Sept. 17, 1935. B. B. KAHN 2,014,848

STOVE

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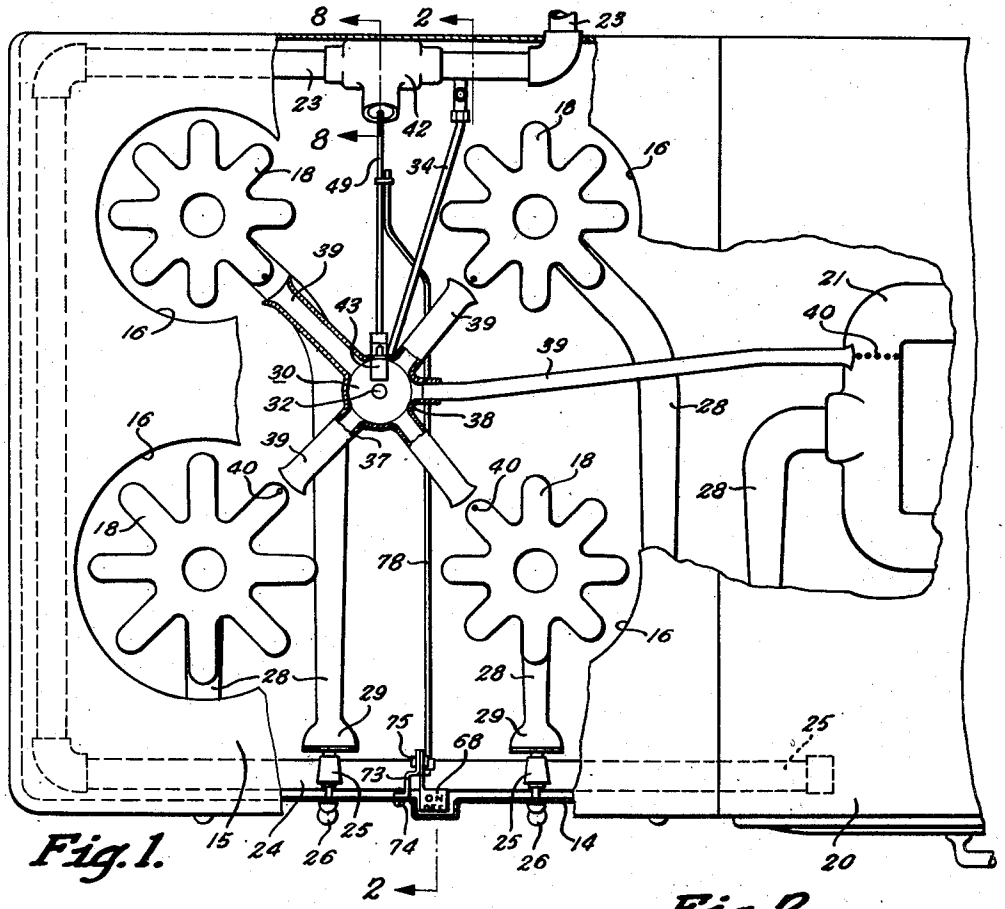


Fig. 1.

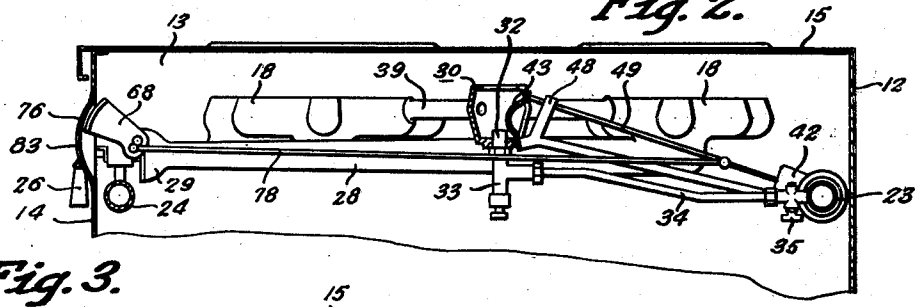
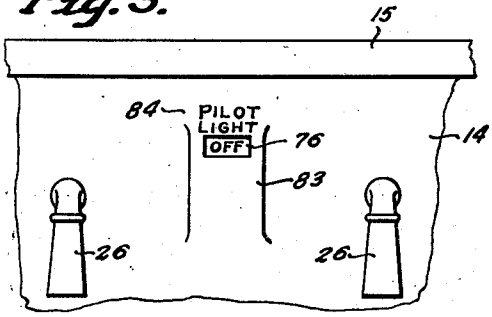


Fig. 2.

