March 10, 1942. G. HERBSTER 2,275,962

SAFETY IGNITION AND CONTROL DEVICE FOR BURNERS

Filed Feb. 2, 1938 4 Sheets-Sheet 1

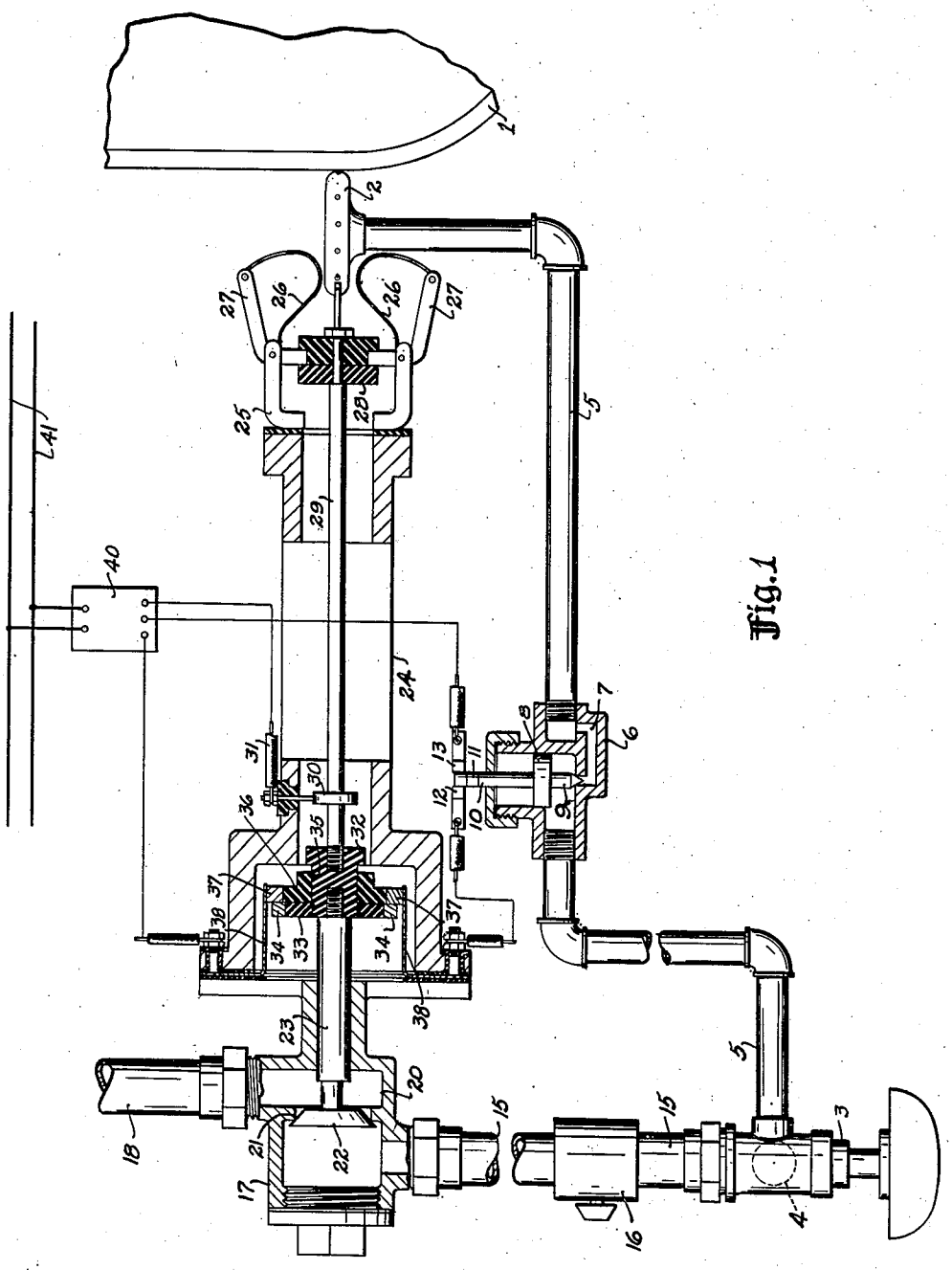


Fig. 1

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SAFETY IGNITION AND CONTROL DEVICE FOR BURNERS

Filed Feb. 2, 1938 4 Sheets-Sheet 2

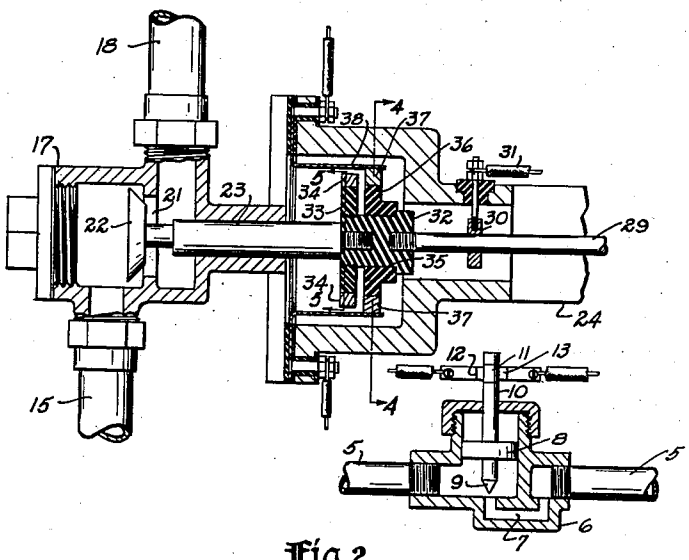


Fig.2

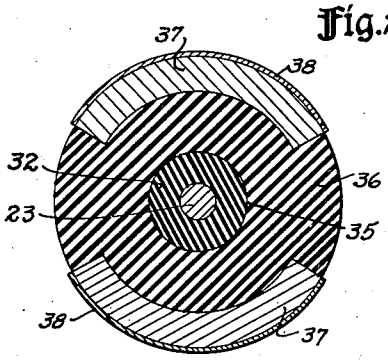


Fig.4

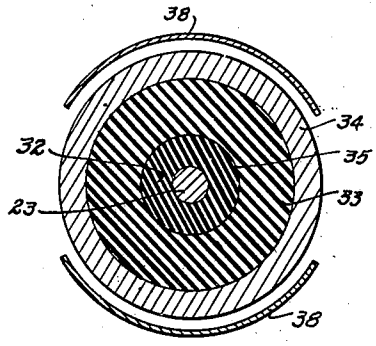


Fig.5

