

Feb. 23, 1937.

L. H. GEURINK ET AL

2,072,034

GAS RANGE LIGHTER AND CONTROL

Filed May 16, 1932 .

3 Sheets-Sheet 1

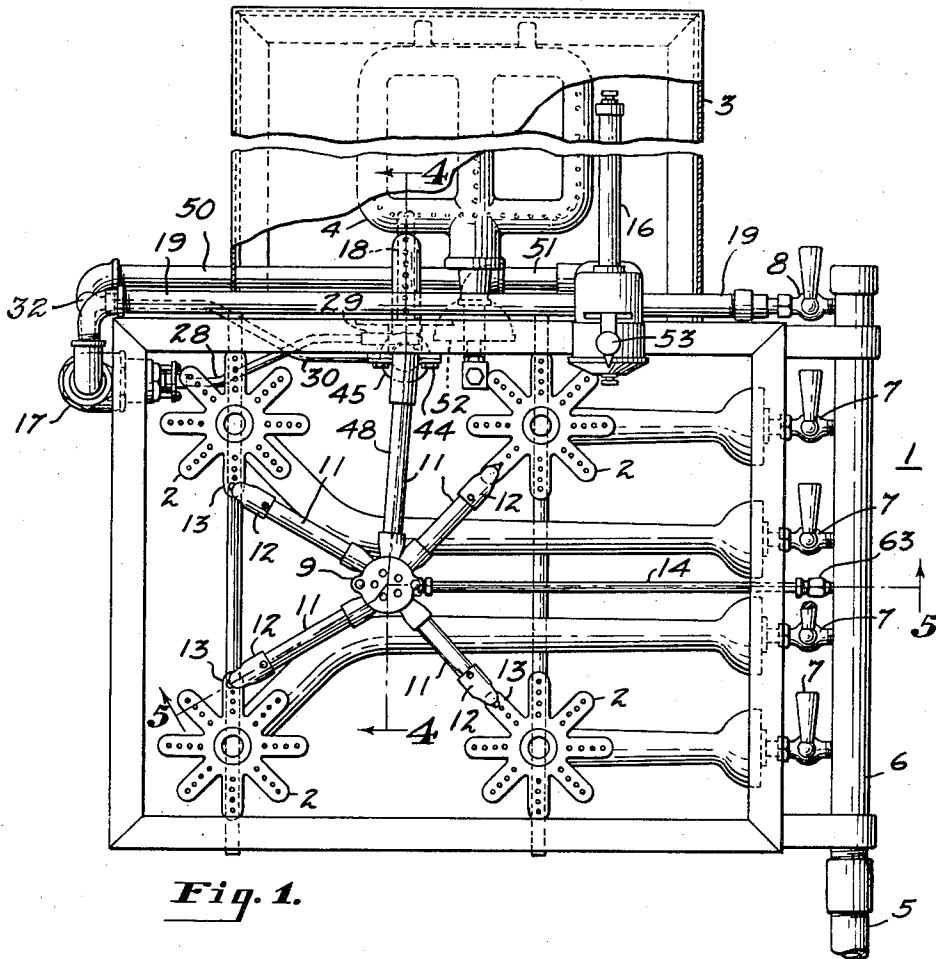


Fig. 1.

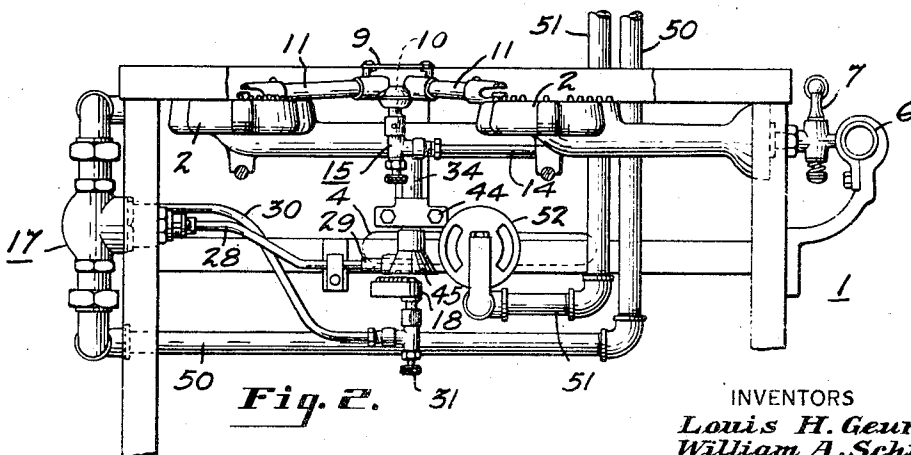


Fig. 2.