Fig. 3.



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Fig. 4.

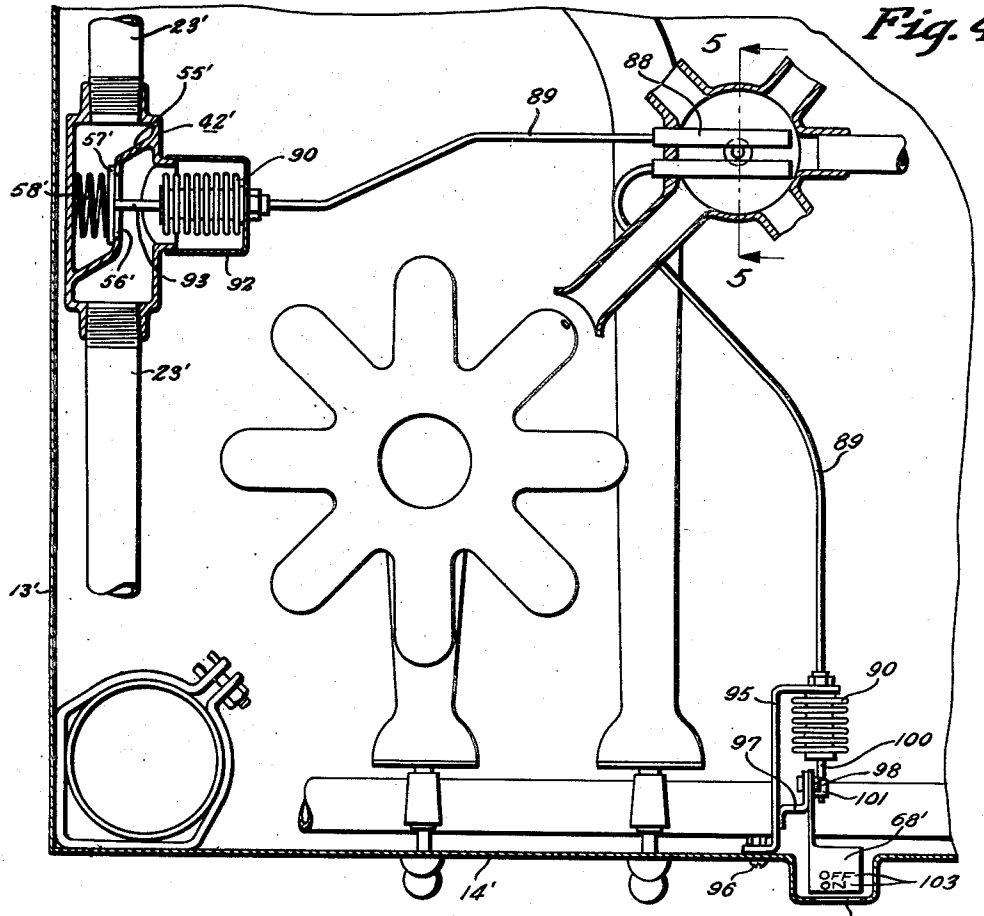
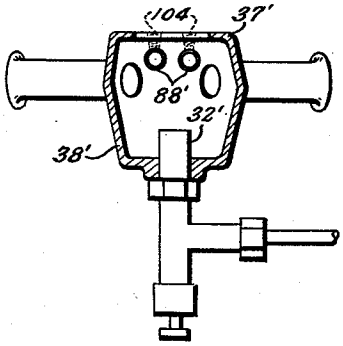


Fig. 5.



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Fig. 6.