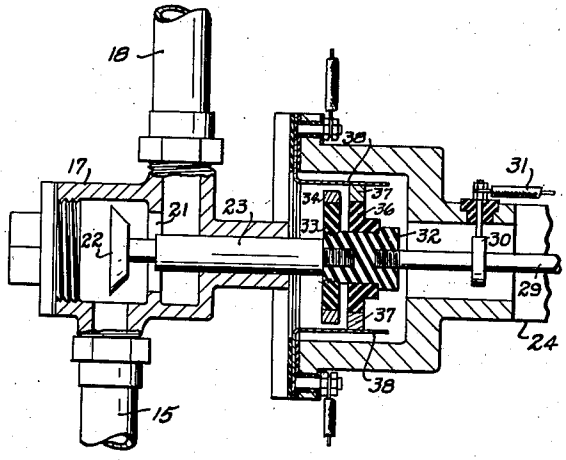


Fig.3

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SAFETY IGNITION AND CONTROL DEVICE FOR BURNERS

Filed Feb. 2, 1938 4 Sheets-Sheet 3

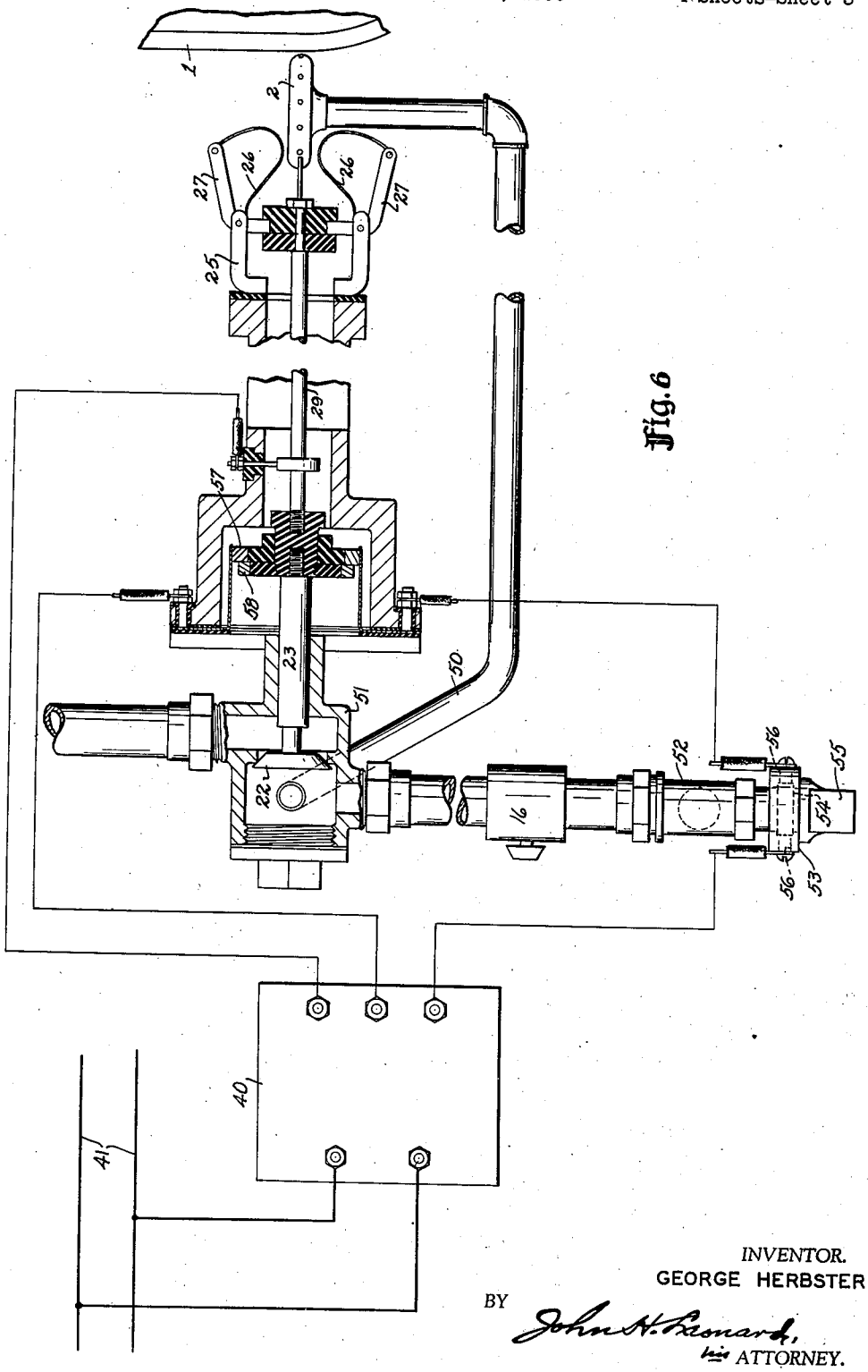


Fig. 6

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SAFETY IGNITION AND CONTROL DEVICE FOR BURNERS

Filed Feb. 2, 1938 4 Sheets-Sheet 4

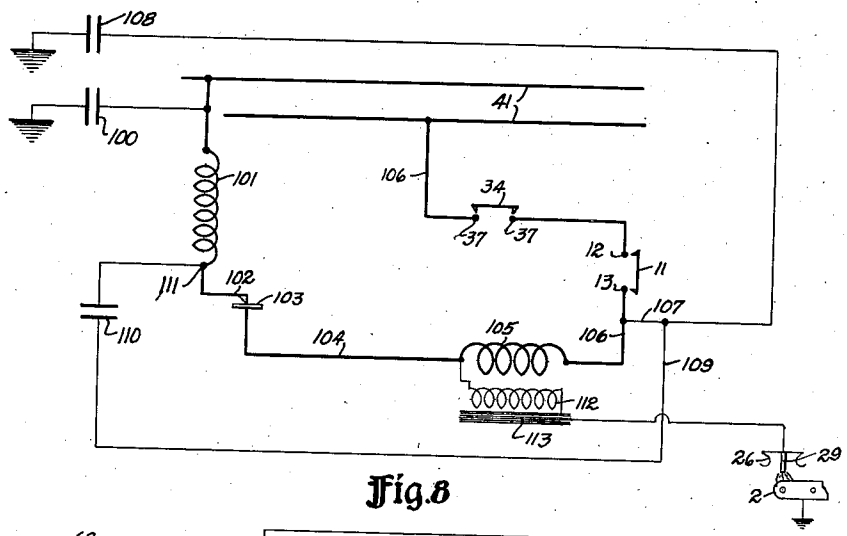


Fig. 8

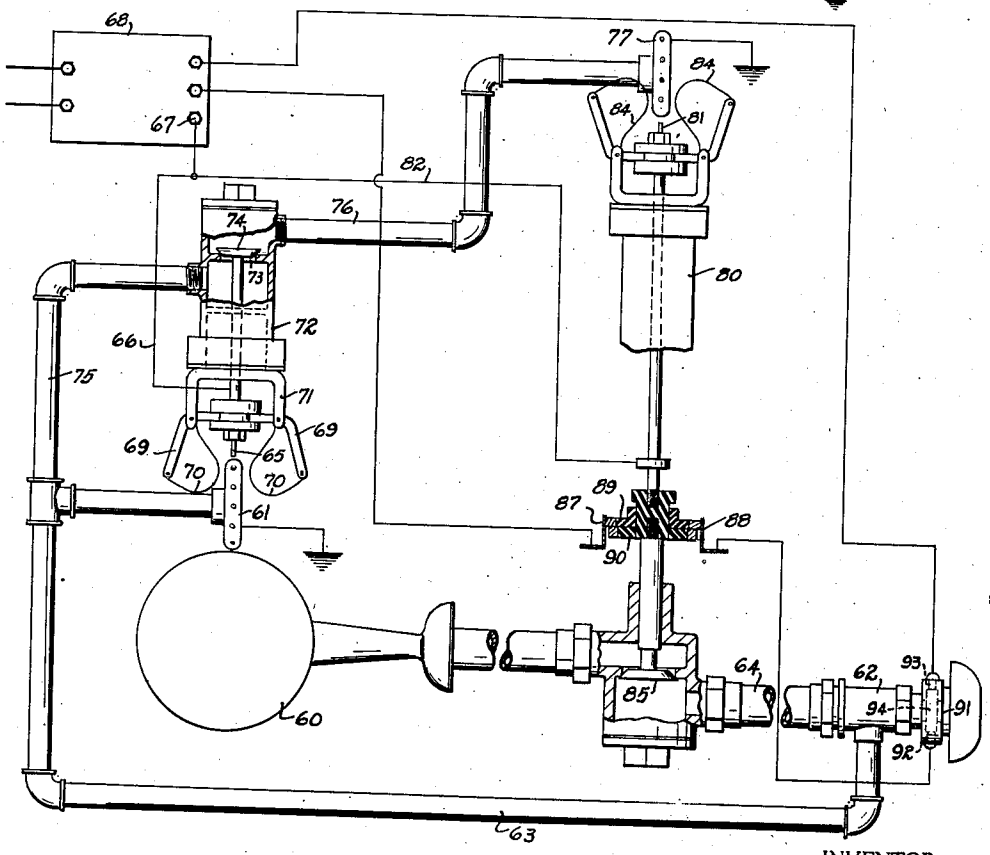


Fig. 7

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UNITED STATES PATENT OFFICE

2,275,962

SAFETY IGNITION AND CONTROL DEVICE FOR BURNERS

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Application February 2, 1938, Serial No. 188,330

4 Claims. (Cl. 158—117.1)

This invention relates to a safety ignition and control device for a fuel burner and particularly for a burner which is located so that it is not readily accessible to or visible to an operator.