INVENTORS

Louis H. Geurink
William A. Schulte

BY *Edmund J. De Pas*
THEIR ATTORNEY

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3 Sheets-Sheet 2

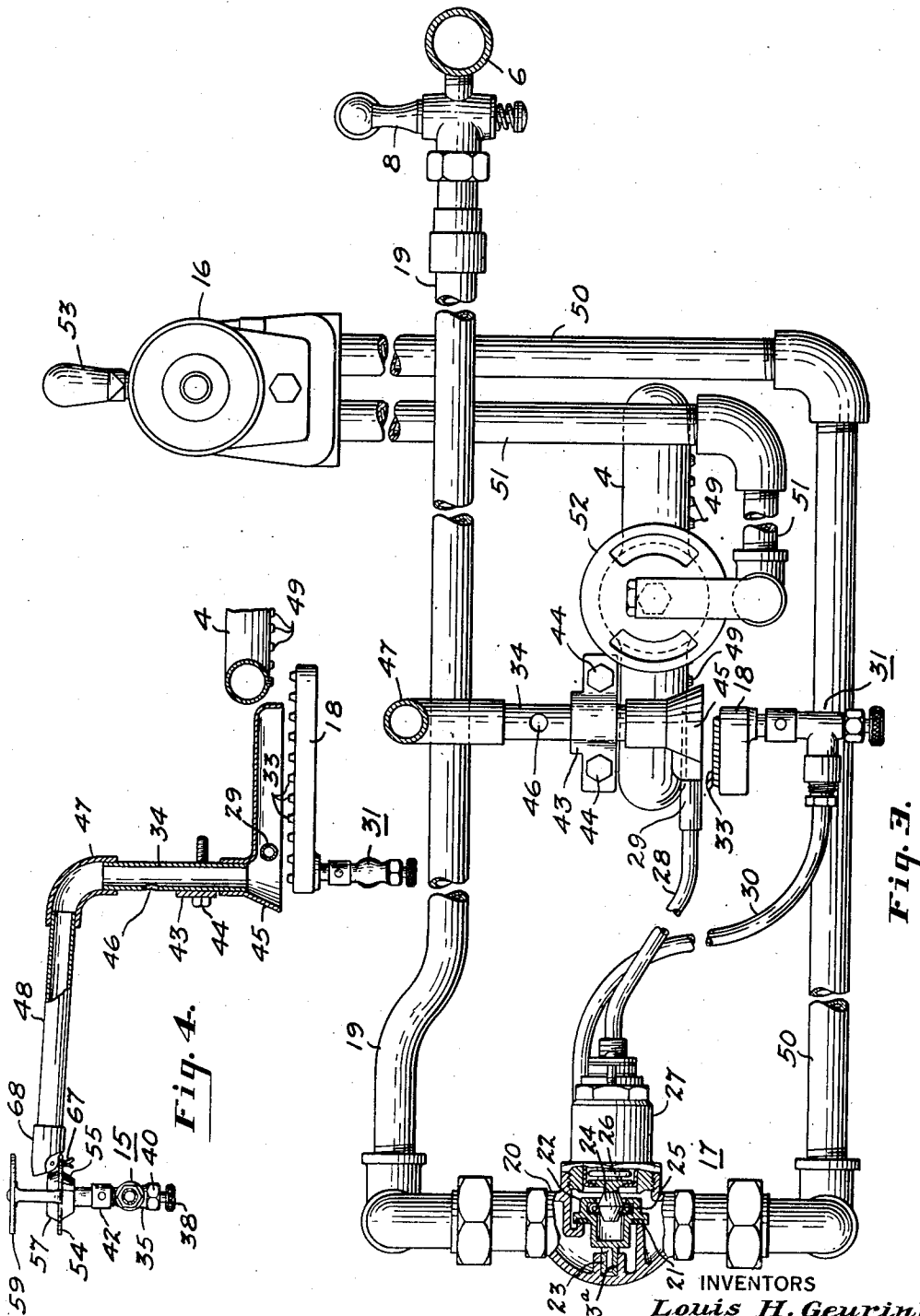


Fig. 3.

Fig. 4.

INVENTORS
 Louis H. Geurink
 William A. Schulte
 BY Edmund J. De Pas
 THEIR ATTORNEY

