Feb. 23, 1954 R. A. WITTMANN 2,670,035

SAFETY CONTROL SYSTEM FOR GAS BURNERS EMPLOYING SINGLE POINT IGNITION

Filed Jan. 17, 1947 3 Sheets-Sheet 1

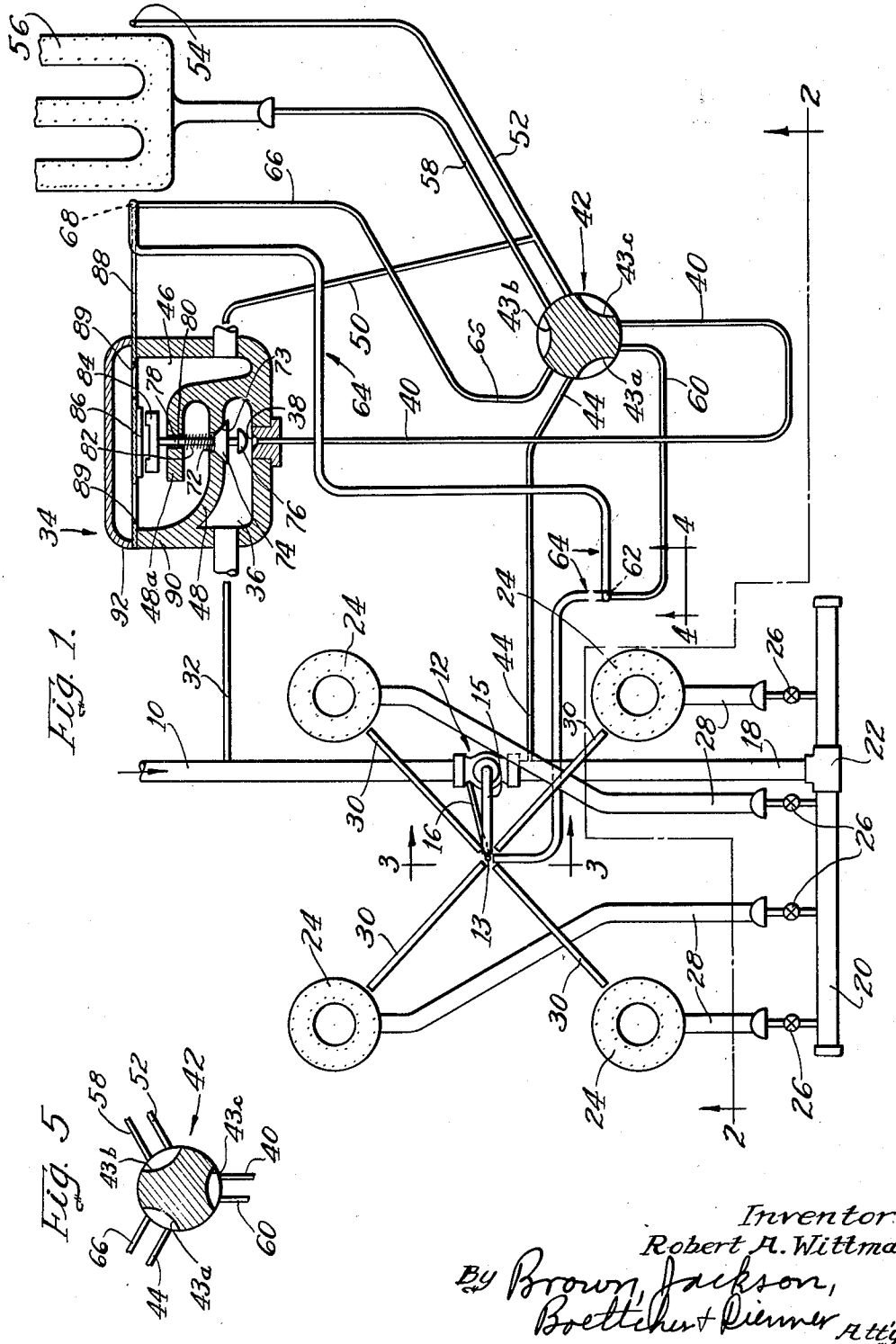

Fig. 1.

Fig. 5

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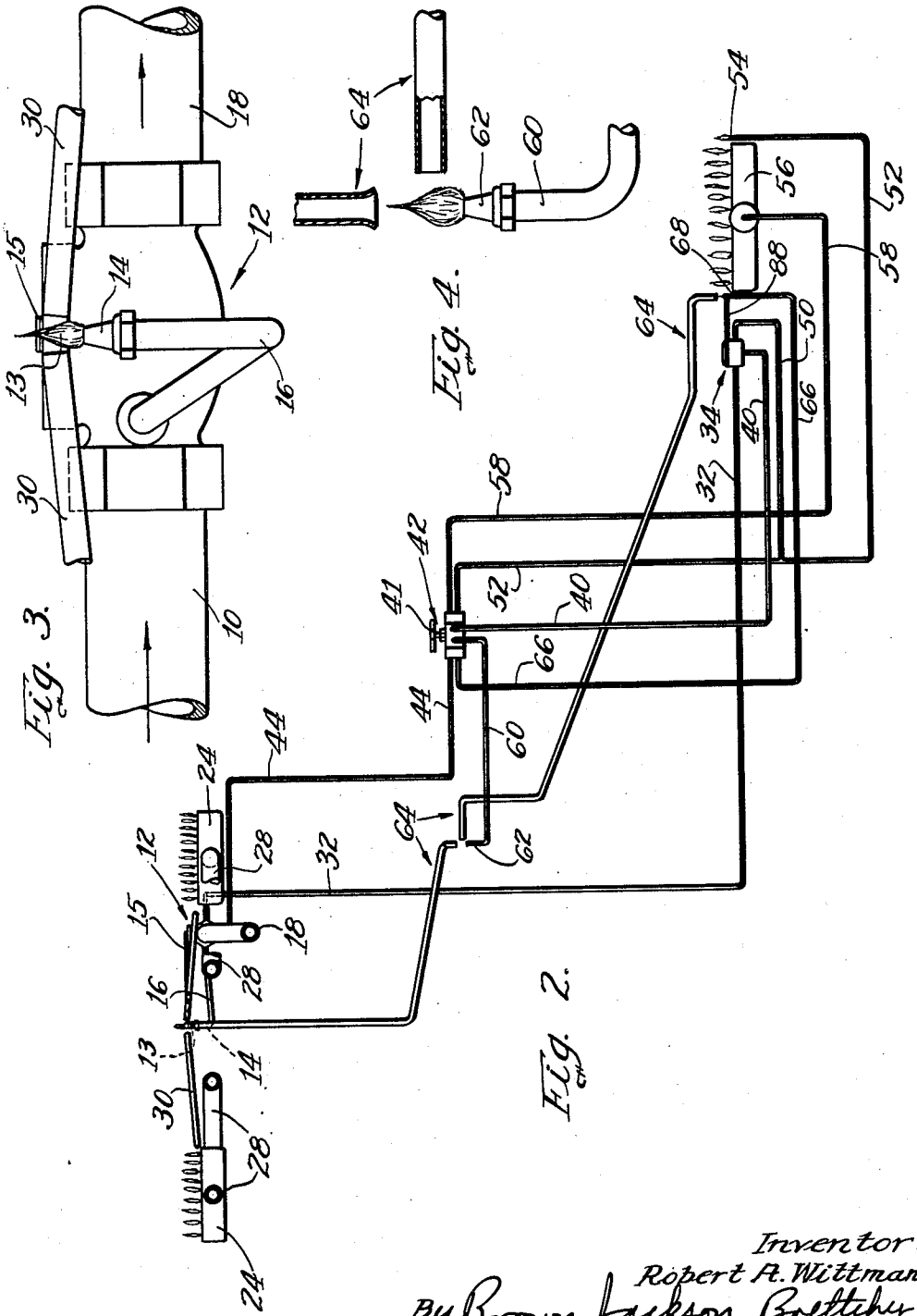