For the purposes of illustration, the invention is described herein in connection with a service burner for a domestic gas range cooking oven, its use in connection with other types of burners being readily apparent in the exemplary description and drawings.

Domestic gas range ovens constitute a fire and explosion hazard due to the fact that the oven burner occasionally is extinguished by drafts or temporary reduction in gas line pressure with a resultant accumulation of gas in the oven compartment.

Attempts have been made to insure proper ignition of the oven service burner at all times by the provision of gas burning pilot burners which operate continuously. Since such pilot burners operate continuously, economy requires that they be adjusted to produce a very small flame. Consequently, the pilot itself is extinguished easily and cannot be relied upon as a complete safety ignition device for a service burner.

Again, since an oven service burner is not readily accessible and visible to the operator of the range, it is not unusual for the operator to be unaware that the service burner is not ignited until an explosion occurs, or the kitchen or room is filled with a hazardous accumulation of gas.

In domestic gas cooking ranges, thermostatic oven temperature controls have been provided, these controls being arranged to be set by a suitable indicating dial to provide different degrees of temperature desired and to maintain the set temperature either by reducing the gas supply to the service burner or by temporarily shutting off gas supply of the service burner. While these controls are very desirable for the purposes intended, they increase the explosion hazard due to the fact that sometimes after shutting off of the gas, or reduction of the supply to the burner to such an extent that the burner becomes extinguished, the subsequent supply of gas does not become ignited but escapes into the oven.

One of the principal objects of the present invention is to provide a safety ignition control device for a service burner which insures that the service burner is ignited or that the admission of gas to the service burner is discontinued.

An equally important object is to provide a device which automatically ignites the service burner consequent upon turning or opening of the usual manual gas cock for admission of fuel to the burner.

A correlative object is to supply ignition sparks in firing relation to a burner for re-igniting the burner automatically upon the burner becoming extinguished for any reason; and, in the event the burner is not re-ignited with reasonable promptness, to block entirely the supply of fuel thereto.

A more specific object is to provide a device for producing electrical sparks in firing relation to a burner, and thermally responsive means operated by the heat produced by the burner to cause cessation of the production of such sparks when the burner becomes ignited and has heated the thermally responsive means to a predetermined degree.

Another specific object is to provide a device for the purposes described which employs a pilot burner which is readily accessible and visible to an operator of a range and which, as a condition precedent to its operation, necessitates the proper operation of a burner remote from it whereby it indicates at all times to the operator that the remote burner is operating properly, or, that the remote burner is extinguished.

Other objects and advantages will become apparent from the following specification, wherein reference is made to the drawings, in which

Figure 1 is a plan view of a device embodying the principles of the present invention and the associated burners which are controlled thereby, part of the device being shown in section for clearness in illustration;

Figure 2 is a fragmentary longitudinal sectional view of the main cut-off valve and associated electrical switches illustrated in Figure 1, showing the valve in partly open position;

Figure 3 is a fragmentary sectional view of the main cut-off valve and associated electrical switch, showing the valve and switch in fully open position;

Figures 4 and 5 are enlarged cross-sectional views taken on planes indicated by the lines 4—4 and 5—5, respectively, in Figure 2;

Figure 6 is a view similar to Figure 1, illustrating a modification of certain parts of the invention;

Figure 7 is a plan view of the device and associated burners illustrating the relation among the various parts for effecting remote control of one of the burners, part of the device being shown in section for clearness in illustration;

Figure 8 is a diagrammatic illustration of an

electric circuit which may be used in connection with the present invention.

Referring first to Figures 1 to 5, inclusive, the invention is shown in connection with a service burner 1 and a pilot burner 2 arranged in firing relation to the service burner 1. The admission of gas to the burners 1 and 2 is controlled initially by the usual rotatable stop cock 3 to which gas from a suitable main line is supplied through a gas inlet passage 4. The gas cock 3 is connected by a pipe 5 to the pilot burner 2 in a manner such that when the gas cock 3 is turned to its "on" position gas is admitted to the pipe 5. Connected in the pipe 5 between the gas cock 3 and pilot burner 2 is a pressure operated auxiliary valve 6 which normally blocks the passage of gas through the line 5. The valve 6 has a duct 7 through which gas may flow from the portion of the pipe 5 which is adjacent the cock 3 to the portion of the pipe 5 which connects with the valve 6. Mounted in the valve 6 is a large diameter piston 8 the under side of which is exposed to the full pressure of the gas from the gas cock 3. The piston has a depending needle valve 9 which is rigid with the piston and normally seats in the inlet end of the duct 7 and blocks the passage of gas through the duct. The valve 9 is normally seated by gravity or a light spring (not shown). The piston 8 is operative when gas is admitted to the valve 6 from the gas cock 3 to be lifted by the gas pressure on the under side of the piston 8 and thus to lift the needle valve 9 and connect the portions of the pipe 5 for admitting gas to the pilot burner 2.

