March 16, 1937. B. B. KAHN 2,073,966

STOVE

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Fig. 1

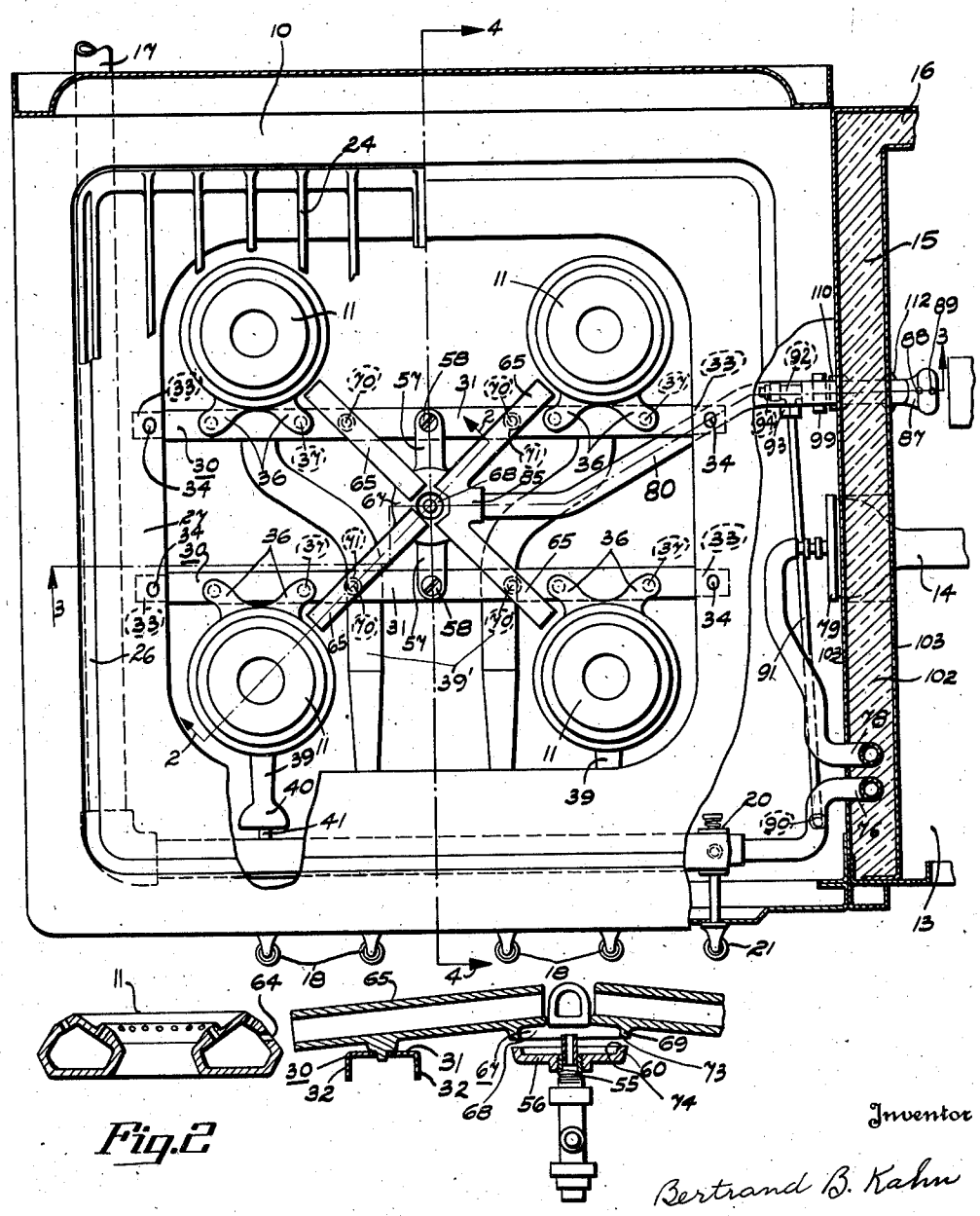


Fig. 2

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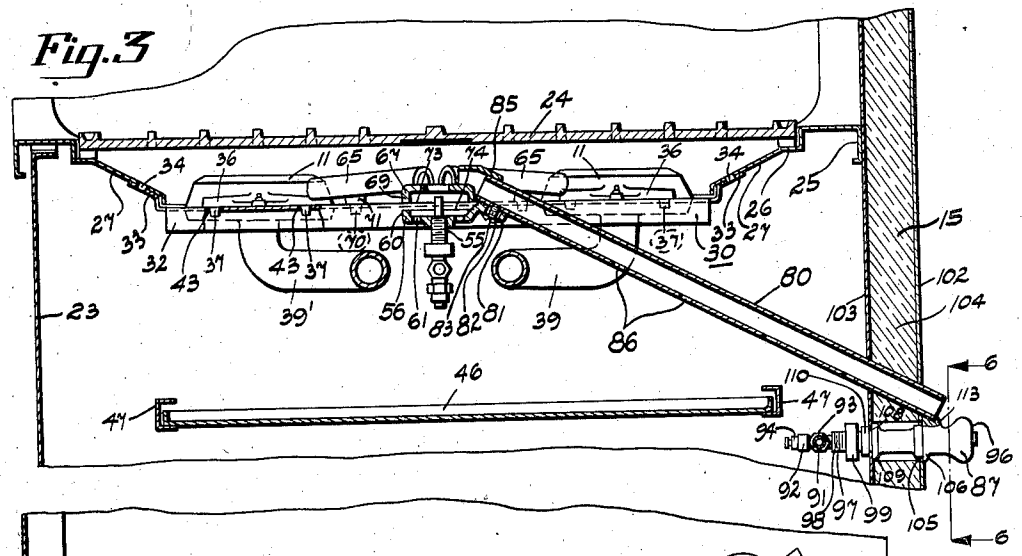
Attorney