Fig. 3.

Fig. 4.

Fig. 2.

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Fig. 6.

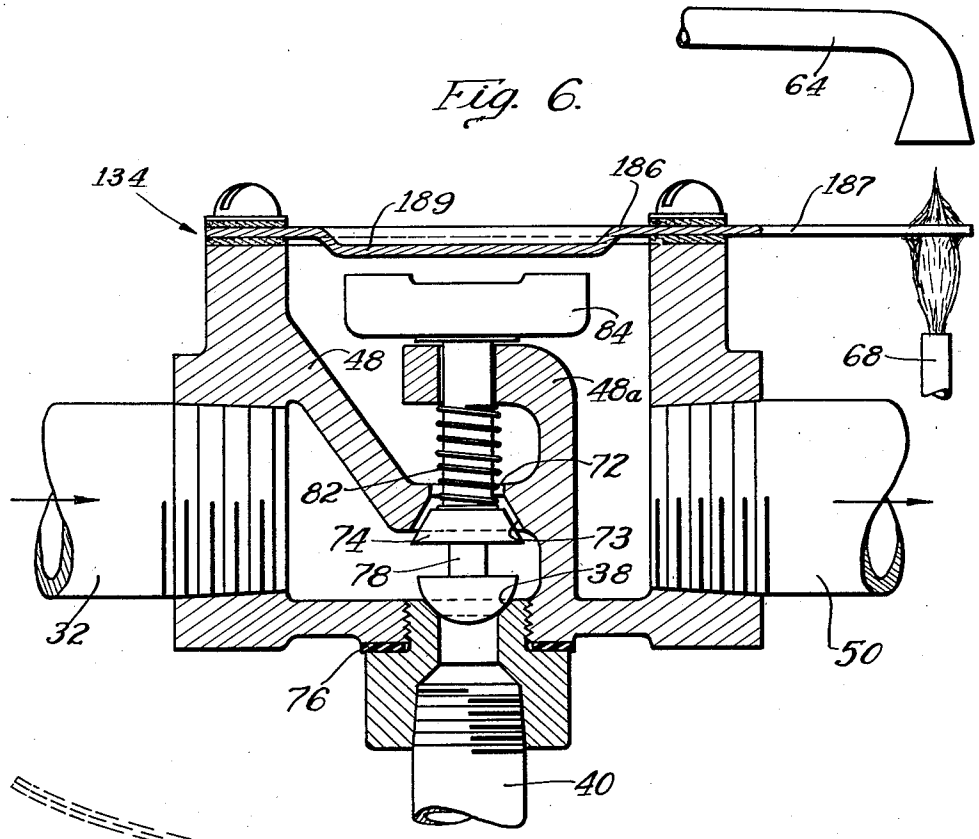
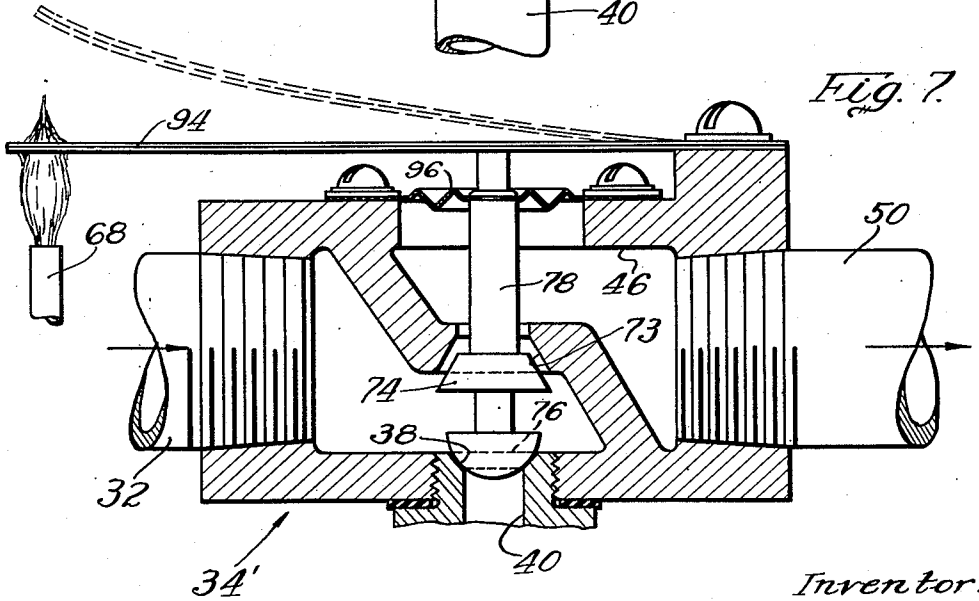


Fig. 7.



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UNITED STATES PATENT OFFICE

2,670,035

SAFETY CONTROL SYSTEM FOR GAS BURNERS EMPLOYING SINGLE POINT IGNITION

Robert A. Wittmann, Chicago, Ill.

Application January 17, 1947, Serial No. 722,584

18 Claims. (Cl. 158—135)

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My invention relates, generally, to single point ignition and safety controls for gas burning systems, and, particularly, for domestic gas ranges employed for cooking food.