Mounted on the piston 8 and movable therewith is a rod 10 of electrical insulating material on which is carried a metal band in the form of a contact bridge 11. Mounted in fixed relation to the valve 6 are stationary contacts 12 and 13 which are arranged so that, upon lifting of the piston 8, the contact bridge 11 connects the contacts 12 and 13 electrically. This arrangement provides an auxiliary electrical switch for controlling a high frequency current as more fully set forth hereinafter. When the gas supply to the valve 6 is stopped, the piston 8 lowers until the needle valve 9 seats in which position the contact 11 is moved out of connecting relation to the contacts 12 and 13, thus opening the circuit therethrough. Accordingly, upon turning the gas cock 3 to open position, gas is not admitted to the pilot unless there is sufficient pressure in the pipe 5 to raise the piston 8. The piston and the pilot burner 2 are so related to the gas line pressure to be used therewith that the piston can rise and open the valve and close the auxiliary switch only when there is sufficient gas pressure to maintain the proper flow of gas to the pilot burner 2. Leading from the gas cock 3 is a pipe 15 by which gas is supplied for the service burner 1. The pipe 15 is connected to any suitable thermostatic oven temperature control 16 between the cock 3 and burner 1. Beyond the control 16, the pipe 15 is connected to a thermostatically operated stop valve, designated generally as 17. The pipe 15 enters the valve 17 in such a manner that when the thermostatic control means thereof are unheated, the valve is closed and prevents the flow of fuel to the service burner 1, but when the thermostatic control means are heated, the valve 17 is opened and permits the flow of fuel to the service burner 1 through the extension pipe 18.

The valve 17 comprises a hollow body 20 having therein a valve seat 21, the pipe 15 being connected to the body 20 at one side of the valve seat and the pipe 18 being connected to the body at the opposite side of the valve seat. Within the body is a valve disc 22 having a stem 23 which is mounted slidably in the body 20 for moving the valve disc 22 to open and closed positions.

Mounted on the valve body is a supporting member having a tubular body 24 disposed in coaxial relation to the stem 23. The body 24 is open at both ends and, at the end opposite from the valve body 20, has a yoke 25. Bimetal thermostatic levers 26 are pivotally connected by their ends to the free ends of the arms of the yoke 25, respectively, and the opposite ends of the levers 26 are pivotally connected to the free ends of the arms of the yoke 27, respectively. The device is positioned so that the thermostatic levers 26 are in heating relation to the pilot burner 2, the configuration and positioning of the levers being such that upon heating of the levers by the burner 2, they move the yoke 27 away from the pilot burner 2 and toward the valve body 20, and upon cooling of the thermostatic levers 26, they move the yoke 27 toward the burner 2 and away from the valve body 20 to the normal position illustrated in Figure 1.

The tubular body 24, being open at both ends, permits relatively cool outside air to be drawn therethrough so that the parts are protected from heat and the thermostatic levers are cooled more readily and thereby rendered more quickly responsive when the device extends into a closed oven compartment.

Carried by the yoke 27 is a block 28 of electrical insulating material having high di-electric properties. Secured by one of its ends in the block 28 and extending axially of the tubular body 24 is a metal rod 29 which is preferably of the type of wire used for the spark terminals in the ordinary automobile engine spark plug.

One end of the rod 29 provides a high capacity discharge spark terminal and is positioned sufficiently close to the burner as to provide a spark gap across which a high frequency spark may jump from the end of the rod 29 to the burner 2 when the burner is grounded and a high capacity current is imposed upon the rod 29. This gap is preferably of a width such that when the thermostatic levers 26 become heated by the burner 2 and move the yoke 27 and, consequently, the rod 29 away from the burner 2 a sufficient degree to open the valve 17 an appreciable extent, as is later described herein, the gap between the end of the rod 29 and the burner 2 is increased to an amount beyond a predetermined maximum spark-gap and the spark cannot jump from the rod 29 to the burner 2

High capacity current is imposed upon the rod 29 through a metal ring 30 which is supported by but electrically insulated from the tubular body 24. The ring 30 very loosely accommodates the rod 29 and is connected by a suitable wire 31 to a source of high frequency current, care being taken to provide a sufficient amount of insulation, as illustrated, between the wire 31 and the tubular body 24 to maintain the spacing of the wire 31 and the body 24 greater than the predetermined maximum spark gap which the high capacity current can jump.

Interposed between the outer end of the valve stem 23 and the adjacent end of the rod 29 is an interponent 32 of electrical insulating material. The interponent 32 is connected fixedly to the