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STOVE

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Fig. 3



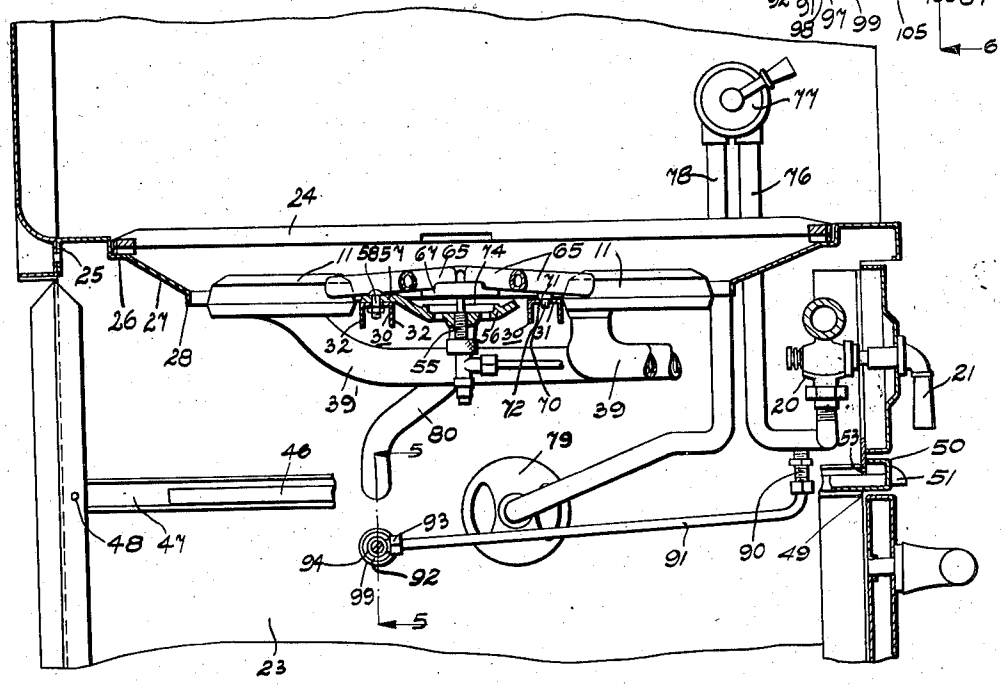