The usual form of gas cooking range has a plurality of "top" gas burners, located on a top surface of the range, and a pilot light therefor, together with one or more gas burners remote from the top burners and located in a compartment frequently referred to hereinafter as an "oven." The "oven burner" (or burners) is employed for baking, roasting and broiling operations. Because the pilot light in such ranges serves to light only the top burners, it is necessary to light the oven burner by separate means, a match usually being employed. This requires the operator to turn on the gas and then to ignite the gas promptly, since, if there is delay in igniting it, an explosive mixture accumulates which may become large enough to explode or to flare out of the oven and burn the operator when the mixture is ultimately lit.

It is an object of my invention to provide a single point ignition system for a gas range which entirely eliminates the use of matches, or similar devices, for ignition of oven burners by having the oven burner, as well as the top burners, lit by one constantly burning pilot light, which is remotely located from the oven burner. "Single point ignition," as generally known, comprises means whereby the top burners of a gas range and the oven burner or burners are all lit from one constantly burning pilot light which is generally located centrally with respect to the top burners of the gas range. By means of flash tubes which are adapted to carry gas from a burner to a pilot light, the oven burners, or a pilot therefor, may be lit directly from the constantly burning pilot light which is usually adjacent the top burners. A constantly burning pilot light in the oven is not satisfactory, since it produces uneven oven temperature, is uneconomical, and is dangerous if it fails to light or is extinguished, since it will then permit an accumulation of gas within the oven to an explosive degree.

In previous attempts to employ a single point ignition system an automatic temperature responsive gas valve has been employed in the gas supply line of the oven and has had its heat responsive elements adapted to cause opening of the valves when the pilot for the oven burner is lit. However, when the oven pilot is turned off, in order that the automatic temperature responsive valves will close to cut off the gas

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supply to the main oven burner, there has been a failure to obtain prompt shutting off of the oven burner, since the heat responsive means of the automatic valves is still subject to the high ambient temperature of the oven in which the main oven burner continues to burn. Consequently, the heat responsive means of the automatic valve cools slowly and the main oven burner is not shut off for some little time.

It is an object of my invention to provide a single point ignition system for top burners and an oven burner, wherein the oven burner is controlled by a single manually operated "on-off" valve, the oven burner lighting automatically in less than 60 seconds when the valve is turned to its "on" position and being instantaneously shut off when said manually controlled valve is turned to its "off" position.

In the accomplishment of the foregoing object I employ with the manually controlled valve an automatic heat responsive valve which may be positioned either in or out of the ambient temperature of the oven and the oven burner, but which is responsive to said oven pilot burner. The automatic heat responsive valve controls the flow of gas to the oven burner and to an auxiliary pilot for the oven burner when the manually operated valve is turned to its "on" position. This automatic valve will not open to permit the flow of gas to the oven burner and auxiliary pilot until the oven pilot has been lit from the constantly burning top burner pilot light. Instantaneous shutting off of the flow of gas to the oven burner and to the pilot for the oven burner is accomplished by turning of the manually controlled valve to its "off" position. The auxiliary oven pilot however continues to burn, since the flow of gas thereto passes through the automatic heat responsive valve. Since the automatic heat responsive valve is not instantaneously closed after the manually controlled valve is moved to its "off" position, continued burning of the auxiliary pilot in the oven protects the user of the gas range who shuts off the gas to the oven burner and then decides almost immediately thereafter to turn the same on again. When the automatic valve does close, it closes the passageways to the main oven burner and it shuts off the flow of gas to the auxiliary pilot which is then no longer required to remain lit for protective purposes.

In order to make said automatic heat responsive valve close more quickly following manipulation of the manually controlled valve to "off" position, I so construct the automatic valve

that quick cooling down of the control means of said valve is made possible. Such construction also prevents over heating of the valve when the oven burner and its pilot are lit.

The automatic heat responsive valve which I employ in my gas range system assures that no gas will flow to the main oven burner unless the oven pilot light has been lit. This same valve further assures that an auxiliary pilot burner will burn in the oven until such time as the automatic heat responsive valve closes. In addition to the foregoing protective features, which are very important, the automatic valve provides the further very important advantage, namely, that no unburned gas can accumulate in the oven, even in case of failure of the automatic heat responsive valve itself, whether the failure occurs when the valve is in open position or closed position, due to dirt, corrosion, maladjustment, etc. If the valve fails to respond when it is in closed position, no gas can flow to the main oven burner or to the auxiliary oven pilot and consequently only the oven pilot itself will burn. There will be no unburned gases of any sort in the oven. If, on the other hand, the automatic heat responsive valve fails when it is in an open position and the operator shuts off the manually controlled valve and thereby closes off the flow of gas to the oven burner and the oven pilot, the only gas which will continue to flow through the automatic heat responsive valve will be to the auxiliary pilot which is lit. Consequently, there can be no accumulation of unburned gases in the oven even when the automatic valve fails in its open position.

Since the rate of flame propagation varies with different gases, it is sometimes desirable to employ an intermediate pilot in combination with the flash tube from the constantly burning pilot light to the oven pilot. It would be uneconomical, however, to have the intermediate pilot burning at all times. It is an object of my invention to have the flow of gas to such an intermediate pilot controlled by an automatic heat responsive valve which controls the flow of gas to the main oven burner. Therefore, when gas of a lower flame propagation rate is employed in my single point ignition system my automatic heat responsive valve permits the flow of gas to said intermediate pilot only after the manually controlled valve is moved to "on" position and only until the automatic valve permits the flow of gas to the main oven burner.

The automatic heat responsive valve for the oven burner, in its preferred form, relies upon the magnetic character of Curie point metals, namely, metals and alloys which normally are ferromagnetic but which, when heated sufficiently, lose their magnetic properties. The transition temperature, or Curie point as it is called, at which this change in magnetic characteristics occurs on heating is a distinct property of each metal or alloy and varies widely among the various metals and alloys. Each metal or alloy, however, has its own distinct and non-varying Curie point. A valve member moved in response to the attraction between a magnet and a Curie point metal may, therefore, be manipulated by heating of the Curie point metal above its Curie point. Since the means, for transmitting heat from a burner-to-be-controlled to the Curie point metal, is positioned in the vicinity of said burner, it has been difficult in prior systems to cause prompt closing action of valve member when the manually controlled pilot valve is moved to "off" position, since the ambient temperature does not change because the main source of heat continues to operate. Although I prefer to employ a heat responsive valve such as above described, valves controlled by gas filled bellows, bi-metal thermostats, thermocouples or other known heat responsive controls come within the scope of my invention.

It is an object of my invention to provide means whereby the Curie point metal may be cooled rapidly below its Curie point, so that the valve member responsive to the attractive force between the Curie point metal and the other magnetic member may be operated quickly. In the accomplishment of this object I provide a valve in which the Curie point metal is positioned directly in the flow of the gas which is directed to the burner to be controlled and permit a restricted flow of said gas to a small auxiliary jet after the main burner to be controlled has been instantaneously shut off. When the Curie point metal is cooled below its Curie point with the assistance of said cooling flow of gas, the restricted flow of gas is also shut off by operation of the automatic valve. A very definite "snap action" of the valve is obtained by using a Curie point metal and permanent magnet. Such metals retain their temperature responsive characteristics indefinitely.