valve stem 23 and to the rod 29 so that the movement of the rod toward the valve body 20 opens the valve and movement of the rod in the opposite direction closes the valve. Secured to the interponent 32 for movement therewith is an annular flange 33 of insulating material. In order to provide a main switch for controlling the high capacity current, annulus or ring contact 34 of suitable electrical conducting metal is carried on the outer periphery of the flange 33. At the opposite end of the interponent 32 is a flange 35, the flanges 33 and 35 providing opposed shoulders between which is slidably mounted on the interponent a switch element 36 in the form of a sleeve of insulating material. Segmental contacts 37 of electrical conducting material are carried on the element 36 and are arranged to be engaged by the ring contact 34 so that the ring contact 34 bridges between the contacts 37 and completes the circuit from one contact 37 to the other. The sleeve switch element 36 is of less thickness than the distance between the opposed shoulders of the flanges 33 and 35 so that the sleeve switch element may slide endwise of the interponent 32 a limited amount. Spring contact arms 38 are carried by the body 24 and yieldably engage the segmental contacts 37 of the switch element 36 for supplying electrical current thereto. The spring contacts 38 normally yieldably resist endwise movement of the sleeve switch element 36 in either direction. In the normal starting position illustrated in Figure 1, the contacts 37 of the sleeve switch element 36 are in contact with the contact ring 34. Upon initial heating of the thermostatic levers 26 and consequent initial movement of the rod 29 toward the valve body 20, the contact 34 is moved away from the contacts 37, this relative movement away from the contacts 37 continuing until the sleeve switch element 36 is engaged by the shoulder of the flange 35. Thereupon the contacts 34 and 37 are moved with the rod 29 in the valve opening direction while remaining in a predetermined maximum spaced relation to each other. Thus, upon initial movement of the rod 29 toward the valve body 20, the main switch provided by the contacts 34 and 37 is immediately opened. Continued movement of the rod in the same direction increases the opening of the switch to a predetermined maximum amount, after which the entire main switch moves with the rod 29 upon continued movement of the rod in the same direction. Therefore, regardless of the amount of movement of the rod 29 toward the body 20 of the valve, only a predetermined maximum amount of movement of the rod in the opposite direction is necessary to re-establish contact between the contacts 34 and the contacts 37, and no appreciable delay can occur in re-establishing the spark if the burner 2 is extinguished. Here it should be noted that the end of the rod 29 nearest the burner 2 is so positioned that the gap between the burner 2 and the rod 29 preferably exceeds the predetermined maximum spark gap only when the valve 20 is fully open and thus is an additional assurance that the spark will be discontinued and re-established, if for some reason the switch defined by the contacts 34 and 37 fails to operate properly.

The source of high capacity current may be any suitable one of the various electrical devices for this purpose. In the illustrative example, the means for producing a high capacity current and spark is indicated at 40, this device being connected to the 110 volt alternating current supplied by the wires 41. If desired, a transformer may be interposed between the device 40 and the source of alternating current 41. Connected in series with the spark producing circuit of the device 40, as is described more fully hereinafter, are the spring contact arms 38, and their associated contacts 34 and 37 and also the contacts 12 and 13 with their associated contact 11. The circuit rendering the spark device 40 operative necessitates the closure both of the contacts 34 and 37 with respect to each other and of the contacts 12 and 13 by the contact 11. Only when all of these contacts are in circuit closing position is the device 40 rendered operative for producing a high capacity discharge spark at the spark terminal end of the rod 29 adjacent the pilot burner 2. If the contacts 34 and 37 are open or the contact 11 is out of bridging relation to the contacts 12 and 13, or both, no spark will be produced.

Operation

In the operation of the device, therefore, the operator first opens the gas cock 3 which admits gas through the line 5 to the valve 6, the gas pressure simultaneously lifting the piston 8 and valve plug 9 for admitting gas to the pilot burner 2 and closing the circuit between the contacts 12 and 13. Since in the normal or starting condition of the device the contacts 34 and 37 are in contact, a circuit is established for energizing the high capacity discharge spark producing means 40 which, through the wire 31, imposes a high capacity current on the rod 29. The high capacity current circuit is grounded at one side and due to the metal pipe connection of the pilot burner 2 it also forms a ground so that a spark or continuous series of sparks jump from the rod 29 to the burner 2 igniting the gas issuing therefrom. Obviously, if the gas line pressure is below a predetermined minimum, gas will not be admitted to the burner 2 and the control circuit will not be completed through the contacts 12 and 13. Consequently, neither the spark nor the flow of gas will occur. Upon ignition of the pilot burner 2, however, the thermostatic levers 26 become heated and move the rod 29 to break the contact between the contacts 34 and 37 so that the spark from the terminal end of the rod 29 to the burner 2 is arrested or discontinued. In event the contact elements 34 and 37 become stuck, for any reason, continued movement of the rod will increase the gap at the burner 2 to such an extent that no further spark will be produced, thus providing an additional safety feature. This same movement of the rod, however, for breaking the circuit between the contacts 34 and 37 opens the valve 22 and admits gas to the service burner which is immediately ignited by the pilot burner 2. In event the pilot burner 2 becomes extinguished for any reason, the thermostatic levers 26 cool, re-establishing the spark between the rod 29 and the pilot burner 2 and thus re-igniting the burner 2. But if for some reason the pilot burner 2 cannot be or is not re-ignited, the thermostatic levers 26 will cool to a sufficient degree to close the valve 22. In this connection, the follow-up relation between the sleeve switch element 36 and the flange switch element 33 should be noted. Because of this relation, the valve 22 does not have to return entirely to the seating position to re-establish the circuit through the contacts 34 and 37 and energize the spark producing means 40, but only

a short movement is necessary before contact is established between the contacts 34 and 37.

Ordinarily, it is desired at all times that the pilot and service burner combination be used. However, if mere ignition is desired without the safety features, it is apparent that the pilot burner may be omitted and the rod 29 used directly for the ignition of the service burner 1.