Fig. 4

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STOVE

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Fig. 8

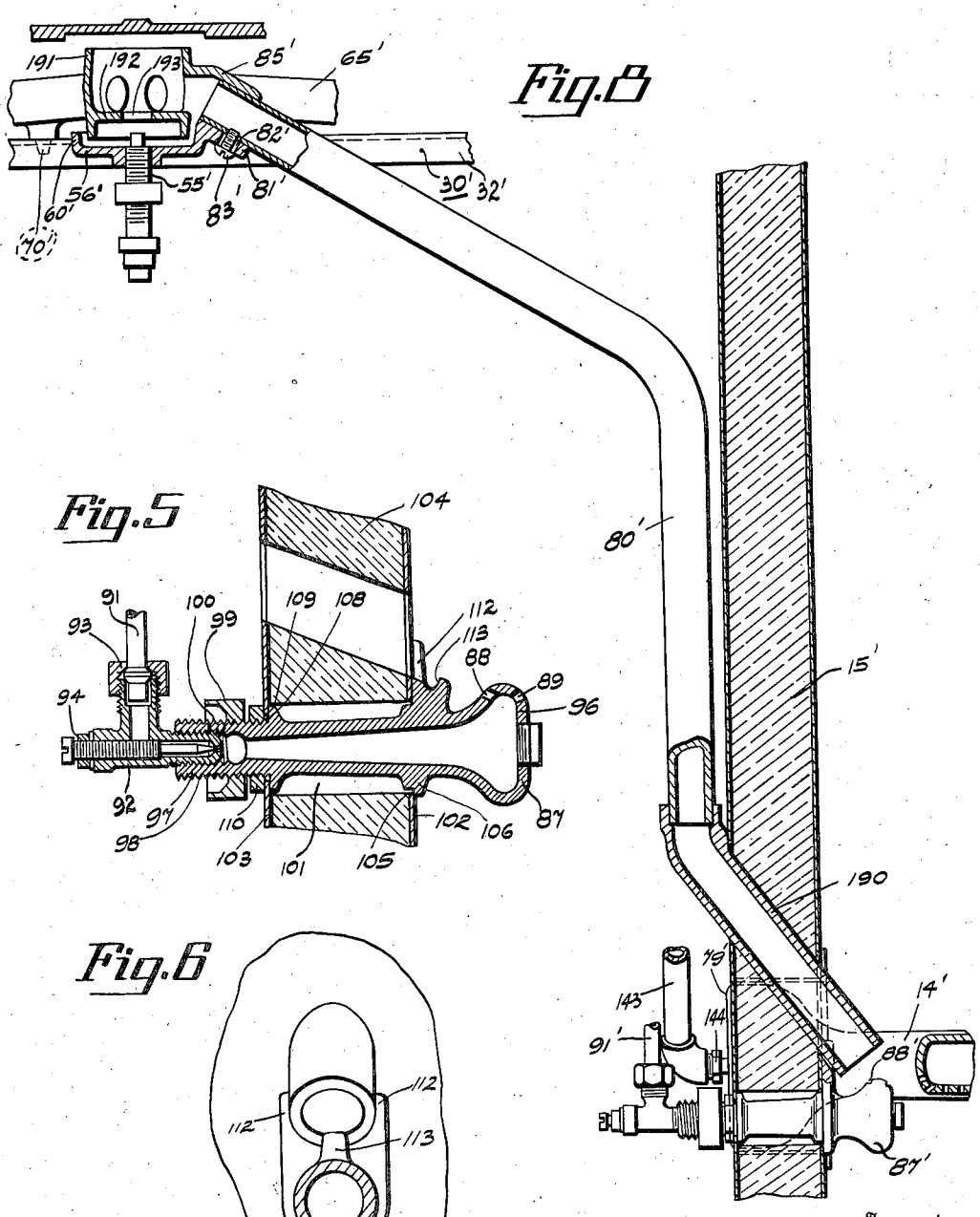