It is a further object to provide a safety control valve for the constantly burning pilot light of the single point ignition system, so that all flow of gas to the top burner or oven burners will be stopped when said pilot light is extinguished accidentally, or otherwise. In this way gas cannot flow from the top burners to the room or from the oven burner to the oven, even when the control valves for said burners are turned to "on" position, either accidentally or intentionally.

Other objects, uses and advantages of my invention will become apparent from the following description when taken with the accompanying drawings, in which:

Figure 1 is a diagrammatic plan view showing a gas burning system employing my invention;

Figure 2 is a diagrammatic elevational view taken on the line 2—2 of Figure 1;

Figure 3 is an enlarged elevational view taken on the line 3—3 of Figure 1;

Figure 4 is an enlarged elevational view taken on the line 4—4 of Figure 1;

Figure 5 is a fragmentary view, partially in section, illustrating the "on" position of the manually controlled valve of Figure 1;

Figure 6 illustrates a modified form of the automatic heat responsive control valve shown in Figure 1; and

Figure 7 illustrates another modification of the automatic heat responsive control valve of Figure 1.

Like reference numerals have been employed in the several views to indicate the same or similar elements.

Referring now to Figures 1 through 5, the reference numeral 10 indicates an inlet or supply conduit through which gas enters the gas burning system. In series with the pipe 10 is an automatic safety shutoff valve, indicated generally by the reference numeral 12, which is open when the pilot light 13 at gas jet or nozzle 14 is lit, and which is closed when said pilot light is extinguished for any reason. Pilot light 13 is intended to be constantly burning and is here-

inafter referred to as a constantly burning pilot light or constant pilot burner. A heat conductor 15 extends from the valve 12 to the flame 13 at the nozzle 14 and serves with other control mechanism in the valve 12 to shut off the valve when the pilot light 13 is extinguished. For details of such a valve, reference may be made to my Patent No. 2,233,659, dated March 4, 1941. The gas jet 14 communicates with valve 12 by pipe 16. When the pilot light 13 is extinguished and the valve 12 closes, no gas will be supplied to conduits beyond the valve, for example, conduits 18 and 44. Conduit 18 connects the discharge side of valve 12 with the gas manifold 20 by a T-joint 22. The "top" burners 24 of the gas burning system are connected in parallel with the manifold 20 through their respective valves 26 and conduits 28. Flash tubes 30 lead from each of the top burners 24 to the pilot light 13, so that when the valve 26 of any top burner is opened, gas will flow from the manifold 20 through the valve 26 and conduit 28 to the burner 24, and gas escaping therefrom will flow upwardly through its flash tube 30 to the pilot light 13 at nozzle 14 and thereby become ignited, the flame flashing back from the pilot light 13 to the top burner 24 to light said burner.

A conduit 32 leads from the inlet conduit 10, in advance of valve 12, to an automatic heat responsive valve, indicated generally by the reference numeral 34, and communicates with the inlet chamber 36 thereof. In Figure 1 the valve 34 has been turned from its normal position, wherein the valve stem 78 extends vertically, in order that the sectional view thereof may better show the valve's internal structure. A valve seat 38 in chamber 36 communicates with a conduit 46 which interconnects chamber 36 with a manually actuated oven burner control valve, indicated generally by the reference numeral 42. If desired, the operating handle 41 for valve 42 may also actuate the usual thermostatic control for the oven. Valve 42 is an "on-off" valve, having three ports 43*a*, 43*b* and 43*c*. As will be noted hereinafter, in some installations the valve 42 will need only 2 ports, port 43*c*, together with conduits 40 and 60 then being omitted. A passageway 44 leads from the conduit 18 on the discharge side of the valve 12, to said manually controlled valve 42. When valve 42 is turned to "on" position, port 43*a* thereof interconnects passageways 44 and 66.

The inlet chamber 36 of automatic valve 34 is separated from the outlet chamber 46 by wall structure 48 and 48*a* which will be referred to more fully hereinafter. A conduit 50 leads from the outlet chamber 46 of the automatic valve 34 to a T-junction with a conduit 52, having at one end an auxiliary pilot (sometimes referred to as an auxiliary pilot burner) 54 adjacent the oven burner 56 and, at its other end, being in series with the manually actuated oven burner control valve 42.

When the manually controlled valve 42 is moved to its "on" position, as illustrated in Figure 5, conduit 52 is interconnected by port 43*b* with a conduit 58 which connects with the oven burner 56, and conduit 40 is connected by port 43*c* with a conduit 60 which leads to an intermediate pilot (sometimes referred to as an intermediate pilot burner) 62 of the flash tube system or apparatus, which apparatus is indicated generally by the reference numeral 64. At this time, the conduit 44 connecting with conduit 18

is interconnected by port 43*a* with a conduit 66 which leads to a pilot, or pilot burner, 68 for the oven burner 56. The flash tube system 64 leading from the constantly burning pilot light 13 to the pilot 68 for the oven burner 56 has, at an intermediate point, an opening 70 (see Figure 4) above the intermediate pilot 62 which is connected by conduits 60, 40 and 32 with the inlet conduit 10 when the manually controlled valve 42 is in "on" position. Intermediate pilot 62 may be omitted if desired, but with certain types of gas I prefer to employ it to assist flame propagation in the flash tube system 64.

Referring now to the automatic heat responsive valve 34, it will be seen that the inlet chamber 36 is separated from the outlet chamber 46 by walls 48 and 48*a*, a passageway 72 being formed in the former wall and having a valve seat 73 at one end. The passageway 72 may be closed by a valve member 74, and conduit 40 may be closed by a valve member 76, both members 74 and 76 being fixedly secured upon the same rod 78 which is guided by passageway 80 in the wall 48*a*. A spring 82 is interposed between the wall section 48*a* and the valve member 74, thus assisting gravity to urge the valve members 74 and 76 downwardly, as viewed in Figure 1, and away from the valve seat 73 and toward the seat 38. At the upper end of the rod 78 is fixed a permanent magnet 84 which is attracted toward a piece of ferromagnetic Curie point metal 86 when said metal 86 is at a temperature below its Curie point. This Curie point metal 86 is supported by a heat conducting member 88 having apertures 89 around the metal 86. The member 88 extends out of the housing of the valve 34 from between the casing 90 and the lid 92 into the vicinity of the oven burner pilot 68 and the oven burner 56. When the pilot 68 is lit, heat is transferred through the conducting member 88 to the Curie point metal 86 which, because of such heating, loses its magnetic qualities and fails to exert an attractive force on the permanent magnet 84 when a temperature above its Curie point is reached. Thereupon, the spring 82, together with the force of gravity, forces the valve members 74 and 76 downwardly, as viewed in Figure 1. This results in the valve member 74 being unseated and in the valve member 76 being seated upon the seat 38.