Referring next to Figure 6, a combination similar to that above described is illustrated, except that the pipe line 50 leading to the pilot burner is connected to a valve 51 which corresponds to the valve 20 instead of being connected directly to the gas cock 52. Referring further to Figure 6, there is shown a further modification in that a switch 53 which is operated directly by the gas cock is used instead of the switch defined by contacts 11, 12 and 13. In this form a contact member 54 is arranged on and for rotation with the handle 55 of the gas cock for closing a circuit through stationary contacts 56 when the gas cock is rotated to open position, the contacts 56 and 54 performing the same function as the contacts 11, 12 and 13. Thus a circuit is established simply by turning the handle 55 of the gas cock 52 to "on" position. This circuit is broken by opening of the contacts 57 and 58 when the pilot burner has become ignited.

Referring next to Figure 7, there is illustrated a safety ignition system employing two thermostatically controlled valves each of which is similar to that described in connection with Figure 1. The particular modification illustrated in Figure 7 is for use where it is desired to utilize a pilot which is located on the top of the range or some other point which is readily accessible and visible to the operator for controlling the operations of a burner which is remote from or concealed from an operator, for example, in the oven of the range. In Figure 7, an oven burner 60 is illustrated, and a pilot burner 61 is located in the oven in firing relation to the burner 60. The supply of gas to the burners 60 and 61 is controlled initially by the gas cock 62 from which a pipe 63 leads directly to the pilot burner 61 and a second pipe 64 leads to the thermostatically controlled valve of the oven burner. The pilot burner 61 is ignited by a spark produced by a rod or movable high frequency terminal 65 which is connected to a source or means for producing the high capacity discharge spark in the same manner as the rod 29 heretofore described. The connection between the rod 65 with the high pressure source is through the electric wire 66 connected to a terminal 67 of the high capacity discharge spark producing device or means 68. The rod 65 is connected for movement with a yoke 69 to the arms of which are connected thermostatic levers 70. The opposite ends of the levers 70 are connected to the free ends of a yoke 71 fixedly mounted on the body 72 of a control valve having a seat 73 in the valve body 72. A cooperating valve disc 74 is carried by the rod and is opened upon heating of the thermostatic levers 70 of the pilot burner 61. Leading from the pilot burner gas supply line 63 is a branch line 75 which is connected with the body 72 at one side of the valve seat 73. Leading from the valve body 72 at the opposite side of the valve seat is a pipe line 76 which leads to a tell-tale pilot burner 77 which may be located on top of the range or wherever it is readily accessible to the operator. It is apparent that before any gas can be admitted to the accessible pilot 77, the pilot 61 first must be in operation and must have heated the thermostatic levers 70 to a sufficient degree to cause them to unseat the valve disc 74.

Arranged adjacent the pilot burner 77 is a valve device 80 corresponding in all respects to the valve and thermostatically controlled device, including the rod 29 and valve 20, illustrated in Figure 1. The valve 80 is provided with a movable high capacity terminal rod 81 arranged close to and in spaced relation from the burner 77 so as to provide a spark gap. The rod 81 is also connected to the high capacity discharge terminal 67 of the high frequency device 68 by a wire 82. The spark gap between the movable terminal 65 and the burner 61 is normally less than the spark gap between the movable terminal 81 and the burner 77 so that when the high capacity terminal 67 is energized, a spark will be produced only between the movable terminal 65 and the burner 61 rather than between the terminal 81 and the burner 77. However, upon heating of the thermostatic levers 70, the terminal 65 is moved away from the burner 61 to a greater distance than the normal gap between the terminal 81 and burner 77. This occurs only upon ignition and burning for a short interval of the burner 61. Consequently, a spark is first delivered to the burner 61 for igniting the gas and as soon as the gas is ignited, the spark is discontinued at the burner 61 and established at the burner 67, and, at the same time, the valve 74 is opened to admit gas to the pilot burner 77. Thereupon, the tell-tale pilot burner 77 becomes ignited and the thermostatic levers 84 being in heating relation to the burner 77, move the movable terminal 81 away from the burner 77 to such a degree that the spark can no longer jump the gap. Consequently, the spark is discontinued both at the terminal 65 and at the terminal 81. Concurrently with this operation of the movable terminal 81 by the thermostatic levers 84, however, the main control valve 85 is opened by the lever 84 for admitting gas to the service burner 60 which is then ignited by the burner 61.

It is often desirable, however, as explained heretofore, that the high pressure device be entirely disconnected from the source of power when it is not being used for producing the high capacity discharge sparks. In order to open the circuit to the device 68, a switch mechanism including contacts 87 and 88 and movable contacts 89 and 90 are operatively associated with the rod 81, these contacts and associated switch elements corresponding to the contacts and elements 33 to 38, inclusive, of the switch described in connections with Figure 1.

Connected in series with the switch composed of the elements 87 to 90, inclusive, is an additional switch 91 which is operated to close the circuit when the gas cock 62 is turned to "on" position. The switch 91 comprises contacts 92 and 93 with an annular contact segment 94 rotatable with the stop cock stem for bridging the contacts 92 and 93 and closing the circuit when the cock is turned to "on" position or partway toward "on" position. The length of the segment 94 and its position are preferably such that the slightest turning of the stop cock toward "on" position connects the contacts 92 and 93 even before any gas is admitted past the cock. Upon opening of the valve 85 for admitting fuel to the service burner, the circuit to the high capacity discharge device is opened and the spark discontinued.