Fig. 5

Fig. 6

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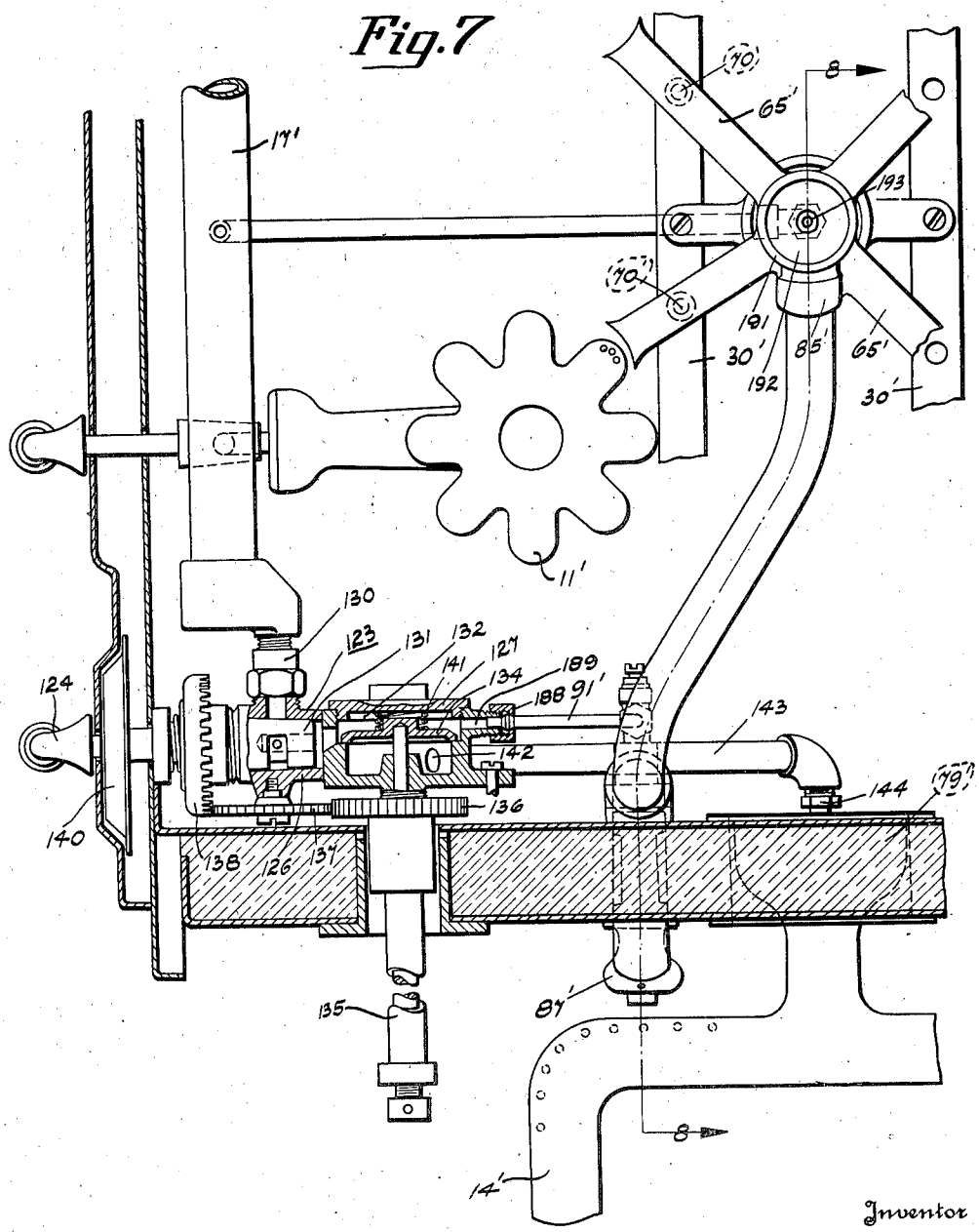
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STOVE