At this time, there is a means of communication between the inlet chamber 36 of the automatic valve 34 and its outlet chamber 46, and gas under pressure will therefore flow from conduit 10 through conduit 32 into chamber 36. From chamber 36 the gas will flow through the passageway 72 and be directed by wall sections 48 and 48*a*, all about the Curie point metal 86 which is directly in the path of the flow of gas to the outlet chamber 46 and to the conduit 50, with a resulting cooling action on said Curie point metal. When the oven burner pilot 68, or the oven burner 56, is lit any flow of gas past the Curie point metal 86 will fail to bring said metal below its Curie point. However, continued flow of gas past the metal after the pilot 68 and oven burner 56 are extinguished will assist in cooling the Curie point metal 86 and the heat conducting strip 88, so that the Curie point metal 86 will more quickly reach a temperature below its Curie point and thus regain its magnetic qualities for purposes of attracting the magnet 84 and thus closing the passageway 72 to prevent further flow of gas through the automatic valve to the

outlet chamber 46 and thence to the oven burner 56 and auxiliary oven pilot 54.

The operation of my gas burning system will now be described. Assuming that the pilot light 13 is lit, so that the valve 12 will be in open position, gas will flow into conduit 18 and from there to gas manifold 20 and the valves 26. Simultaneously, gas will flow to the conduit 44 from conduit 18 and then to the manual controlled valve 42 which is in blocking or "off" position. No gas will flow from the manifold 20 to the top burners 24 unless the individual valves 26 of these burners are turned on. If, for any reason, the pilot light 13 is extinguished, safety valve 12 will close and no gas will be supplied to conduit 18 or other conduits beyond the valve 12. With the oven burner 56 turned off and the Curie point metal 86 of valve 34 at a temperature below its Curie point, the valve member 74 of automatic valve 34 will be seated and the valve member 76 of said valve 34 will be unseated, thus permitting a flow of gas from the inlet chamber 36 of valve 34 to the conduit 40, and from there to the manually controlled valve 42 which, at this time, blocks the flow of the gas from conduit 40 to conduit 60.

When it is desired to light the oven burner, the operator merely turns the manually operated oven burner control valve 42 to its unblocking or "on" position, such as that illustrated in Figure 5, whereupon pairs of conduits 52 and 58, 44 and 66, and 40 and 60 will be interconnected by the ports of valve 42. This will permit the flow of gas from the inlet chamber 36 of valve 34 through the conduit 40 and conduit 60 to the intermediate pilot 62 of the flash tube system 64 and, simultaneously, will permit the flow of gas from the conduit 18 through conduit 44 and conduit 66 to the oven burner pilot 68. Pilots 62 and 68 will, therefore, supply gas to the flash tube system 64, said gas flowing from each pilot to the pilot light 13 at nozzle 14 adjacent the top burners 24 where the gas is ignited and said ignited gas flashes back and lights the intermediate pilot 62 and also the pilot 68 for the oven burner 56.

Although manipulation of the manually controlled valve 42 to its "on" position interconnects the passageways 58 and 52, there will be no flow of gas therethrough until gas is supplied through the automatic heat responsive valve 34 to conduit 50 which is connected to the outlet chamber 46 of said valve. This flow of gas will be permitted only when the valve member 74 of the automatic valve 34 is unseated. Said valve member 74 will be unseated when the Curie point metal 86 is heated above its Curie point temperature by the pilot 68 and therefore ceases to attract the permanent magnet 84, whereupon gravity, aided by the spring 82, retracts the magnet 84 and the valve member 74 and, simultaneously, seats the valve member 76 upon valve seat 38, thus closing off the flow of gas to the conduit 40 and to the intermediate pilot 62 for the flash tube system 64. Heat for raising the temperature of the Curie point metal 86 above its Curie point is supplied from the oven burner pilot 68 through the medium of the heat transmitting member 88, which is located adjacent the pilot 68 and the oven burner 56. If desired, the heat transmitting member 88 may itself be formed of Curie point metal.

With the manually controlled oven burner valve 42 in its "on" position, pilot 68 for the oven burner will become lit, as above described, and upon its heating the Curie point metal 86 above its Curie point temperature, valve member 74 will be unseated and gas will flow through the automatic valve 34 and conduit 50 to the conduits 52 and 58, thus supplying gas to the oven burner 56 and the auxiliary pilot 54. As soon as gas is supplied thereto the burner 56 and pilot 54 are ignited from the oven burner pilot 68.

When the operator desires to shut off the oven burner, he turns the manually controlled valve to "off" position, whereupon conduit 58 leading to the oven burner 56 is immediately disconnected from its source of gas from conduit 52 and the oven burner 56 is immediately extinguished. However, gas will continue to flow to the auxiliary pilot 54 adjacent the oven burner 56, since the pilot is fed by conduits 52 and 50 from the outlet chamber 46 of the automatic valve 34 which has not as yet closed. Simultaneously, with the shutting off of the gas to the oven burner 56, the gas will also be shut off to the oven pilot 68 by reason of conduit 66 being disconnected from conduit 44 at the manually controlled valve 42. This means that the only flame which continues to burn, in addition to the constantly burning pilot light 13 adjacent the top burners 24, is that of the auxiliary pilot 54 which is remote from the heat transmitting member 88 of the automatic valve 34. Although the ambient temperature surrounding the heat transmitting member 88 at its outermost end may be as high as 650°–750° F., when the oven burner 56 is lit, instantaneous shutting off of burner 56 reduces the ambient temperature, and the heat of member 88 and the Curie point metal 86 is transmitted to the gas which continues to flow through the automatic valve 34 and around the transmitting member 88 and the Curie point metal 86 to the auxiliary jet 54. Such flow of gas helps to cool the Curie point metal 86 below its Curie point temperature, whereupon the metal 86 rapidly regains its magnetic properties and attracts the permanent magnet 84 which is connected to the rod 78. Rod 78, which carries the valve members 74 and 76, thereupon moves upwardly, as viewed in Figure 1, and seats the valve member 74 on the seat 73 and unseats the valve member 76 from seat 38. At this time, the flow of gas from the outlet chamber 46 of valve 34 to the conduit 50 will stop, since the valve member 74 is seated and, consequently, the flame at the auxiliary pilot 54 will go out. Although valve member 76 has become unseated from seat 38, the flow of gas through the inlet chamber 36 and the conduit 40 is prevented by reason of the manually controlled valve 42 blocking the connection between conduit 40 and conduit 60 which leads to the intermediate pilot 62 of the flash tube system 64. At this time, a complete cycle of operation has been completed and the system is in the condition in which it was found prior to the movement of the manually controlled valve 42 to "on" position. It will be particularly noted that there is absolutely no time lag or delay in shutting off the oven burner 56, and that such shutting off is accomplished instantaneously by turning the manually controlled valve 42 to its "off" position. In gas burning ranges which do not immediately shut off the oven burner when the manually controlled valve is moved to "off" position, the control means of the automatic heat responsive valve continues in a high ambient and cools slowly.

