Nov. 8, 1938. H. J. LONG 2,135,585

LIGHTING CONTROL FOR FUEL BURNERS

Filed June 25, 1936

Fig. 1.

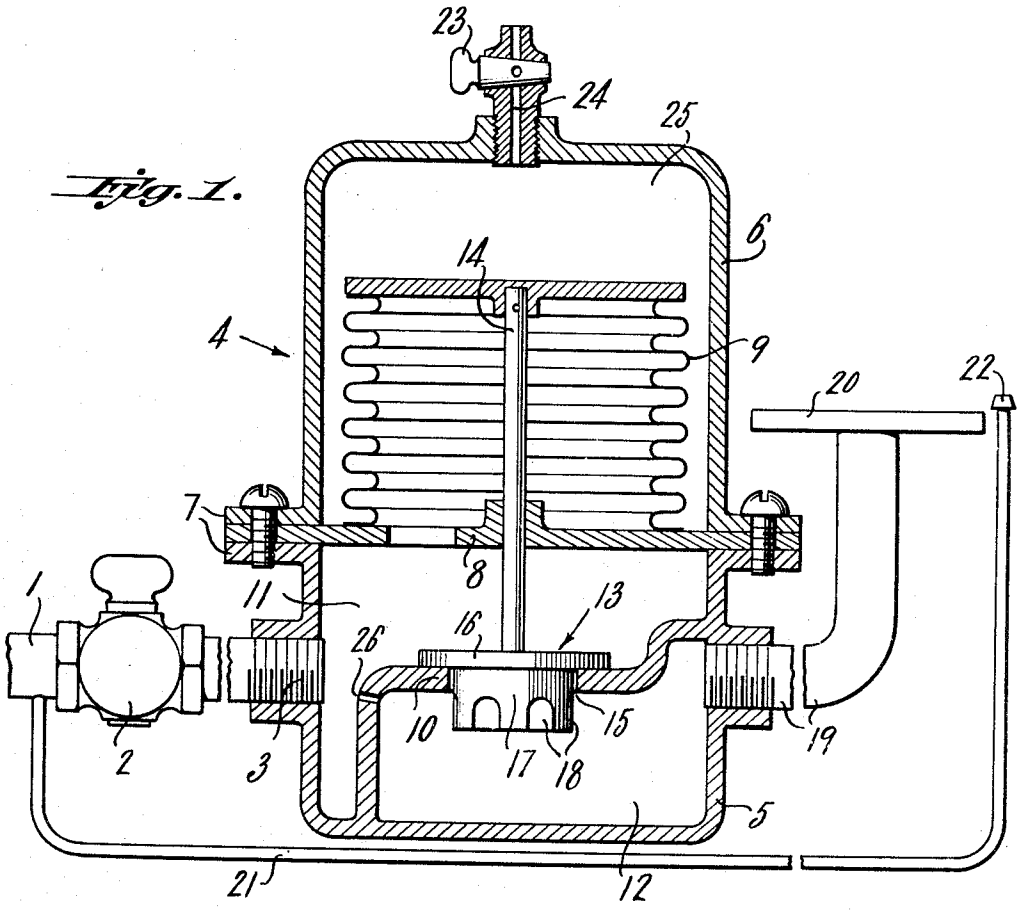


Fig. 2.

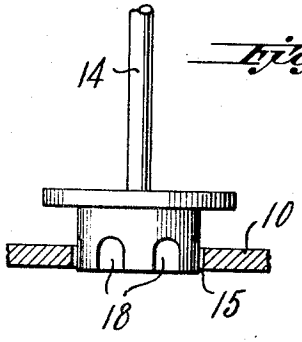
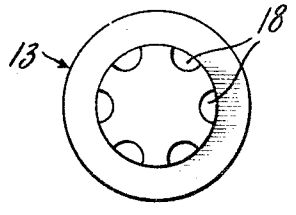


Fig. 3.



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LIGHTING CONTROL FOR FUEL BURNERS

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Application June 25, 1936, Serial No. 87,179

1 Claim. (Cl. 158—115)

This invention relates to a device for effecting a gradually increasing flow of fuel to a burner during the lighting thereof.

It is common practice particularly in connection with gas burners to provide a continuously burning pilot flame adjacent the main burner for igniting the latter when the main gas valve is opened. Where the main burner is relatively large, and consequently possesses a large number of jet orifices, a material time interval passes before ignition spreads from the jets adjacent the pilot to those remote therefrom. By the time the flame has progressed to the more remote jets, a considerable quantity of gas has escaped therefrom which gas tends to form an explosive mixture with the air in the combustion space which ignites with an explosive puff. Such operation is objectionable in large burners of the Bunsen type and becomes almost intolerable in luminous flame burners of even moderate size, since the semi-explosive combustion occurring at this time results in the formation of soot, and occasionally results in a puff strong enough to extinguish the pilot as well as the main burners.

It is the principal object of the present invention to overcome the above mentioned defect and to this end a device is provided which will so retard the flow of fuel to the burner that during the lighting period only sufficient fuel flows to the burner to permit ready ignition at each jet followed by an increasing flow which permits the flame to rise to its fullest extent after ignition has been effected. The presence of material quantities of unburned gas in the combustion chamber prior to ignition at all parts of the burner is thereby avoided.