Filed July 17, 1931 4 Sheets-Sheet 4

Fig. 7



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2,073,966

UNITED STATES PATENT OFFICE

2,073,966

STOVE

Bertrand B. Kahn, Cincinnati, Ohio, assignor to The Estate Stove Company, Hamilton, Ohio, a corporation of Ohio

Application July 17, 1931, Serial No. 551,407

4 Claims. (Cl. 158—115)

This invention relates to stoves.

One of the principal objects of the invention is the provision of a stove comprising an assembly of parts which may be inexpensively fabricated, readily assembled and accurately maintained in proper operating position, and in which those parts that are a determining factor in maintaining a high operating efficiency in the stove are readily accessible and are easily removable to encourage frequent cleaning.

Another object of the invention is the provision in a stove of a burner lighter mechanism comprising but few parts of simple construction and associated with a normally burning pilot light to provide for automatic ignition of the several burners upon admitting fuel thereto.

Another object of the invention is the provision in a stove having a normally burning pilot and a thermostatically controlled burner, of a secondary pilot which is automatically ignited from the normally burning pilot upon admission of fuel to the burner, the secondary pilot remaining ignited at all times that fuel is available for the burner.

Other objects and advantages of the invention will be apparent from the following description, the accompanying drawings and the appended claims.

In the drawings, which illustrate preferred embodiments of the invention—

Fig. 1 is a fragmentary plan view of a stove constructed in accordance with this invention; some of the parts being broken away for clearness of illustration;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1;

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 1;

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 4;

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 3;

Fig. 7 is a fragmentary plan view showing a somewhat different arrangement of parts; and

Fig. 8 is a sectional view taken on the line 8—8 of Fig. 7.

The drawings, in which like characters of reference designate like parts throughout the several views thereof, illustrate a cooking stove which comprises generally a cooking top 10 having associated therewith a plurality of cooking top burners 11, and an oven compartment 13 which is provided with an oven burner 14. The oven is positioned so that the wall portion 15 of the oven enclosing housing 16 serves as a dividing wall between the oven and the cooking top. Fuel is supplied to the various burners from a manifold 17 to which suitable valves are attached having control handles 18 by which the flow of fuel to the cooking top burners 11 may be regulated. A valve 20, having an operating handle 21, is connected to the manifold for the supply of fuel to the oven burner 14.

The cooking top 10 is formed of a single sheet metal member which is attached to the stove body 23 and supports a grill 24, and the burners 11. As shown, the cooking top is in the form of a rim or frame having an outer portion 25 extending therefrom as a down turned flange. The inner side of the frame, that side opposite to the flange 25, is depressed to form a seat 26 for reception of the grill 24 which serves to support vessels and other objects which are to be positioned over the burners 11. Continuing from the depression 26 is a downwardly and inwardly extending flange 27 which terminates in an inner edge 28 that serves to define the opening in which the burners 11 are positioned.

Burner supporting means in the form of spaced parallel bars 30 are attached to the cooking top flange for reception of the cooking top burners. As shown, the bars 30 are formed of sheet metal and are of channel shape; the web 31 of each member being positioned horizontally while the side flanges 32 extend downwardly therefrom. The ends of each bar have projecting portions 33 which are formed to lie in surface contact with the under side of the flange 27 and are attached thereto as by rivets 34. The bars 30 are provided with spaced holes for the reception of projecting pins which are formed on the burners for their location and attachment to the bars. As shown, each burner 11 is provided with outwardly projecting arms 36 in which are provided perpendicularly extending projections or pins 37. The pin spacing for all burners is preferably uniform and the supporting bars are interchangeable as they are preferably symmetrical as to hole spacing to permit of simplicity in assembly of the bars and burners.

