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BURNER IGNITING DEVICE

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4 Claims. (Cl. 158-115)

My invention relates to a new and useful igniting device for burners, such as the oven burners of gas cooking stoves, an object being to provide simple, inexpensive and efficient means for controlling the supply of fuel to an oven or other main burner and to a pilot burner for igniting said main burner.

Where a main burner is used at infrequent or different intervals, such as in connection with a gas cooking stove, a pilot burner is often employed to ignite the main burner when fuel is supplied to said main burner, the pilot burner being constantly lighted. Usually, the pilot burner is normally turned down to provide a small flame and incur a minimum consumption of fuel, means being provided to turn the pilot burner up and provide a larger flame for efficient ignition of the main burner when the latter is turned on. Very often, as in connection with the main burner in the oven of a gas cooking stove, said main burner is used with the flames thereof turned down relatively low so that such relatively low flames of the main burner are capable of being accidentally extinguished in some way, such as through sudden closing of the oven door. Obviously, if this should occur when the pilot burner is turned down, the main burner would not be positively re-lighted, at least not completely, with the result that considerable gas would escape from the main burner and fill the oven with the attendant danger of fire and explosion.

The primary object of the present invention, therefore, is to provide means for automatically turning the pilot burner up when the main burner is turned down relatively low, so that said pilot burner will effectively and completely re-light the main burner in a positive manner should the flames of the latter be accidentally extinguished when so turned down.

More specifically, I contemplate the provision of means which will not only carry out the above-mentioned object, but which will cause the pilot light to be turned down when the main burner is turned off and also when the main burner is turned up to provide relatively large flames which are not easily extinguished accidentally, thereby minimizing consumption of fuel for operation of the pilot burner.

As the above objects of the present invention may be carried out in different ways and through the employment of different specific means, the specific embodiments of the present invention shown in the accompanying drawing are merely illustrated by way of example.

With the above general objects in view, and others that will become apparent as the nature of the present invention is better understood, such invention consists in the novel form, combination and arrangement of parts hereinafter more fully described, shown in said accompanying drawing and claimed.

In the drawing:

Figure 1 is a somewhat diagrammatic view partly in section, partly in elevation, and partly in plan, illustrating an embodiment of my invention associated with the oven burner of a gas cooking stove.

Figure 2 is an enlarged fragmentary vertical section taken substantially on line 2-2 of Figure 1.

Figure 3 is an enlarged fragmentary section taken on line 3-3 of Figure 2.

Figure 4 is a view similar to Figure 1 illustrating another embodiment of my invention.

Figure 5 is an enlarged fragmentary section on line 5-5 of Figure 4; and

Figure 6 is a view somewhat similar to Figure 5 with the movable valve member in a different position of adjustment.

Referring in detail to the drawing, 5 indicates a relatively large main burner, and 6 indicates a pilot burner for igniting said main burner. Fuel is supplied from a pipe 7, the fuel passing from this pipe to a manifold 8, and then through a branch pipe 9 to the main burner 5 under control of a valve 10 interposed in said branch pipe 9. Fuel is also constantly supplied to the pilot burner 6 through a small pipe 11 so that said pilot burner is kept constantly burning. If desired, a safety valve 12 of the type generally disclosed in the U. S. patent to C. Ferrari No. 1,624,044 dated April 12, 1927, may be employed in the gas supply pipe 7 so as to automatically close when the flow of fuel ceases and to prevent flow of gas to the burners 5 and 6 should such flow be subsequently resumed, until said valve 12 is manually re-opened.

The present invention contemplates the provision of some means for allowing a predetermined restricted flow of gas to the pilot burner 6 when the valve 10 is closed and the main burner 5 is shut off, so that said pilot burner 6 is normally turned down and consuming a minimum amount of fuel. Means is also provided for automatically supplying additional fuel to the pilot burner 6 so that the latter is turned up for efficiently and positively igniting the main burner 5 when the valve 10 is opened to turn said main burner 5 on. With the construction of Figure 1,