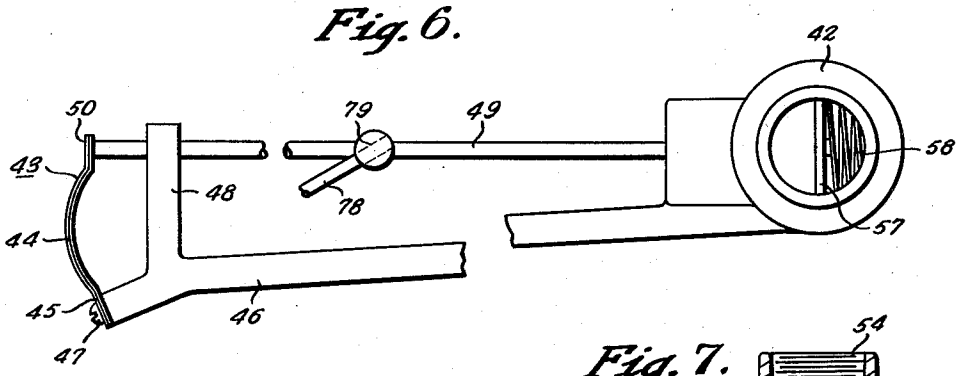


Fig. 7.

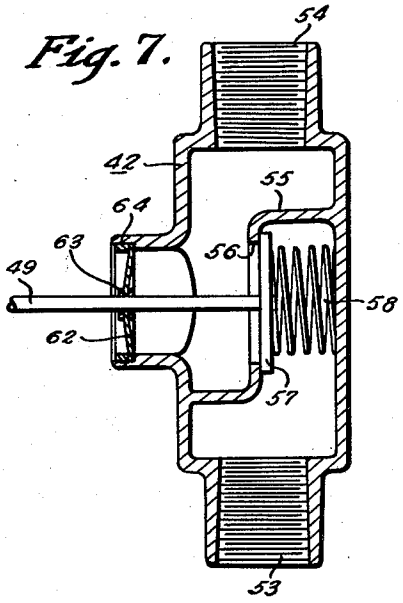


Fig. 9.

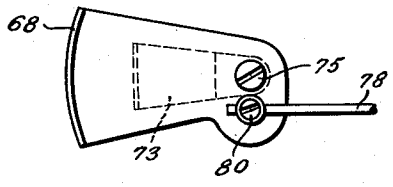


Fig. 8.

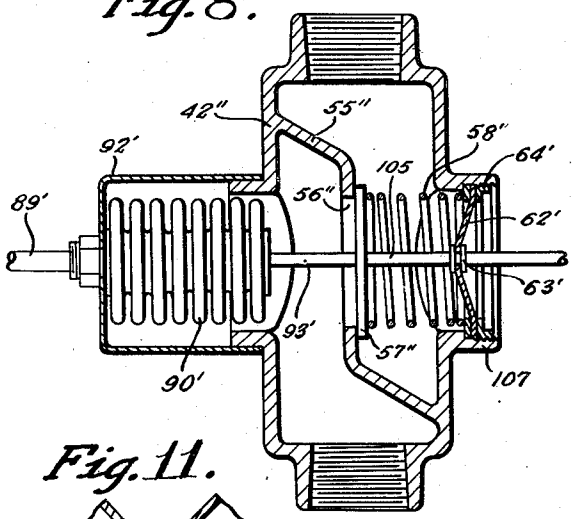


Fig. 10

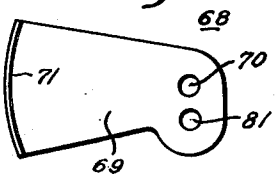
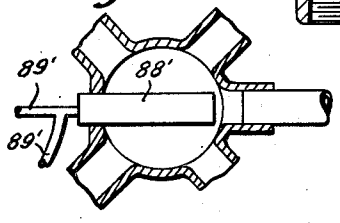


Fig. 11.



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UNITED STATES PATENT OFFICE

2,014,848

STOVE

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Application May 1, 1931, Serial No. 534,199

4 Claims. (Cl. 158—117.1)

This invention relates to stoves.

One of the principal objects of the invention is the provision in a stove of visual, or the like, means for indicating whether or not a burner, such as a normally burning pilot light, is functioning properly.

Another object of the invention is the provision of such means which comprises heat responsive mechanism associated with the pilot for automatically indicating whether or not the pilot is burning.

Another object of the invention is the provision in a stove of an automatically actuated valve responsive to abnormal variations in operation for preventing the uncontrolled escape of gas.