Each of the cooking top burners 11 has attached thereto a fuel supply tube 39 which provides a passage terminating in a mixing compartment 40 having an opening for reception of a fuel outlet 41 forming part of each fuel supply valve. The fuel outlets 41 are telescopically received within openings of the mixing compartment 40 and thus serve as a third point of sup-

port for each burner. Such a burner support provides for ready accessibility of the burners as, to attach a burner, it is merely necessary to insert the fuel outlet 41 within the opening of the mixing compartment and then insert the pins 37 within the holes 43 of the supporting bars 30. The burners 11 are all of like shape and consequently all have a similar spacing of pins 37. This permits a uniform spacing of pin receiving holes in the bars 30 so that the burners are interchangeably received therein. Each fuel supply tube 39 is shaped according to the positioning of the burner to which it is attached.

A removable pan or tray 46 is positioned beneath the cooking top opening, as defined by the flange edge 28, and serves to catch any foreign matter which may fall through the grill 24. This pan 46, which is supported upon suitable guide members 47 attached to the stove at 48, extends through the stove front at 49 and has formed thereon a closure member 50 in which is provided a handle 51. When the pan is in position beneath the cooking top the closure 50 serves as a cover for the opening 53 in the stove front through which the pan is withdrawn; the opening 53 being of sufficient depth to permit the pan to be withdrawn therethrough together with its accumulation of dirt or other foreign matter.

A burner lighter structure is provided for automatic ignition of the cooking top burners 11 and comprises a normally burning pilot light 55 which is attached to a supporting member 56 having oppositely projecting arms 57 which overlie the bars 30. The pilot support arms 57 are provided with openings which coincide with openings in the bars 30 for the reception of bolts 58 which serve to securely hold the pilot in fixed position relatively to the supporting bars and the burners attached thereto. That portion of the pilot support adjacent the point of attachment of the pilot is of disk like form and is preferably provided at its rim with an upturned flange 60. Suitable air admission openings 61 may be provided in the plate portion of the disk.

To permit a flow of fuel from each cooking top burner to the pilot for ignition therefrom, each burner 11 is provided with a jet opening 64 which is directed generally toward the end of a tube 65 that extends from adjacent each burner 11 and terminates adjacent the burner tip of the pilot 55. These tubes all form a unit assembly with the member 67 which connects the tubes adjacent the pilot ends. As shown, the tube assembly is one integrally formed casting in which the central connecting portion 67 is formed as a disk having a central opening 68 and a rim portion in the form of a down turned flange 69; the flange 69 being of similar diameter to the flange 60 of the pilot support. Upon admitting fuel to a burner 11, a portion of this fuel flows from the jet opening 64 and through the tube 65 to the pilot 55 for ignition and flash back to the burner.

To properly locate the tube assembly with respect to the burner jets 64 and the pilot, each tube 65 is provided with a downwardly extending pin 70 which projects from a boss 71 formed on the under side of each tube. The bars 30 are provided with openings 72 which are spaced to receive the tube pin projections 70 to thereby accurately locate the tube assembly so that the central opening 68 will stand concentrically with respect to the pilot tip. The faces of the bosses 71 are so related with respect to the lower face 73 of the flange 69 that when the tube assembly is positioned on the bars 30 the flange face 73 will stand spaced from the upper face 74 of the flange 60 thus providing an opening which, although affording a restriction to rapid air flow, provides free air supply to the pilot. The ignition tube unit, by being supported entirely from the pins 72 may, like the burners 11, be readily removed by merely lifting the unit from the supporting bars 30. By attaching the burners and burner igniting parts so that they are accessible and readily removable, the frequent removal of these parts for cleaning is encouraged so that the stove may be maintained at a high degree of operating efficiency.