this is accomplished by connecting the pipe 11 with the manifold 8 and providing a valve 13 in the pipe 11 for regulating the amount of fuel allowed to flow to the pilot burner 6 from the manifold 8 so that small flames of the desired size will be normally provided by the pilot burner 6 as indicated by dotted lines at *a* in Figure 1, and by connecting the branch pipe 9 at the outlet side of valve 10 with the pipe 11 at the outlet side of valve 13 by means of a pipe 14 having a valve 15 for regulating the flow of fuel there-through. Thus, when the valve 10 is opened to supply fuel to the main burner 5, additional fuel is supplied to the pilot burner 6 by way of pipe 14 so that said pilot burner will be turned up to provide extended jets or flames capable of efficiently and positively igniting the main burner 5, as indicated at *a'* in Figure 1. Obviously, by adjusting the valve 15, the size of the flames when extended at *a'* may be properly regulated. In this embodiment, the valve 10 may consist of an ordinary control valve of the turn plug type. However, as shown in Figure 4, the pipe 14 and the valves 13 and 15 may be eliminated by employing a special valve 10*a* in place of the valve 10. As shown, the valve 10*a* has a second relatively small outlet 16 to which the pipe 11 is connected instead of being connected to the manifold 8, said outlet 16 being in constant communication with the inlet of valve 10*a* and manifold 8 by means of a groove 17 provided in the inner surface of the casing of valve 10*a* and providing for the necessary restricted flow of gas to the pilot burner 6 so that the latter will normally have the small flames as indicated at *a*. Further, the movable member 17' of valve 10*a* has its gas passage 18 enlarged at one end as at 19 so as to afford unrestricted flow of gas from the manifold 8 to the pipe 11 when said movable valve member 17 is in open position as shown in Figure 6, thereby allowing the necessary additional flow of fuel to the pilot burner 6 to cause the latter to be turned up and provide or afford the extended flames as at *a'* when said valve 10*a* is opened and the main burner 5 is turned on. In either or both embodiments, an automatic thermostatic temperature control valve may be employed for regulating the temperature within the oven or chamber 20 heated by the main burner 5, said automatic thermostatic temperature controlling valve being indicated at 21 and being of the type generally disclosed in the patent to R. E. Newell et al. No. 1,998,818, dated April 23, 1935. If such a thermostatic temperature control valve is employed, it is simply necessary to interpose the same in the pipe 9 between the valve 10 or the valve 10*a* and the main burner 5 as shown in Figure 1 and in Figure 4, the thermo-sensitive element 22 of said valve 21 being of course located in the chamber 20 as usual.

An essential part of the present invention is the provision of means for automatically turning the pilot burner 6 down after the main burner 5 has been turned on and lighted by said pilot burner and for keeping said pilot burner 6 turned down as long as said main burner 5 is burning and turned on relatively high so that its flames are not readily extinguished accidentally, thereby avoiding wasteful consumption of fuel by the pilot burner. Another important feature of the present invention is the provision of such means so that it will automatically cause the pilot burner 6 to be turned up when the main burner 5 is turned down to a point where it pro-

duces relatively small flames capable of being readily extinguished accidentally, whereby said main burner 5 will be effectively and positively re-lighted in case its flames should become accidentally extinguished when so turned down, thereby preventing escape of gas from the main burner 5 into the oven or chamber 20 and creating a fire or explosion hazard. As shown, these results may be had by providing a thermostatically operated control valve 22 for the pilot burner 6 interposed in the pipe 11, the thermo-sensitive element 23 of the thermostatic means for operating the valve 22 being so arranged that it will not respond to the general temperature of radiated heat in the oven or chamber 20, but will be contacted by and thereby respond only to the direct heat of the flame of main burner 5 itself. This is accomplished by mounting the thermo-sensitive element 23 so that a portion of the flame of the main burner 5 plays directly upon said thermo-sensitive element 23 as illustrated in Figure 2, the arrangement further being such that when the burner 5 is turned on and the thermo-sensitive element 23 is unheated, the valve 22 will be fully opened as shown in Figure 3. Obviously, if the burner 5 is burning and turned up high, the thermo-sensitive element 23 will expand so as to operate the valve 22 and turn the pilot burner 6 down, as well as to keep such pilot burner turned down as long as the main burner 5 is lighted and turned up relatively high. On the other hand, should the main burner 5 be turned down relatively low to a point where it provides small flames capable of being readily extinguished accidentally and affording relatively little heat, the thermo-sensitive element 23 will expand to a certain extent and cause the pilot burner 6 to be turned up for producing extended flames capable of efficiently and positively re-lighting the main burner 5 in case its flames should be accidentally extinguished when so turned down relatively low.