A further object of the invention is the provision in a stove having a normally burning pilot light arranged to automatically ignite gas escaping from a burner, of a control valve operatively associated with the gas supply of the burner and arranged to automatically close upon failure of the pilot.

Other objects and advantages of the invention will be apparent from the following description, the accompanying drawings, and the appended claims.

In the drawings, which illustrate preferred embodiments of the invention—

Fig. 1 is a plan view, partly in section, of a stove constructed in accordance with this invention;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary elevational view of the stove;

Fig. 4 is a fragmentary view taken similarly to Fig. 1 and showing a somewhat different arrangement of parts;

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 4;

Fig. 6 is a detailed view of the control mechanism;

Fig. 7 is a sectional view taken on the line 7—7 of Fig. 1;

Fig. 8 is a sectional view of a control valve;

Fig. 9 is a side elevational view of the indicating target;

Fig. 10 is a detailed view of the indicating target; and

Fig. 11 is a fragmentary view showing a different heat responsive member.

The drawings, in which like characters of reference designate like parts throughout the several views thereof, illustrate the invention as applied to a cooking stove having a plurality of burners which are arranged to be ignited from a common pilot light. As shown, the stove frame comprises side plates; the rear enclosing plate being designated by the numeral 12, the side plate 13, and the front plate 14. A cooking top 15 is provided having spaced openings 16 beneath which are mounted the cooking top burners 18. An oven 20 is positioned adjacent the cooking top 15 and is heated from a burner 21 positioned therein.

The various burners are supplied with fuel from a pipe 23 which is attached to a suitable source of supply and is connected to a manifold 24 extending across the front of the stove to which the control valves 25 for the burners are attached. Each burner is provided with a valve 25 having a control handle 26 readily accessible to the operator, and each burner is provided with a fuel passage 28 which extends between the burner and its respective valve; a suitable mixing chamber 29 being provided in each passage.

A pilot light 30 is provided for ignition of the burners and is shown mounted at substantially the midpoint between the cooking top burners 18. The pilot 30 comprises a burner 32 with which is associated a valve 33 for control of the supply of gas to the pilot which is fed thereto through a communicating pipe 34 connected to the supply conduit 23 through a shut-off valve 35.

The pilot light burns constantly, and means are provided so that whenever a burner valve is turned "on" the gas escaping from that burner will be automatically ignited from the pilot. As shown, the pilot 30 is provided with an igniting conduit 37 comprising a housing 38 which encloses the pilot flame, and spaced branches 39 of tubular section extending from the housing 38 toward each of the burners. Each burner is provided with one or more jet openings 40 which are directed toward the end of the adjacent conduit branch 39 so that upon opening a fuel valve 25 the gas escaping from the jets 40 will travel through the conduit branch and into the housing where it is ignited by the pilot flame; the flash back serving to ignite the gas issuing from the other jets of the burner.

A control is provided so that if the pilot should become extinguished gas may not issue from the burners, and means are incorporated in the control to indicate the operation of the pilot. A control valve housing 42 is provided in the fuel supply pipe 23 and has a movable valve member which regulates the passage of fuel through the pipe. The valve member is operatively connected to a heat responsive device 43 positioned within heating range of the pilot so that a change in temperature at the pilot will cause this heat respon-

sive device to be moved for actuation of the valve contained within the housing 42. As shown particularly in Fig. 1, the heat responsive device is in the form of a bimetallic strip 44 comprising metals of differing expansion value joined so that upon temperature change the strip is caused to bend. The bimetallic strip 44 is provided with an extended end 45 for attachment to a supporting member 46 as by means of the screws 47. The supporting member 46 may be formed, as shown, as an arm extending from the valve housing 42 and has provided on it an upstanding lug 48 for the support of a movable rod 49 extending from the valve housing 42 to the free end 50 of the element 44. The valve housing 42 has an inlet end 53 and a similarly threaded outlet end 54 for attachment to the supply pipe 23. The housing is provided with a dividing partition 55 having an opening 56 through which the passage of fuel is controlled by a valve member 57 attached to the control rod 49. The valve member 57 is constantly urged toward closed position by provision of a spring 58 and is moved toward open position by a movement of the bimetallic element 44 resulting from an increase in the temperature of the element.