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3 Sheets-Sheet 3

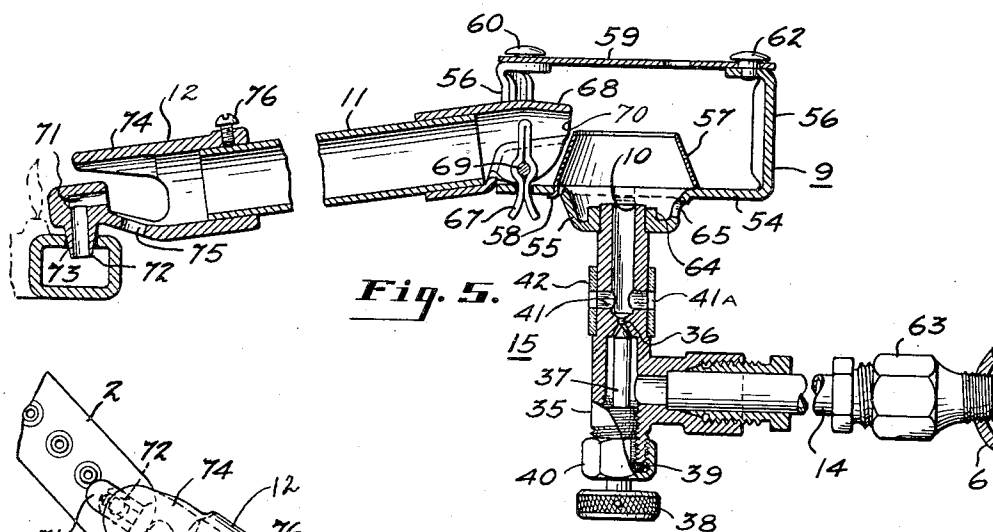


Fig. 5.

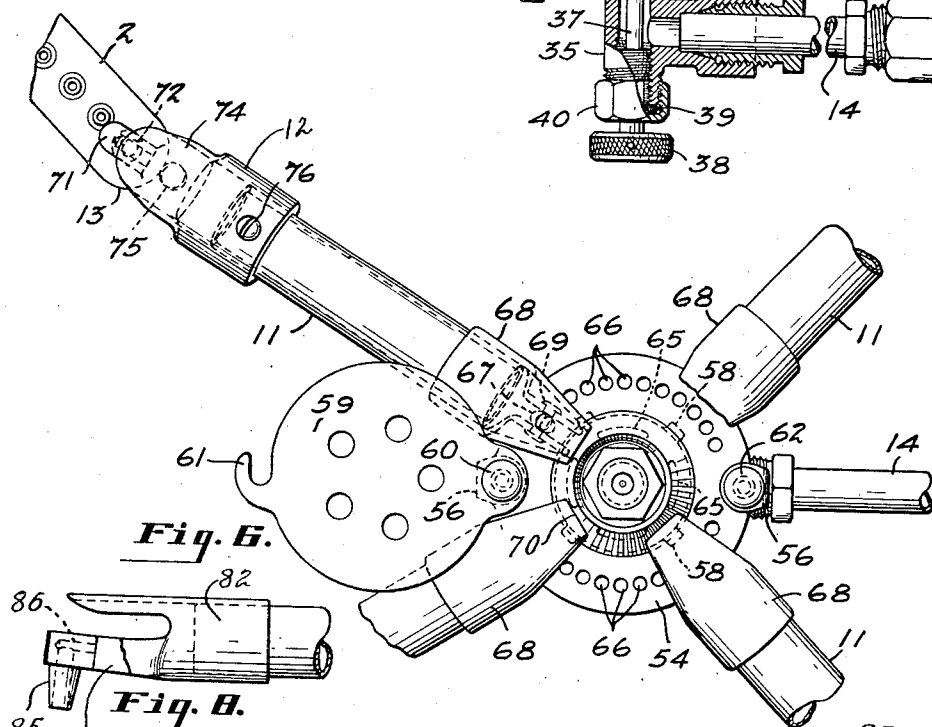


Fig. 6.

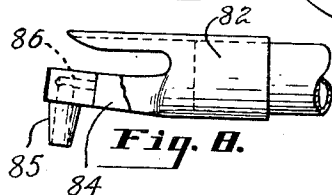


Fig. 8.

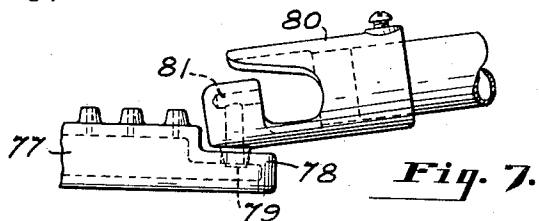


Fig. 7.

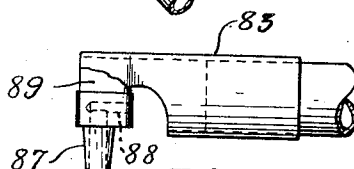


Fig. 9.

INVENTORS
Louis H. Geurink
William A. Schulte
BY Edmund J. DePas
THEIR ATTORNEY

UNITED STATES PATENT OFFICE

2,072,034

GAS RANGE LIGHTER AND CONTROL

Louis H. Geurink and William A. Schulte, East
Cleveland, Ohio, assignors to The Patrol Valve
Company, Cleveland, Ohio, a corporation of
Ohio

Application May 16, 1932, Serial No. 611,586

15 Claims. (Cl. 158—115)

This invention relates to ignition and control devices and in particular devices of the type disclosed, for effecting the ignition and control of a plurality of gas burners by means of a remote pilot burner and a cooperating thermostatic valve.