If the user of the oven shuts off the oven burner and then changes his mind and immediately turns it on again, the auxiliary pilot 54, which continues to burn adjacent the oven burner until

automatic heat responsive valve 34 closes, will ignite the gas delivered from the oven burner and thereby prevent the accumulation of an explosive mixture in the oven. However, as soon as the automatic valve 34 closes, turning the manually controlled valve to "on" position will be ineffective to cause a flow of gas from the oven burner 56 until the pilot light 68 therefor is lit and heats the control means of the automatic heat responsive valve 34 above its Curie point temperature to cause unseating of valve member 74.

Since the top burners and oven burners are all dependent for operation upon the single constantly burning pilot light 13 adjacent the top burners 24, it is desirable to have a safety shutoff valve, such as valve 12, which is responsive to the presence of a flame at the pilot 13. In this connection, although I have illustrated conduit 32 as being positioned in advance of the valve 12, it will be understood that it may also be positioned on the discharge side of said valve, if that is desired.

In the operation of my single point ignition system it should be further understood that the automatic heat responsive valve need not be identical with valve 34 but may take the form of any one of a number of known heat responsive valves. By way of example, reference may be had to Figure 7 which illustrates another form of heat responsive valve 34', wherein the pilot 68 for the oven burner 56 may act upon a bimetallic strip 94, which in turn is connected with a rod 78 on which are carried valve members 74 and 76. When the bimetallic strip 94 is cold it takes the position indicated by the dotted lines in Figure 7. However, as it becomes heated by the flame of pilot 68, it moves downwardly and opens valve 74 while closing off conduit 40 by seating the valve member 76 on the seat 38. When the oven burner pilot 68 is turned off, the bimetallic strip 94 cools and moves toward its dotted line position, thereby seating valve member 74 and unseating the valve member 76. A flexible diaphragm 96 secured to the rod 78 prevents the escape of gas from the outlet chamber 46 of the valve 34', while yet permitting upward and downward movement of rod 78.

A modification of the automatic control valve 34 of Figure 1 is shown in Figure 6, wherein it is indicated generally by the reference numeral 134. The only substantial difference between the valve 134 and the valve 34 of Figure 1 is in the Curie point metal element 186 which serves both as a magnetic member and as a heat transmitting member, comparable to member 88 of Figure 1. The outermost end 187 of element 186 is subjected to the flame of the oven burner pilot 68 and a depressed portion 189 serves as a magnetic element directly above the permanent magnet 84. It will also be observed that the element 186 forms the closure member for the top of the valve 134 and therefore eliminates the need of a lid, such as lid 92 of valve 34 in Figure 1. By combining three functions as it does, the element 186 makes the valve 134 less expensive than the valve 34. In this structure, the flow of gas through the valve can be directed by the wall structures 48 and 48a only against one side of the sheet of Curie point metal and not all about it, as may be done in the case of the valve 34 of Figure 1. However, since the element 186 serves as the closure of the valve 134, the top surface thereof is largely exposed to air which is able to carry away heat, because the valve 134 need not be located immediately adjacent the oven burner which it controls.

Although I have described preferred embodiments of my invention, it will be apparent that modifications may be made therein without departing from the scope of the invention, and that the automatic heat responsive valve may find additional applications other than in my gas burning system.

I claim:

1. For use in a gas burning system having a source of gas, a gas burner, gas ignition means, and gas conduit means adapted to be interconnected between the source of gas and the gas burner, the combination of a pilot burner and an auxiliary pilot burner for said gas burner; manually controlled valve means adapted to block and unblock the flow of gas in said conduits to the gas burner and said pilot burner; means for lighting from said ignition means the gas which is delivered to said pilot burner; automatic valve means adapted automatically to block and unblock the flow of gas in said conduits to the gas burner and said auxiliary pilot burner; control means adapted automatically to effect the blocking and unblocking action of said automatic valve means in response to the temperature of said control means, said control means being adapted to be heated by said pilot burner when the latter is lit; said gas burner being adapted to be lighted by moving the manually controlled valve means to unblocking position whereby gas is supplied to the pilot burner, thereby igniting said pilot burner from said ignition means and heating the control means by said pilot burner to a temperature at which the control means effects actuation of the automatic valve means to unblocking position for delivering gas to the auxiliary pilot burner and to the gas burner, the gas issuing therefrom being lit from the pilot burner; and the gas burner and pilot burner being adapted to be shut off by movement of the manually controlled valve means to blocking position, whereupon the control means is no longer heated by the pilot burner, said auxiliary pilot burner continuing to be lit until the temperature of said control means is reduced to a predetermined point whereupon the automatic valve means moves to block the flow of gas to said auxiliary pilot burner.

2. The combination of claim 1 wherein a portion of the control means for the automatic valve means is disposed in the path of the gas flowing to said auxiliary pilot burner, whereby the control means may be rapidly cooled after said pilot burner for the oven is extinguished by moving the manually controlled valve means to block the flow of gas to said pilot burner.

3. The combination of claim 1 wherein the means for lighting gas delivered to said pilot burner includes a flash tube system which is adapted to extend between the ignition means, in the form of a constantly burning pilot burner, and said pilot burner for the gas burner.

4. The combination of claim 3 wherein the means for lighting gas delivered to said pilot burner includes an intermediate pilot burner for the flash tube system, which intermediate pilot burner is adapted to be connected with the source of gas in series through said manually controlled valve means and said automatic valve means, said automatic valve means being adapted to unblock the flow of gas to said intermediate pilot burner when it blocks the flow of gas to said auxiliary pilot burner and the gas burner, and being adapted to block the flow of gas to said intermediate pilot burner after it has unblocked the flow of gas to said auxiliary pilot burner.