The bimetallic element 44 is positioned closely adjacent the pilot flame and, due to the unequal expansion characteristics of the metals of which it is made, it is caused to flex as the pilot temperature varies. The element is constructed to move in a direction to open the valve 57 when it becomes heated and, so long as the pilot is burning, the valve is maintained open so that fuel may flow freely through the control valve housing 42 to the burners. If the pilot should become extinguished the element 44 moves in a reverse direction so that the valve 57, under urge of the spring 58, closes to prevent further passage of fuel to the burners. The passage through which the rod 49 extends within the housing 42 for attachment to the valve member 57 is closed by provision of a flexible diaphragm 62 which may be made of leather or other suitable material, and is shown securely fastened at 63 to the rod 49 and at 64 to the housing 42. As this diaphragm is subjected only to the fuel pressure in the burner supply there is but a slight load upon the flexible member.

To provide a visual indication of the operation of the pilot flame a movable indicating target 68 is provided within view of the stove operator, and is operatively connected to the element 44 so that the target will be moved as the element 44 moves. As shown, the target 68 comprises a plate like member 69 pierced for pivotal support at 70, and a perpendicularly extending flange portion 71 presenting a curved face circumferentially related to the pivot point 70. A supporting bracket 73 is attached to the housing portion 14 of the stove by means of the screws 74, and is provided with an attaching stud 75 for pivotal support of the target 68. The bracket 73 is arranged to support the target with the flange portion 71 parallel to the stove front and in operating relationship with an opening 76 provided therein. The flange portion 71 of the target has "on" and "off" indications provided thereon so that the operation of the pilot light can be determined by observing the indication appearing in the window 76.

A connecting link 78 extends from the rod 49 to the target for movement thereof as the element 44 is moved. As shown, the link 78 is attached to the rod 49 by a fitting 79, and is pivotally connected to the target at 80 by an attachment 81 which is positioned off center with respect to the pivot 70 an amount sufficient to swing the target through an arc of movement which will permit the indication "off" and "on" to appear within the window 76 as the element 44 moves due to temperature change. An embossed portion 83 is provided on the stove member 14 of such radius as to permit the target to be mounted closely adjacent the window 76, and to permit the window 76 to be positioned so that it is easily visible to the operator of the stove. The words "Pilot light" may be provided on the stove member 14 adjacent the opening 76, as shown at 84, as an aid to indicating the operation of the pilot.

Referring particularly to Fig. 4, an arrangement of parts is shown wherein the control valve 42' and the indicating target 68' are independently actuated. In this illustration of the invention expansible fluid controls are substituted for the mechanical linkage of Fig. 1. A control assembly comprises a tubular cell 88 which is positioned adjacent the pilot flame, and has attached to it a communicating tube 89 which connects to a bellows 90. The bellows 90 is caused to move by the expansion or contraction of the fluid contained therein upon subjecting the cell 88 to temperature change. As shown, the igniting conduit 37' of the pilot 32' is arranged to support two cells 88 so that these members stand within the confines of the housing 38' and within heating range of the pilot light 32'.

The expansible fluid control assembly which actuates the fuel supply valve 42' is arranged so that the bellows 90 is suitably supported, as indicated at 92, from the housing 42'. A rod 93 connects the free end of the bellows with the valve member 57' which controls the passage of fuel through the opening 56' in the dividing partition 55' of the valve. Expanding movement in the bellows 90 is resisted by a spring 58' which tends to move the valve member 57' to closed position. Tension of the spring 58' is counteracted by the pressure created in the bellows 90 upon subjecting the cell 88 to the heat of the pilot flame.

The bellows 90 of the expansible fluid control for actuating the target 68' is supported from the front plate 14' of the stove by means of a bracket 95 which is shown attached to the plate 14' by means of screws 96. The bracket 95 is provided with an extending wing 97 for pivotal support at 98 of the target 68'. A connecting rod 100 extends from the free end of the target bellows 90 to a pivotal attachment at 101 with the target 68' so that as the target bellows 90 moves upon temperature change, the target will be caused to swing through an arc sufficient to change the indications 103 which show alternately through the window 76' of the stove member 14.