One of the objects of this invention is to provide an improved safety ignition device for an inclosed burner, in which the ignition of the burner is effected by means of a continuously operating pilot burner which is located at a point remote from the inclosed burner and its housing.

Another object of this invention is to provide an improved form of flash-tube lighter, in which the injection nozzles of the flash tubes are arranged for permanent alignment with the flash tubes irrespective of the relative position of the flash tube or the burner with which it is associated.

Another object of this invention is to provide in a flash-tube lighter, an improved gas collecting tip or fitting for the burner end of the flash tube.

Another object of this invention is to provide in a flash-tube lighter, an improved form of pilot and flash tube supporting structure.

Another object of this invention is to provide an improved form of pilot burner construction.

A further object of this invention is to provide a control device for inclosed gas burners, which is arranged to insure the provision of an ignition means for such a burner before its gas supply can be turned on.

With these and other objects in view, the invention consists in the novel construction, arrangement and combination of parts, hereinafter described, illustrated in some of its embodiments in the accompanying drawings and particularly pointed out in the appended claims.

In the drawings, Figure 1 is a plan view of a gas range illustrating one mode of practicing our invention. Figure 2 is a side elevational view of top burner assembly of the range. Figure 3 is an enlarged side elevational view, partly in section, showing the details of the oven burner control. Figure 4 is an enlarged sectional view taken on line 4—4, Figure 1. Figure 5 is an enlarged sectional view of the lighter taken on line 5—5, Figure 1. Figure 6 is an enlarged plan view of the lighter and one of its flash tubes. Figure 7 is a side elevational view of a modified form of flash tube nozzle and burner. Figures 8 and 9 are side elevational views of modified forms of flash tube nozzles.

Referring to Figure 1, the numeral 1 indicates generally a gas range having a plurality of top burners 2, and an oven 3, which is arranged to

be heated by means of the oven burner 4. The range is supplied with gas by means of a gas supply conduit 5, which communicates with the range manifold 6, from which a plurality of valves 7 control the gas supply of the top burners 2. A valve 8, similar to the top burner control valves, is connected to the manifold 6 for controlling the gas supply of the oven burner 4.

The range is provided with a flash-tube igniter 9, which has a continuously operating pilot burner 10. The flash tubes 11 of the lighter are open at each end for the purpose of conducting gas from the top burners 2, to the continuously operating pilot burner 10 and then flashing a flame from the pilot to the main burners for igniting the latter.

The conduction of gas from the top burners 2 to the pilot burner 10, is effected by way of a gas collecting nozzle or main burner flash tube fitting 12 and an associated flash tube 11. The fitting 12 is supplied with gas by way of a lighter port which is drilled in the top of each of the top burners. Thus, when gas is supplied to any of the burners 2, a certain portion of it is injected into an associated flash tube which conducts such gas to the flame of the pilot burner 10, effecting the ignition of the gas in the flash tube, which flashes back and effects the ignition of the main burner which is being supplied with gas.

Fuel for the pilot burner 10, is supplied by way of a conduit 14, which is under control of a needle adjusted gas and air mixing valve 15. The gas supply of the oven burner 4 is under the joint control of the manually operable valve 8, a thermostatically operated oven regulator 16 and a thermally actuated valve 17. The oven burner is arranged to be lighted by an ignition or auxiliary burner 18.

The control of the oven burner 4 is primarily effected by means of the manually operable valve 8, which communicates with the gas supply manifold 6 as shown. Upon the opening of the valve 8, gas is supplied to the conduit 19, which communicates with the inlet side of the thermally actuated valve 17. This valve is normally in a closed position. The valve 17 includes a globe valve body 20 having a valve seat 21 integrally formed therewith. A valve head 22 cooperates with the valve seat 21 to control the flow of fuel therethrough.

The valve head 22 is carried on a valve stem 23, which is integrally formed therewith. A bearing 23a is formed in the valve body for the reception of the valve stem 23. The valve head 22 is oper-

atively associated with a snap-action mechanism which comprises a cam 24 and a garter spring 25 which surrounds the cam. The garter spring is carried in an annular channel formed in the valve head and the cam is connected to a thermostatically operated bellows 26. The bellows is carried in a cup shaped member 27 and is in communication with a tube 28, which contains a thermo-sensitive fluid. The oven ignition burner 18 is arranged to supply heat to the tip 29, of the tube 28, for effecting the actuation of the valve 17.

The auxiliary burner 18 is supplied with gas by way of a gas supply conduit 30 and a needle adjusted gas and air mixing valve 31, which provides the burner 18 with a combustible mixture of gas and air so that this burner operates with a blue flame. The valve body 20, of the valve 17, is provided on its inlet side with an opening in which there is received a suitable fitting 32 for placing the conduit 30 in communication with the gas supply conduit 19.

