from the latter, and a lateral extension on said auxiliary burner outside the oven controlling said heat responsive means, said auxiliary burner extension projecting at an angle to said opening in the oven whereby the heat responsive means is positioned beyond the direct line of oven heat through said opening; said valve, heat responsive means and said auxiliary burner operating to close off said main burner fuel supply upon extinguishment of said auxiliary burner.

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