Both the control valve and its associated actuating mechanism, and the indicating target and its actuating mechanism are complete self-contained units which may be removed bodily from the stove structure. The cells 88 are attached to the igniting conduit as by provision of set screws 105 which are threaded in the conduit housing and serve to clamp the cells where they pass through the housing wall. Upon removing the cells from the housing by loosening the set screws, the indicator assembly may be entirely removed by merely detaching the bracket 95, while the control comprising the valve housing 42' may be readily detached by merely unscrewing the valve from its position on the fuel supply conduit 23'.

If desired, the valve actuating mechanism and indicator actuating mechanism may be interconnected for operation from a single tubular cell 88' as indicated in Fig. 11. With such an rangement the communicating tubes 89' for the valve and indicating mechanisms are joined so that pressure change in the system, as a result of temperature change at the burner, is uniformly distributed to the two attached mechanisms to cause simultaneous operation of the valve control and of the indicator.

The valve structure shown in Fig. 8 illustrates an expansible fluid control which serves to actuate an indicating device as well as provide for regulation of the passage of fuel through the valve. The valve housing 42'' is provided with a dividing partition 55'' having an opening 56'' which is controlled by a valve member 57'' interconnected by a link 93' with the free end of a bellows 90'. The bellows 90' is carried by a shell 92' which serves as an enclosing housing for the opening in the valve through which the connecting member 93' projects. The fixed end of the bellows 90' has a tube connection 89' which extends to a heat responsive element such as the cell 88 shown. The connecting member 93' which serves to actuate the valve member 57'' continues beyond the valve member, as shown at 105, and passes from the valve housing 42'' through an opening defined by the flange 107. The rod extension 105 is adapted to be connected to an indicating target such as that shown in Fig. 9, so that the operator may readily determine the position of the supply valve and the condition of the pilot light. A flexible closure is provided for the opening through which the rod extension 105 passes and is shown in the form of a flexible diaphragm 62' which is held to the rod 105 by the clamping washers 63', and is sealed adjacent the valve flange 107 by being clamped as shown at 64'. This valve, like that shown in Fig. 7, is provided with a spring 58' which is positioned between the valve member 57'' and the sealing means 64' to constantly urge the valve member toward closed position. If desired, a metallic bellows similar to that shown at 90' may be substituted for the flexible sealing diaphragm 62'.

While the forms of apparatus herein described constitute preferred embodiments of the invention, it is to be understood that the invention is not limited to these precise forms of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. In a stove having a burner and a fuel supply therefor, means operable to indicate whether the burner is ignited or extinguished, said indicating means comprising an expansible fluid container having a portion positioned in heating relation to the burner, an expansible portion positioned remotely from the burner, and a target operatively connected to the expansible portion of the fluid container.

2. In a stove having a burner and a fuel supply therefor, means operable to indicate whether the burner is ignited or extinguished, said indicating means comprising a flexible container, a movable target, means pivotally supporting said target and supporting said flexible container, means interconnecting said target and the said container, and a fluid containing cell positioned in heating relation to said burner and in communication with said flexible container to produce movement of said target upon a change in temperature of the cell.

3. In a stove having a burner and a fuel supply pipe therefor, a pilot light operable to ignite the burner, a valve positioned in said fuel supply pipe to control the passage of fuel to the burner, an expansible fluid container having a portion positioned adjacent said pilot light and an interconnected expansible portion operatively attached to said valve and operable to move the valve upon a change in temperature of the expansible fluid container, a movable indicator operable to indicate whether the pilot is ignited or extinguished, and a second interconnected expansible portion of the expansible fluid container operatively connected to said movable indicator and operable to move the indicator to visually indicate the temperature condition at the pilot light.

4. In a stove having a burner and a fuel supply pipe therefor, a pilot light operable to ignite the burner, valve means connected to said fuel supply pipe to regulate the passage of fuel therethrough, a movable indicator operable to indicate whether the pilot is ignited or extinguished, and control means for said valve means and indicator, said control means comprising a containing means for an expansible fluid which fluid is responsive to the heat of the pilot light, portions of said last-named means being operatively connected to said valve and to said indicator whereby a change in the heat transferring condition at said pilot light will operate both said valve and said indicator.

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