The burner 18 has a plurality of drilled raised ports 33, the adjacent ports of which are in lighting proximity to each other. The ports at one end of this burner are in lighting proximity to the ports of the oven burner. The other end of the burner 18 has a port in axial alignment with the tube 34, for injecting gas into this tube and adjacent to such port there are ports for supporting flames for heating the thermostatic bulb 29.

The needle adjusted mixing valves 15 and 31 are of similar construction and the valve 15 is shown in detail in Figure 5. This valve includes a body portion 35 having a port 36 with which an adjustable needle 37 cooperates for controlling the flow of gas therethrough. The exposed end of the needle 37 is provided with a knurled disc 38, by means of which it is operated. The needle is surrounded with packing material 39, which is held in place by a gland nut 40. Air inlet openings 41 are provided above the gas injection port 36 for the purpose of supplying air to the gas stream flowing through the valve. An adjustable sleeve 42 having apertures 41a is provided for regulating the amount of air supplied to the gas by way of the openings 41. The sleeve 42 is rotatable on the valve body so that the apertures 41a may be brought into partial or complete registry with the openings 41.

The structure just described, constitutes in the case of the top pilot burner 10, a complete burner structure which includes provisions for the regulation of the gas supply of the burner and other means for the regulation of the air supply of such burner.

The tube 34 is held in place in an adjustable manner by means of the clip 43 and its holding bolts 44 which are fastened in the side wall of the oven 3. The tube 34 carries on its lower end, a channeled shield 45 for the burner 18. An air hole 46 is provided in the side of the tube 34 for supplying additional air to the gas injected into the tube. An L-shaped fitting 47 receives in its lower end the upper end of the tube 34 and in its upper end it receives the oven flash tube 48.

The oven flash tube 48 terminates at a point adjacent to the flame of the pilot burner 10, so that gas emitted by the end port of the burner 18 is conducted by this tube to the pilot burner 10 for effecting first the flash ignition of the end port of the burner 18 and then the progressive ignition of the successive ports of the burner 18, one from the other.

A certain amount of air is drawn into the oven flash tube by the gas stream emitted by the end port of the burner 18, thus insuring the provision of a combustible mixture of gas and air for the flashing of a flame from the pilot 10, back to the burner 18. The shield 45 over the burner 18 prevents the ports of this burner from being stopped up with food and other materials that might be dropped thereon. The shield 45 also assists in the collecting and in the directing of gas to the tube 34.

The ports of the oven ignition pilot or auxiliary burner 18 extend from a point below the tube 34 to a point adjacent to the oven burner 4. The oven burner is provided with flame supporting ports 49. The outlet side of the thermally actuated valve 17 communicates with a conduit 50 which is connected to the inlet side of the thermostatically controlled oven regulator valve 16. The outlet side of the thermostatic valve 16 communicates with a conduit 51 which supplies gas to the gas and air mixing tube 52 of the oven burner 4.

The specific construction of the valves 7, 8, 16 and 17 does not form a part of this invention and they are not described in detail as they merely represent any valve suitable for the purpose for which they are employed. The valve 17 forms a part of the subject matter of application for United States Letters Patent, Serial No. 568,647, filed by John T. Marvin, October 13, 1931.

When it is desired to operate the oven burner, the valve 8 is opened, whereupon a supply of gas is admitted to the conduit 19. Under such conditions, the valve 17 normally would be occupying the position shown in Figure 2, wherein the valve head 22 is shown in contact with the seat 21. With the parts in the position just described, the gas supplied by way of the conduit 19 passes through the conduit 30 to the mixing valve 31, which supplies a combustible mixture of gas and air to the auxiliary burner 18. Under these conditions, the end port of the burner 18 operates to supply a combustible mixture of gas and air to the tubes 34 and 48 which is conducted to and ignited by the pilot burner 10. The flash back produced by such ignition serves to light the burner 18.

In a short time, after the ignition of the auxiliary burner, the thermostat bulb 29 becomes sufficiently heated to effect the opening of the valve 17, whereupon a supply of gas is admitted to the oven burner 4 by way of the conduits 50 and 51 and the oven regulator valve 16.

The gas admitted to the oven burner 4 is then ignited by the flames supported by the end ports of the ignition burner 18. The oven burner then operates under control of the thermostatic valve 16. This valve is provided with a manually settable handle 53, by means of which a predetermined temperature may be maintained in the oven. The ignition burner 18 is supplied with gas at full line pressure at all times and its operation is not affected by the operation of the valve 16 which automatically controls the flow of gas to the oven burner only, and as sometimes happens, this valve may cut down the flow of gas to the oven burner to such a point so that a slight draft or disturbance in the oven will cause its extinguishment.