Referring next to Figure 8, the circuit and operating parts comprising one form of high capacity discharge spark producing device are illustrated diagrammatically. A 110 volt alternating current is supplied to the device from the 110 volt supply line 41. One line of the 110 volt supply is connected to a condenser 100, the opposite side of which condenser is connected to a ground. The same line is also connected to a coil 101 which operates the vibrating reed 102, the reed being an electrical conductor. The reed makes and breaks contact with a contact 103. A wire 104 leads from the contact 103 and connects it to one terminal of a primary winding 105. The opposite terminal of the primary winding 105 is connected to the opposite side of the 110 volt circuit by a wire 106. The two switches heretofore described are connected in series with the last mentioned terminal of the coil 105, these switches being designated, for clearness, by the numerals used in connection with their description in Figure 1. The use of the switches of the modifications instead of those specifically indicated is readily apparent from the exemplary showing. Thus, to close the primary circuit and establish the spark, it is necessary that both of the series connected switches be closed. Between the primary winding 105 and the nearest one of the switches, the wire 106 is connected by a wire 107 to a condenser 108, the opposite side of which is grounded. A wire 109 is connected to the wire 107 between the primary winding 105 and condenser 108 and to one side of the condenser 110, the opposite side of which condenser 110 being connected to that terminal of the coil 101 which is between the coil 101 and the vibrating reed 102, as indicated at 111. A secondary winding 112 is positioned in inductive relation to the primary winding 105 and one terminal of the secondary winding 112 is connected to the terminal of the coil 105 between the coil 105 and the contact 103. The winding 112 is provided with a metal pole piece 113 to which is connected the wire 31. The other terminal of the secondary winding 112 is connected to the metal pole piece 113. The wire 31 is connected to the movable terminal or rod 29, which, in turn, through the spark gap, completes the circuit through the pilot burner 2, which is grounded. Instead of the high capacity discharge spark device described, any suitable high capacity discharge spark device may be used.

In this modification it is apparent that at all times the readily accessible tell-tale pilot is burning and the operation of the igniting pilot or remote burner and the service burner is assured and proper operation of the latter is indicated.

Having thus described my invention, I claim:

1. An ignition device for a service burner comprising a pilot burner readily accessible to an operator, means for admitting fuel to said pilot burner, a second pilot burner remote from the first pilot burner and in firing relation to the service burner, electric spark terminals associated with the pilot burners, respectively, each terminal being spaced from its associated pilot burner and providing a spark gap for igniting its associated pilot burner when the spark gap is less than a predetermined maximum, high frequency electric spark producing means connected to said terminals, the spark gap for the second pilot burner normally being less than that for the first pilot burner and both gaps normally being less than the maximum, whereby the second pilot burner terminal is operative and the first burner terminal is inoperative until the gap of the second pilot burner terminal is made greater than the gap of the first, thermostatic means in heating relation to the pilot burners respectively and operated when heated to move the associated terminals away from the associated pilot burners and beyond said maximum, valve means operated by the thermostat means of the second pilot burner when the last mentioned thermostat means is heated to admit fuel to the first pilot burner, and valve means operated by the thermostat means of the first pilot burner when the last mentioned thermostat means is heated to admit fuel to the service burner, whereby the readily accessible first pilot burner cannot be ignited for admitting fuel to the service burner until the second pilot burner is operating.

2. A safety ignition device for a gas burner, comprising a thermostat associated with the burner, an electrical ignition means including a normally open circuit for supplying a spark at the burner when the circuit is closed, a switch in the circuit arranged to close the same, said switch having a contact fixedly connected to a movable member of the thermostat and another contact having a limited lost-motion connection with the movable member of the thermostat, and means resisting but not preventing movement of the second mentioned contact away from the first, whereby the circuit can be broken by initial movement of the movable member in one direction and re-established upon taking up of the lost motion by movement of the member in the opposite direction irrespective of the extent of movement of the member in the first direction.

3. In a combination including two gas burners, ignition means including spark terminals respective to the burners and in igniting relation to gas emitted therefrom and cooperating ground conductor means for the terminals; a single source of high potential current connected electrically to both terminals, both terminals being in spark-delivering relation to their respective ground means, one terminal being initially spaced closer to its ground means than is the other terminal to its ground means so that the former only is initially effective to deliver spark, a thermostat motor in heat-receiving relation to one of the burners and connected to said one spark terminal in a manner to separate said one terminal from its ground means a greater distance than the spacing of the other terminal from its ground means when the thermostat motor is heated by said burner, whereby gas will be ignited at said other burner only after gas has been ignited at said one of the burners.

4. A gas ignition and control system for a service burner comprising two pilot burners, one pilot burner in igniting relation to the service burner and the other pilot burner remote from the service burner, thermally responsive means operatively associated with said one pilot burner for controlling flow of gas to said other pilot burner, a valve for controlling the flow of gas to the service burner, thermally responsive means operatively associated with said other pilot burner for operating said valve, and igniting means in igniting relation to said other pilot burner and rendered operative consequent upon predetermined heating of the thermally responsive means of said one pilot burner for igniting the said other pilot burner.

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