5. For use in a gas burning system, in combination, gas ignition means; a gas burner; a pilot burner and an auxiliary pilot burner for said gas burner; gas conduit means adapted to be interconnected between a source of gas and said gas burner, said pilot burner and said auxiliary pilot burner; manually controlled valve means adapted to block and unblock the flow of gas in said conduits to said gas burner and pilot burner; automatic valve means adapted automatically to block and unblock the flow of gas in said conduits to said gas burner and said auxiliary pilot burner; control means adapted automatically to effect the blocking and unblocking action of said automatic valve means in response to the temperature of said control means, said control means being adapted to be heated by said pilot burner when the latter is lit; said gas burner being adapted to be lighted by moving the manually controlled valve means to unblocking position whereby gas is supplied to the pilot burner, thereby igniting said pilot burner from said ignition means and heating the control means by said pilot burner to a temperature at which the control means effects actuation of the automatic valve means to unblocking position for delivering gas to the auxiliary pilot burner and to the gas burner, the gas issuing therefrom being lit from the pilot burner; and said gas burner and pilot burner being adapted to be shut off by movement of the manually controlled valve means to blocking position, whereupon the control means is no longer heated by the pilot burner, said auxiliary pilot burner continuing to be lit until the temperature of said control means is reduced to a predetermined point whereupon the automatic valve means moves to block the flow of gas to said auxiliary pilot burner.

6. For use in a gas range provided with a gas supply pipe, top burners, and a single constantly burning pilot light adjacent the top burners, the combination of an oven burner, a pilot burner adjacent the oven burner, a gas conduit adapted to interconnect said oven burner to said supply pipe, automatic valve means in said conduit normally biased to closed position, thermally responsive control means for the automatic valve means adapted automatically to cause the automatic valve means to open and to be maintained open when said thermally responsive control means is heated above a predetermined temperature by said oven pilot burner when the latter is lit, flash tube means adapted to extend from the constantly burning pilot light to the oven pilot burner to ignite gas at the latter, a second gas supply conduit adapted to interconnect said oven pilot burner with said gas supply, and manually operable valve means disposed in the first conduit between the automatic valve means and the oven burner and disposed in the second conduit between the gas supply and the oven pilot burner for opening said conduits or for closing them.

7. For use in a gas range having a source of gas, an oven burner, and a constant pilot burner, with the oven burner being remote from the constant pilot burner, the combination of a pilot burner and an auxiliary pilot burner for said oven burner, means for igniting said pilot burner from said constant pilot burner when gas is delivered to said pilot burner, gas conduit means adapted to be connected between a source of gas and said pilot burner and including a multi-port manually controlled valve means, conduit means adapted to be connected between a source of gas and said oven burner and including said manually controlled valve means and automatic valve means in series, and conduit means connected between the outlet of said automatic valve means and said auxiliary pilot burner, said manually controlled valve means in closed and open positions simultaneously closing off or opening, respectively, said first two mentioned conduit means, said automatic valve means having automatic control means which is responsive to heat produced by the flame of the pilot burner for the oven burner, with said control means automatically causing said automatic valve means to open when the control means is heated to a predetermined temperature whereby, when the manually controlled valve is in open position, gas may be delivered to the oven burner and said auxiliary pilot burner and is lit from the oven pilot burner, said auxiliary pilot burner continuing to remain lit until the automatic valve means is closed in response to its control means being cooled below said predetermined temperature.

8. For use in a gas range having a gas supply and a constantly burning pilot light, and an oven burner remote from the constantly burning pilot light, the combination of a pilot burner and an auxiliary pilot burner for said oven burner, means including a flash tube and an intermediate pilot burner for igniting said pilot burner from said constantly burning pilot light, manually controlled triple-port valve means, an automatic two-way valve means, a first conduit including said manually controlled valve means adapted to interconnect the gas supply and said oven pilot burner, a second conduit including said manually controlled valve and said automatic valve in series adapted to interconnect the gas supply and said oven burner, a third conduit between the inlet side of said automatic valve means and said intermediate pilot and including said manually controlled valve means in series in said conduit, and a fourth conduit extending between the outlet of said automatic valve means and said auxiliary pilot burner, said manually controlled valve in closed and opened positions simultaneously closing off or opening, respectively, the first three mentioned conduits and said automatic valve means having control means responsive to heat generated by said oven pilot burner and being biased to close off said second and fourth conduits and to open said third conduit when said control means is below a predetermined temperature, the cycle of operation for lighting said oven burner requiring movement of said manually controlled valve means to its "on" position whereby gas is supplied from the inlet side of the automatic valve means to said intermediate pilot and from the source of gas to said oven pilot burner, said last two named pilot burners being then lit from said constantly burning pilot light, said oven pilot burner then heating the control means of the automatic valve means above the predetermined temperature to cause said valve to open the second and fourth conduits, whereby gas is supplied to the oven burner and to the auxiliary pilot burner and is there ignited by said oven pilot burner, and to close off the flow of gas through said third conduit, and the cycle of operation for closing off said oven burner requiring only a movement of the manually controlled valve to "off" position whereby the flow of gas to said oven burner and oven pilot burner is immediately shut off, said auxiliary pilot burner remaining lit until the control means for the automatic valve means has been cooled below said

predetermined temperature whereupon the automatic valve means closes and blocks said fourth conduit and opens said third conduit.

9. The combination of claim 8 wherein the control means for the automatic valve means is positioned in part directly in the flow of gas to the gas burner and to the auxiliary pilot burner whereby the cooling effect of the flow of gas serves more quickly to lower the temperature of the control means below said predetermined temperature when the manually controlled valve is moved to "off" position.

10. For use in a gas burning system having a source of gas, a gas burner, and ignition means remote from said gas burner, the combination of a pilot burner, conduits adapted to interconnect said pilot burner and said gas burner with a source of gas, a two-part valve having one port in the conduit to the pilot burner and the other port in the conduit to the gas burner and effective simultaneously to open or close both conduits, with the flow of gas to said pilot burner being under the control solely of said one port of said two-port valve, automatic valve means positioned in series with that port of the two-port valve which communicates with the gas burner, said pilot burner being adapted to be supplied with gas and being lit by the ignition means when the two-port valve is moved to "on" position, control means responsive to the heat of said pilot burner for opening the automatic valve means whereby the gas burner will be supplied with gas and will be lit by said pilot burner, an auxiliary pilot burner adapted to be supplied with gas from a source of gas when the automatic valve means opens, the gas from said auxiliary pilot burner being lit from the pilot burner, said gas burner and pilot burner being instantly shut off when the two-port valve is moved to "off" position and said heat responsive control means then being cooled to cause closing of the automatic valve means to shut off the flow of gas to said auxiliary pilot burner.