Extinguishment of the oven burner under these conditions would cause no harm as it would be reignited immediately by the ignition burner 18. The burner 18 operates at full capacity and hence

is not so easily extinguished as is the oven burner under the conditions just outlined.

From the foregoing, it is apparent that we have provided a safety control and ignition means for an inclosed burner in which the ignition of the burner is effected by means of a remote pilot and an associated ignition burner having a portion adjacent the inclosed burner. The ignition burner by reason of being supplied at all times with gas at full line pressure, is not apt to be as readily extinguished as is the burner which it serves to ignite, such burner being under control of a thermostatic valve which increases and decreases its gas supply, causing it to burn at times with a small flame which is apt to be easily extinguished.

The provision of the thermally actuated valve 17 invests the appliance with a high degree of safety, as the use of this valve necessitates the presence of an ignition flame for the oven burner before such burner can be supplied with gas. The use of an ignition burner 18, spanning part of the distance between the oven burner and the pilot light, provides a positive and safe means for igniting the oven burner and at the same time permits the locating of the thermally actuated valve exteriorly of the oven where it is not affected by the heat of the oven burner.

The specific form of lighter disclosed herein materially contributes to the safe operation of the range. The lighter is constructed so that it can be used on gas ranges having different burner arrangements without necessitating any material alterations in the lighter. The labor of installing and connecting the lighter for the ignition of the top burners is greatly simplified and involves only the operation of connecting the pilot gas supply line to the range manifold as the other elements of the lighter for the top burners are simply dropped into place. Our improved lighter eliminates the need of any side-drilling of the burners as is customary in lighters of this type where a port is drilled in the side of the burner for the purpose of injecting gas into the flash tube.

The flash tube supporting frame or member 54 is formed from a metal stamping and it has a centrally located perforated frusto-conical cup 55, and a pair of vertical columns or arms 56 integrally formed therewith. An oppositely disposed frusto-conical cup 57, is positioned above the cup 55. The cup 57 has a number of tongues 58, which are received in suitable openings and bent over the frame 54 to hold the cup 57 in place. A perforated cover plate 59 is pivoted at 60 to one of the vertical arms 56. A hook 61 is formed on the cover plate for the purpose of engaging the pin 62 which is carried by the other arm 56, to hold the plate in its closed position.

The frame 54 is supported by the pilot gas supply tube 14. A fitting 63, which is screwed into the manifold 6, serves to connect the pilot gas supply line 14 to the manifold 6. The cup 55 has an upturned sleeve or flange 64 which is tightly fitted over the end of the pilot burner to secure the frame 54 and the pilot burner to each other. Air holes 65 are formed in the cup 55 for furnishing air to the pilot flame.

A number of circumferentially spaced holes 66 are punched in the member 54. These holes are provided for receiving the cotter pins 67, which are pivotally secured to the flash tube pilot end fitting 68 by the pins 69. By reason of the large number of holes 66 it is possible to adjust the discharge nozzles 68 about the pilot 10, so that the flash tubes 11 are in alignment with the flame

of the pilot burner. The cotter pin 67 is extended across the diameter of the fitting 68 as it has been found by experiment that faster ignition of the burners takes place when a small obstruction is placed in the fitting 68.

The flash tubes 11 are slidably and snugly fitted into the fittings 68. The outlet end 70 of these fittings is somewhat restricted in order to permit their being grouped in a small circle and also to cause the force of the explosion when they flash to be expended largely at the other end of the flash tube, thus providing faster and more positive ignition for the main burners 2 and at the same time lessening the probability of the flash blowing out the pilot flame.

The flash tube burner end fitting 12 is provided for the end remote from the pilot 10, of the flash tubes 11. The fittings 12 are in the form of a casting in which there is formed an L-shaped gas conduit 71. The portion 72 of the fitting defining the lower end of this conduit is received in a port 73, one of which is drilled in the top of each of the top burners 2. The walls of the hole 73 are straight and the portion 72 of the fitting is tapered so that the flash tubes have a limited angular adjustment in a vertical plane with respect to the burners 2.

The side walls of the fittings 12 are cut away so as to provide a shield 74 which extends over the discharge end of the conduit 71, to prevent food and other articles dropped on the lighter from plugging up the gas passageway of the conduit. A hole 75 is formed in the nozzle just below the discharge end of the conduit 71 for the purpose of supplying additional air to the flame supported at this point.

The cut-away side portions of the fittings 12 and the hole 75 permit the entrainment of a considerable amount of air along with the gas discharged from the conduit 71, so that a highly explosive gas mixture is discharged from the pilot burner end of the flash tube.

The flash tubes are adjustably received in the fittings 12, and are screwed therein by means of the screws 76. In the modified form of flash tube fitting 80, illustrated in Figure 7, the top plane of the main burner 77 is offset at 78. The offset part of the burner is drilled for reception of the fitting part 79, defining in part, the gas conduit 81 which is formed in the fitting.