The fuel supply to the oven burner 14 has incorporated in it a thermostat whereby the oven may be maintained at a desired temperature. As shown, fuel passing to the oven burner 14 from the supply manifold 17 first passes through the shut-off valve 20 which is under control of the valve handle 21, then passes through a pipe 76 to a manually adjustable thermostatically operated valve 77, then through a pipe 78 to the oven burner mixer 79. To provide for automatic lighting of the oven burner 14 an ignition tube 80 is provided which extends from adjacent the oven burner structure and terminates adjacent the normally burning pilot 55. The end of this tube 80 is positioned to receive a flow of fuel from the oven burner structure upon opening of the valve 20, and to convey this unburned fuel to the pilot 55 for ignition and flash back to the oven burner structure. As shown, this ignition tube 80 is a piece of cylindrical tubing which projects through the oven wall 15 and is further supported from an extending arm 81 of the pilot support 56. The arm 81 is provided with a slot 82 for passage of a screw 83 which is threadedly received within the tube 80; the slot providing for a degree of longitudinal adjustment in the positioning of the tube. The central connecting disk 67 for the ignition tubes 65 is provided with a hood portion 85 which overlies the pilot end of the tube 80 and serves to direct the fuel flow from the oven burner structure to a point adjacent the burner tip of the pilot 55. If desired, the tube 80 may be provided with a series of openings 86 on the lower side thereof to aid combustion within the tube.

To insure prompt ignition of the oven burner a secondary pilot 87 is provided intermediate the oven burner 14 and the adjacent end of the tube 80. The secondary pilot 87 has its fuel supply interconnected with that of the oven burner, and is provided with jet openings 88 and 89 which are directed respectively toward the tube end and the burner 14 so that upon opening the oven valve 20 fuel may flow from these jets 88 and 89 for ignition of the burner 14. As shown, the pipe 76 connecting the shut-off valve 20 with the oven thermostat 77 is provided with a fitting 90 having a connecting pipe 91 extending to the pilot 87. The pipe 91 is attached to the pilot at a fitting 92 by provision of a union 93. The fitting 92 is in the form of a needle valve having an adjustable member 94 by which the fuel flow to the pilot 87 may be regulated.

The pilot 87 is of tubular form having a bulbous end 96 which stands within the oven compartment and has formed therein the jet openings 88 and 89. The opposite end of the pilot, indicated by the number 97, is exteriorly threaded as indicated at 98, for the reception of an air regulating nut 99 which may be moved along the threads to uncover air openings 100 formed as drilled holes extending radially through the stem end of the pilot. The pilot 87 is of such shape that it

may be readily supported in the oven side wall 15 where it is positioned sufficiently beneath the level of the oven burner 14 and the open end of the tube 80 that the jet openings direct a flow of fuel respectively toward these two members.

The pilot 87 is mounted within an opening 101 which extends through the oven wall; the pilot being provided with spaced flanges for location of and attachment to the wall. As shown, the oven wall 15 comprises spaced side plates 102 and 103 having a suitable insulating filling 104 provided therebetween. Axially aligned openings are provided in the oven walls 102 and 103 for engagement by the flanges of the pilot. The opening 105 in the wall 102 is provided of sufficient diameter to admit the rear end of the pilot and is of such size as to engage the annular flange 106 provided adjacent the bulbous end 96. The opening 108 in the wall 103 is proportioned to pass the threaded stem 98 at the rear end of the pilot and to engage the flange 109 which is held in clamped engagement with the wall by provision of a nut 110. Means are provided to properly locate the pilot relatively to the end of the tube 80 and comprise a forked extension 112 which projects from the flange 106 and is provided with a yoke like opening of such shape that the tube end may be received therein. A projection 113 stands adjacent the yoke opening to serve as a positioning means for the tube end. By drilling the jet openings 88 and 89 relatively to the yoke opening proper assembly and registration of the jets with respect to the ignition tube and the burner is assured.