The above and other objects and features of this invention will be apparent from the following detailed description taken in conjunction with the accompanying drawing, in which:

Fig. 1 is a sectional view with parts shown in side elevation, of a device constructed in accordance with the present invention; Fig. 2 is a detail of the valve element thereof, shown in open position; and Fig. 3 is a bottom plan view of said valve element.

Referring to the drawing, reference numeral 1 indicates a gas supply pipe having a main gas valve 2 which is shown as a manually operable cock, but which, it will be understood, may be any conventional gas supply valve, either manually or automatically actuated. The supply pipe 1 is connected with the inlet opening 3 of a housing 4 which is constructed in two parts comprising a lower casting 5 and an upper casting 6 each having outwardly extending flanges 7. A perforated partition 8 is clamped between the two castings 5 and 6 and forms a support for a bellows 9 which is welded or otherwise attached thereto with an air-tight joint.

A partition 10 divides the lower casting 5 into an inlet chamber 11 and an outlet chamber 12. A valve 13 having a stem 14 attached to the bellows 9 is adapted to control an opening 15 in partition 10, affording communication between the inlet chamber 11 and the outlet chamber 12. The valve 13 is provided with a flat disk-shaped portion 16 adapted to seat on the surface of partition 10 and a depending cylindrical portion 17 which obstructs the opening 15 during the first portion of the upward movement of the valve 13. Grooves 18 are provided in the lower end of the cylindrical portion 17 permitting an increased flow through the opening 15 after a substantial upward movement of the valve 13. The bleed opening 26 in the partition 10 permits the flow of a small amount of gas from the inlet chamber 11 to the outlet chamber 12 whenever the main gas valve is opened, whether or not the valve 13 is open. It will be understood that the bleed opening 26 may be omitted and all of the initial flow of gas provided by means of a slight clearance between the cylindrical portion 17 of the valve 13 and the side walls of opening 15. Such clearance may be provided to augment the flow during the initial portion of the opening movement of the valve. As shown in the drawing, such clearance is somewhat exaggerated for the purpose of clarity. An outlet pipe 19 connects the outlet chamber 12 with a main gas burner 20 which as shown is a conventional type of luminous flame burner in connection with which the invention is particularly useful. A bypass passage 21 connected with the supply pipe 1 at a point ahead of the main gas valve 2 leads to a pilot burner 22 positioned adjacent the main burner 20. An adjustable cock 23 controls a passage 24 leading from a chamber 25 formed between the upper side of the bellows 9 and the casting 6 to provide an adjustable vent from said chamber to the atmosphere.

In operation, when the main gas valve 2 is opened, gas from the pipe 1 flows to the inlet chamber 11 of the housing 4 and a portion thereof passes through openings in the perforated partition 8 to increase the pressure in the interior of bellows 9. A small quantity of the gas also flows through the orifice 26 in partition 10 and thence directly to the main burner 20. Ignition is effected at the jet orifice adjacent the pilot burner

22 and spreads rapidly to all jets of the burner 20, providing a low flame at all parts thereof. In the meantime as the pressure rises in the interior of the bellows 9, this member tends to expand upwardly. This expansion is at first opposed only by atmospheric pressure of the air in chamber 25, but as expansion of the bellows into the chamber tends to compress this air, pressure on the two sides of the bellows tends to equalize. This back pressure of the air in chamber 25 prevents the bellows from expanding rapidly, and its rate of expansion is dependent upon the rate at which air is permitted to leak from the chamber to the atmosphere by way of passage 24. As this passage is controlled by adjustable cock 23, the rate of expansion of the bellows and therefore the rate of lift of valve 13 may be manually controlled. The cock 23 is so adjusted that after opening the main gas valve 2, sufficient time elapses to permit the gas flowing to the main burner through orifice 26, and also through the slight clearance between the valve 13 and the passage 15 when the valve is slightly lifted, to become ignited over the entire face of the burner 20 before the bellows 9 moves sufficiently to lift the valve 13 to its full open position.

It will be seen that the device above described insures that the ignition of the burner will be effected during a period when the rate of flow of gas thereto is relatively low. This is especially advantageous in connection with luminous flame burners, where relatively large quantities of gas may flow at high velocity from the jets remote from the pilot burner or other ignition means before the flame has had time to spread fully over the burner. It will also be apparent that the duration of the initial period of restricted gas supply may be predetermined to correspond to the normal period required to fully ignite the particular burner with which the device is used.

Though there has been herein described for the purposes of illustration but a single preferred embodiment of the invention, other embodiments within the scope of the appended claim will be obvious to those skilled in the art. Furthermore, it will be obvious that in the application of the device to the numerous forms of manually and automatically controlled gas appliances, numerous adaptations and combinations may be made.

Having thus described the invention, what is claimed as new is:

In a lighting control for gas burners of the type including a main burner and a pilot adjacent thereto, a supply line leading to said main burner, a casing connected in said supply line, a diaphragm forming a partition dividing the interior of said casing into two chambers, and a valve attached to said diaphragm controlling the flow of gas through said casing, the effective area of said diaphragm exposed to gas pressure being independent of the position of said valve, said valve carrying a skirt portion for partially obstructing the orifice controlled by said valve during a predetermined movement of said diaphragm.

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