The fitting 80 differs from the fitting 12 in that it is cylindrical in shape throughout its entire length, thus providing a larger opening in the burner end of the fitting. This construction tends to lessen the force of the explosion at the pilot burner end of the flash tube.

Figures 8 and 9 illustrate modified forms of fittings 82 and 83 respectively, for the burner end of the flash tube. The fittings 82 and 83 are formed of sheet metal. The sides of the fitting 82 are cut away so as to provide a pair of tongues 84 which embrace and are welded to a screw machine part 85.

A gas passageway 86 is drilled in the part 85. The fitting 83 has a screw machine part 87 similar to the part 85, and in which a passageway 88 is drilled. In this form of fitting the underside of the fitting is cut away so as to provide a pair of tongues 89 which embrace and are welded to the part 87.

The gas injecting passageways 71, 81, 86 and 88 of the different forms of fittings are formed in a fixed part of the fittings. By reason of this construction, gas is always discharged into the flash tube in line with its axis regardless of the

position of adjustment of the tube. This feature insures the uniform operation of the lighter and prevents inexperienced people from disturbing the relation of its operating parts. In addition to these advantages, the initial installation of the lighter is greatly facilitated by reason of our improved form of fitting for the burner end of the flash tube.

Furthermore, it is to be understood that the particular forms of apparatus shown and described, and the particular procedure set forth, are presented for purposes of explanation and illustration and that various modifications of said apparatus and procedure can be made without departing from our invention as defined in the appended claims.

Having thus described our invention, what we claim is:

1. In a gas burning appliance, in combination, a plurality of main burners having flame supporting ports, a continuously operating pilot burner, an open-ended gas conducting flash tube for each of said main burners having one end in communicating relation with a port of said main burner and the other end adjacent to the flame of said pilot burner, a member having a series of circumferentially arranged closely spaced holes for supporting the ends of said tubes adjacent to said pilot burner, and a pin pivotally secured to one end of each of said flash tubes and received in one of the holes of said member to adjustably position and secure said flash tubes with respect to said pilot burner.

2. In a gas burning appliance, in combination, a main burner having flame supporting ports, a continuously operating pilot burner, a gas conducting flash tube for said main burner having one end positioned to receive gas from a port of said main burner and the other end located adjacent to the flame of said pilot burner, a supporting member for the end of said tube adjacent to said pilot burner, and a pin extending across the diameter of said flash tube and projecting therefrom, said member having a hole for receiving said pin whereby to locate said flash tube in position to discharge gas at the flame of said pilot burner.

3. In a gas burner lighter, a pilot burner, remotely positioned main burners ignitable thereby, flash tubes for conducting gas from said main burners to said pilot burner to provide for the flash ignition of said main burners, and means for removably supporting the ends of said flash tubes remote from said main burners in position to convey a combustible gaseous mixture to the flame of said pilot comprising, a stamped metal plate having provisions for carrying and anchoring the stated ends of said flash tubes and having upright standards integrally formed therewith, and a cover plate for the ends of said flash tubes and pilot burner carried by said standards.

4. In a gas burner lighter, a pilot burner, remotely positioned main burners ignitable thereby, flash tubes for conducting gas from said main burners to said pilot burners to provide for the flash ignition of said main burners, and means for supporting the ends of said flash tubes remote from said main burners in position to convey a combustible gaseous mixture to the flame of said pilot comprising, a sheet metal plate having provisions for carrying and anchoring the stated ends of said flash tubes, and having upright standards integrally formed therewith, and a cover plate pivotally supported by one of said

standards and detachably engaging the other of said standards.

5. In a gas burner lighter, a pilot burner, a remotely positioned main burner ignitable thereby, a flash tube for conducting gas from said main burner to said pilot burner to provide for the flash ignition of said main burner, and means for supporting the end of said flash tube remote from said main burner in position to convey a combustible gaseous mixture to the flame of said pilot comprising, a sheet metal plate having provisions for carrying and anchoring the stated end of said flash tube, and a cup-like shield surrounding the flame of said pilot burner and interposed between the end of said flash tube and said pilot burner, said shield being formed in part by a portion of said plate.

6. In a gas burner lighter, a pilot burner, a remotely positioned main burner ignitable thereby, a flash tube for conducting gas from said main burner to said pilot burner to provide for the flash ignition of said main burner, and means for supporting the end of said flash tube remote from said main burner in position to convey a combustible gaseous mixture to the flame of said pilot comprising, a stamped metal plate having a central depression for receiving said pilot burner and having provisions for carrying and anchoring the stated end of said flash tubes, and a sleeve located above the central depression of said plate having tabs crimped over said plate for the securement of said sleeve.