11. In a gas range, in combination, a gas supply pipe, a constantly burning pilot light, a safety valve in series in said supply pipe and adapted to close when said pilot light is extinguished, a plurality of top burners connected with the supply pipe on the discharge side of said safety valve, individual control valves for each of said top burners, an oven burner remote from the constantly burning pilot light, an oven pilot burner for said oven burner, flash tube means leading from the oven pilot burner to said constantly burning pilot, a conduit leading from the supply pipe on the inlet side of said safety valve to the oven burner, a conduit leading from the supply pipe on the discharge side of said safety valve to the oven pilot burner, manually controlled valve means in both conduits, automatic valve means in series with the manually controlled valve means in the conduit leading to the oven burner, control means for said automatic valve means adapted to open the latter in response to heat above a predetermined temperature supplied by the oven pilot burner when lit, a conduit leading from the discharge side of the automatic valve means to an auxiliary pilot burner adjacent the oven burner, the lighting of the oven burner being effected by moving the manually controlled valve means to open position so that gas may flow to the oven pilot burner and be lit from the constantly burning pilot light, whereupon heat above said predetermined temperature supplied by the oven pilot burner will cause the automatic heat responsive valve means to open and supply gas to the oven burner and auxiliary pilot burner where it will be lit by the oven pilot burner, and the shutting off of the oven burner and oven pilot burner being effected instantly by moving the manually controlled valve to closed position, whereupon the flow of gas will continue only to the auxiliary pilot burner until the automatic heat responsive valve means cools below the predetermined temperature and closes.

12. For use in a gas burning system having a gas supply, gas ignition means, and a gas burner remote from the ignition means, the combination of a pilot burner; an auxiliary pilot burner for the gas burner; conduit means adapted to interconnect said gas supply with the gas burner, the pilot burner and the auxiliary pilot burner; means for lighting the pilot burner from the gas ignition means; manually controlled valve means adapted to be interposed between the gas supply and said gas burner and said pilot burner for blocking and unblocking the flow of gas thereto; automatic valve means for automatically blocking and unblocking the flow of gas in said conduit means to said auxiliary pilot burner and to said gas burner; heat responsive control means for said automatic valve means adapted automatically to control the blocking and unblocking action of said automatic valve means in response to the temperature of said control means; said control means being adapted to be heated from burning gas at the pilot burner; said gas burner being adapted to be lit by moving the manually controlled valve means to unblocking position, whereby gas is supplied to the pilot burner, igniting said pilot burner from said ignition means by said means for lighting, and heating the control means to a temperature at which the automatic valve means is automatically moved to unblocking position, whereupon gas will be supplied to said gas burner and to said auxiliary pilot burner, the gas being adapted to be lit from said pilot burner; said gas burner and said pilot burner being adapted to be immediately shut off by moving the manually controlled valve means to blocking position, said auxiliary pilot burner at that time continuing to remain lit until the heat responsive control means cools below a predetermined temperature.

13. The combination of claim 12 wherein the auxiliary pilot burner is so positioned that, when lit, it does not heat the heat responsive control means for the automatic valve means.

14. The combination of claim 12 wherein the auxiliary pilot burner is remote from the pilot burner and adjacent the gas burner and is lit from the pilot burner through the intermediary of the gas burner.

15. In a burner control system of the class wherein there is a main burner, pilot burner means for lighting said main burner, said pilot burner means comprising a first pilot burner, a fuel supply line for supplying fuel to said main burner, a fuel supply line for supplying fuel to said first pilot burner, a safety shutoff valve in the fuel supply line for the main burner and operable to closed position to shut off the supply of fuel to said main burner, valve means in the fuel supply line for said first pilot burner and operable to closed position when said safety shutoff valve in the fuel supply line for the main burner is open, whereby to shut off the supply of fuel to said first pilot burner, the combination with said system of stand-by pilot burner means in juxtaposition to the main burner for relighting

said main burner when the safety shutoff valve in the fuel supply line to the main burner is in open position and the valve means in the fuel supply line for said first pilot burner is closed, and said pilot burner means comprising a second pilot burner in addition to said first pilot burner, and a fuel supply line for said second pilot burner, and additional valve means partially in the fuel supply line for the main burner and partially in the fuel supply line for one of the pilot burners, said additional valve means being operable to closed position simultaneously to shut off the supply of fuel to both the main burner and one of said pilot burners and to open position simultaneously to establish a supply of fuel to said main burner and to one of said pilot burners.

16. In a burner control system of the class wherein there is a main burner, pilot burner means for lighting said main burner, said pilot burner means comprising a first pilot burner, a fuel supply line for supplying fuel to said main burner, a fuel supply line for supplying fuel to said first pilot burner, a safety shutoff valve in the fuel supply line for the main burner and operable to closed position to shut off the supply of fuel to said main burner, valve means in the fuel supply line for said first pilot burner and operable to closed position when said safety shutoff valve in the fuel supply line for the main burner is open, whereby to shut off the supply of fuel to said first pilot burner, the combination with said system of stand-by pilot burner means in juxtaposition to the main burner for relighting said main burner when the safety shutoff valve in the fuel supply line to the main burner is in open position and the valve means in the fuel supply line for said first pilot burner is closed, and said pilot burner means comprising a second pilot burner and fuel supply means therefor in addition to said first pilot burner, said safety shutoff valve in the fuel supply line for the main burner being under the control of heat responsive means subject to the heat of said second pilot burner, and there being a thermostat controlled valve and a connected gas cock for controlling the supply of fuel to the main burner and to said first and second pilot burners.

17. In apparatus of the class described, in combination, a main burner, a fuel supply line for supplying fuel to said main burner, a first pilot burner, a safety shutoff valve in the fuel supply line for said main burner, said safety shutoff valve having a fuel inlet and a fuel outlet, heat responsive means subject to the heat of said first pilot burner and operable to maintain said safety shutoff valve open when said first pilot burner is ignited and to release said safety shutoff valve for operation to closed position when said first pilot burner is extinguished, a second stand-by pilot burner in juxtaposition to said main burner, and a fuel supply line for maintaining a supply of fuel to said second stand-by pilot burner from the fuel outlet of the safety shutoff valve in the fuel supply line for the main burner, whereby to maintain said second stand-by pilot burner ignited if said safety shutoff valve remains open after said first pilot burner is extinguished, said safety shutoff valve in the fuel supply line for the main burner being arranged so that when in closed position it shuts off the supply of fuel to both said main burner and to said stand-by pilot burner.

18. Apparatus according to claim 17 wherein there is additional shutoff means in the fuel supply line leading to the main burner and in the fuel supply line leading to said first pilot burner, which additional shutoff means is adapted to shut off the supply of fuel to both the main burner and the first pilot burner and is capable of being opened to reestablish a supply of fuel to the main burner and to the first pilot burner without ignition of said first pilot burner, the additional shutoff means in the fuel supply line leading to the main burner being disposed between the fuel outlet of the safety shutoff valve and the main burner.

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