Obviously, the thermostatic actuating means for the valve 22 may be of any specific construction or type, and the valve 22 may be located either within or outside the chamber or oven 20. When the valve 10 or 10*a* is closed and the main burner 5 is turned off, the pilot burner 6 will be turned down to provide the small flame as at *a*, although the valve 22 is fully opened at this time. This is due to the fact that no fuel is supplied through pipe 14 in Figure 1 and only a limited supply of fuel is allowed to pass to the pilot burner 6 from manifold 8 by the valve 13, or only a limited amount of fuel is allowed to flow to the pilot burner 6 in Figure 4 by way of groove 17 as shown in Figure 5. However, if the valve 10 or 10*a* is opened fully as is ordinarily done when turning the main burner 5 on, additional fuel will be simultaneously supplied to the main burner 6 either by way of pipe 14 of Figure 1 or by way of the enlarged bore portion 19 of valve member 17' in Figure 4 as shown in Figure 6. This results in turning the pilot burner 6 up when the main burner 5 is turned on so as to provide the extended flame *a* capable of positively and effectively igniting the main burner 5. As a portion of the flame of the main burner 5 plays upon the thermo-sensitive element 23, it is soon heated and expanded so as to operate the movable member of valve 22 and turn the pilot burner 6 down again, as well as to maintain said pilot burner in turned down condition as long as the main burner is turned up relatively high. Should the main

burner 5 be turned down relatively low so as to provide relatively small flames which might be readily extinguished accidentally, either through operation of valve 10 or 10a or thermostatic control valve 21, the small flames from burner 5 will allow the thermo-sensitive element 23 to cool to a great extent and expand so as to operate the movable member of valve 22 and turn the pilot burner 6 up so that said pilot burner affords relatively large or extended flames capable of effectively and positively re-lighting the main burner 5 in case its relatively small flames should become accidentally extinguished from any cause. It will thus be seen that I have provided a means whereby operation of the main burner 5 is partially or completely extinguished condition is prevented so as to prevent gas from escaping from the main burner 5 into and filling the chamber or oven 20 with the consequent creation of a fire or explosion hazard. It will further be seen that this means provides for the effective and positive lighting or re-lighting of the main burner at all times, although minimizing consumption of fuel by the pilot burner due to the fact that the latter is turned down whenever the main burner is turned off or turned up relatively high.

What I claim as new is:

1. In combination, a main burner, a manually operable valve for controlling the flow of fuel to said main burner, a pilot burner for igniting said main burner, and a thermostatically operated valve for controlling the flow of fuel to said pilot burner, said thermostatically operated valve having its thermo-sensitive element arranged so that a portion of the flame of the main burner will play directly thereon for automatically causing the pilot burner to be turned down when said manually operable valve is actuated to turn the main burner up and for automatically causing the pilot burner to be turned up when said manually operable valve is actuated to turn the main burner down.

2. In combination, a main burner, a pilot burner for igniting said main burner, means including a manually operable control valve for turning the main burner on and simultaneously turning the pilot burner up and for turning the main burner off and simultaneously turning the pilot burner down, and a thermostatically operated valve for controlling the flow of fuel to said pilot burner,

said thermostatically operated valve having its thermo-sensitive element arranged so that a portion of the flame of the main burner will play directly thereon for automatically causing the pilot burner to be turned down when said manually operable valve is actuated to turn the main burner up and for automatically causing the pilot burner to be turned up when said manually operable valve is actuated to turn the main burner down.

3. In combination, an inverted main burner, a manually operable valve for controlling the flow of fuel to said main burner, a pilot burner for igniting said main burner, a valve for controlling the flow of fuel to said pilot burner, and thermostatically operated means for actuating said last-named valve including a thermo-sensitive element arranged adjacent said main burner so as to be contacted by and to respond only to the direct heat of the main burner flame for automatically turning the pilot burner up when said manually operable valve is actuated to turn the main burner down and for automatically turning the pilot burner down when said manually operable valve is actuated to turn the main burner up.

4. In a gas cooking stove, the combination of an oven, a main burner for heating said oven, a pilot burner for igniting said main burner, means including a manually operable control valve for turning the main burner on and simultaneously turning the pilot burner up and for turning the main burner off and simultaneously turning the pilot burner down, an adjustable thermostatically operated control valve arranged between said main burner and said manually operable control valve for automatically turning the main burner down when the oven is heated to a predetermined temperature, a valve arranged between said manually operable control valve and said pilot burner for controlling the flow of fuel to said pilot burner, and thermostatically operated means for actuating said last-named valve to automatically turn the pilot burner up when said main burner is turned down by said thermostatically operated control valve, said thermostatically operated means including a thermo-sensitive element arranged so that a portion of the flame of the main burner will play directly thereon.

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