7. In a gas burner lighter, a pilot burner, a remotely positioned main burner ignitable thereby, a flash tube for conducting gas from said main burner to said pilot burner to provide for the flash ignition of said main burner, and a fitting for the main burner end of said flash tube comprising a sleeve having a part at the end thereof with a passageway formed therein for conducting gas from one of the ports of said burner and discharging it into said fitting and flash tube, and guard means provided by said fitting for preventing food and other substances dropped on the fitting from stopping up the stated passageway.

8. In a gas burner lighter, a pilot burner, a remotely positioned main burner ignitable thereby, a flash tube for conducting gas from said main burner to said pilot burner to provide for the flash ignition of said main burner, a tip attached to the main burner end of said flash tube having a passageway formed therein for conducting gas from a port of said main burner and discharging it into said flash tube, and guard means provided by the outer end of said tube above said passageway for preventing substances dropped on the tube from stopping up the stated passageway.

9. In a gas burner lighter, a pilot burner, a remotely positioned main burner ignitable thereby, a flash tube for conducting gas from said main burner to said pilot burner to provide for the flash ignition of said main burner, a tip attached to the main burner end of said flash tube having a passageway formed therein for conducting gas from a port of said main burner and discharging it into said flash tube, the under side of said tube being provided with a passage for admitting secondary air to said tube for mixture with said gas.

10. In a gas burner lighter, a pilot burner, a remotely positioned main burner ignitable thereby, a flash tube for conducting gas from said main burner to said pilot burner to provide

for the flash ignition of said main burner, a tip attached to the main burner end of said flash tube having a passageway formed therein for conducting gas from a port of said main burner and discharging it into said flash tube, the under side of said tube being provided with a passage for admitting secondary air to said tube for mixture with said gas, and guard means provided by the outer end of said tube above said gas passageway and secondary air passage for preventing substances dropped on the tube from stopping up said passages.

11. In a gas burner lighter, a pilot burner, a remotely positioned main burner ignitable thereby, a flash tube for conducting gas from said main burner to said pilot burner to provide for the flash ignition of said main burner, a tip attached to the main burner end of said flash tube having a passageway formed therein for conducting gas from a port of said main burner and discharging it into said flash tube, the side walls adjacent said tip being cut away from the end thereof inwardly toward said pilot burner to provide passages for the admixture of secondary air with the gas in the tube, and to provide a guard overhanging said gas passageway.

12. In a gas burner lighter, a pilot burner, a remotely positioned main burner ignitable thereby, a flash tube for conducting gas from said main burner to said pilot burner to provide for the flash ignition of said main burner, a tip attached to the main burner end of said flash tube having a passageway formed therein for conducting gas from a port of said main burner and discharging it into said flash tube, the under side of said tube being provided with a passage for admitting secondary air to said tube for mixture with said gas, and guard means provided by the outer end of said tube above the secondary air passage for preventing substances dropped on the tube from stopping up said passage.

13. In a gas burner lighter, a pilot burner, a remotely positioned main burner ignitable thereby, a tube for conducting gas from said main burner to said pilot burner to provide for the flash ignition of said main burner when gas

is supplied thereto, and means comprising a projection of small width relative to the diameter of said flash tube, disposed in said tube adjacent the pilot burner and substantially traversing said tube for inducing turbulence in the gaseous mixture in said tube without substantially impeding the flow of said mixture.

14. In combination, a pilot burner, a remotely positioned main burner ignitable thereby, a tube for conducting gas from said main burner to said pilot burner to provide for the flash ignition of said main burner when gas is supplied thereto, means for securing one end of said flash tube adjacent to said pilot burner for universal movement, said tube being provided at the end adjacent the main burner with a tip rigidly secured thereto, said tip having a downwardly extending tapered portion provided with a gas passageway, said main burner having a port therein with straight side walls for receiving the tapered portion of said tip whereby the flash tube has a limited angular adjustment in a vertical plane with respect to the main burner.

15. In a gas burner control and ignition device, in combination, a main heating burner, a walled enclosure therefor, a remotely positioned continuously operating pilot burner located outside the range of normal lighting proximity with respect to said main burner, an elongated ignition burner extending through a wall of said enclosure from a point exterior thereof to a point adjacent said main burner, a shield in the form of an inverted trough disposed above and spaced from said ignition burner, a source of gaseous fuel supply for said burners, a substantially L-shaped flash tube extending from said pilot burner to said ignition burner for conducting gas from the ignition burner to the pilot burner, the end of the tube nearest the ignition burner being received in an opening provided at one end of said shield, and a valve responsive to the heat of said ignition burner for controlling the fuel supply to the main heating burner, said valve including a thermostatic bulb operatively connected to the valve and extending through a wall of said shield and over said ignition burner.

LOUIS H. GEURINK.
WILLIAM A. SCHULTE.