As the secondary pilot 87 receives its fuel supply from a pipe connection positioned intermediate the shut-off valve and the thermostatically operated valve, the pilot 87 is supplied with fuel at all times that the shut-off valve is open and without regard to positioning of the thermostat or conditions of fuel flow through the thermostatically controlled valve. As soon as the shut-off valve is opened fuel issues from the jets 88 and 89 of the secondary pilot and, as jet 88 is directed toward the end of tube 80, this tube quickly receives sufficient fuel to cause ignition and flash back from the normally burning pilot 55 for ignition of the pilot 87. Owing to the rapidity of ignition of the pilot 87 but little unburned fuel can escape from the oven burner 14 before the jet 89 is burning to ignite this burner.

The pilot 87 not only provides for initial ignition of the burner 14 but serves also as a constantly burning pilot during all times that the shut-off valve 20 is open. When the fuel flow to the burner 14 has been materially reduced or has been shut off entirely due to the oven temperature reaching a point at which the thermostat acts to so restrict the fuel flow that the burner may be extinguished, the pilot 87 continues to burn and, through the jet 89, provides a pilot flame in intimate contact with the burner 14 for prompt automatic ignition of this burner as soon as fuel issues from its jets.

Referring particularly to Figs. 7 and 8, a somewhat different arrangement of parts is shown in which a fuel supply to the oven burner and to the secondary pilot is controlled from a valve structure wherein by operation of a single control handle the supply of fuel may be regulated, and may also be adjusted to provide a desired oven temperature. The valve structure, designated generally 123, incorporates a shut-off valve 126 and a thermostatically controlled valve 127, both of which are regulated from a single control handle 124 so that by a single manipulation of the handle 124 fuel may be supplied to the oven burner 14', and the valve structure may be further adjusted to provide a desired oven temperature. Fuel for the oven burner 14' passes from the manifold 17' through a fitting 130 providing a passage to the shut-off valve 126 which has a rotatable cored valve plug 131 through which fuel may pass into the body portion 132 of the thermostatically controlled valve 127. The body of the valve 127 is provided with a valve disk 134 which is movable by a thermostatic element upon temperature change within the oven to regulate the flow of fuel through that valve. An outlet passage 142 is provided in the body of the thermostatically controlled valve 127 on the opposite side of the valve disk 134 from that which is in communication with the shut-off valve plug 131. The passage 142 connects with a pipe 143 which terminates in a fuel nozzle 144 for the mixing chamber 79' of the oven burner.

A temperature responsive element 135 is provided within the heating zone of the burner 14' and is of such character that it undergoes a change in length as the result of change in the oven temperature. The temperature responsive element is operatively connected to the valve disk 134 and is also interconnected through gears 136, 137 and 138 for adjustment upon movement of the control handle 124 which is shown provided with an indicating dial 140 that may be calibrated in degrees of oven temperature corresponding to the action of the thermostatic element. The gearing between the control handle 124 and the temperature responsive element 135 permits an initial manual setting of the thermostatic element to provide a desired oven temperature as indicated by the dial 140. Fuel to the oven burner 14' is then controlled by the valve disc 134 which is automatically regulated by the temperature responsive element in accordance with changes in the oven temperature; the valve disk being always urged toward closed position by provision of a coil spring 141 as shown. The flow of fuel to the oven burner is regulated by the degree of opening of the thermostatically controlled valve disk 134 and consequently if the temperature within the oven compartment should rise an amount sufficient to cause the valve disk 134 to close entirely the oven burner would then go out even though the shut-off valve should still be open to admit fuel to the thermostatically controlled valve.

To cause ignition of the fuel at the oven burner 14' upon turning the valve structure 123 "on" and to re-ignite the burner upon admission of fuel thereto after closure of the thermostatically operated valve disc 134, the oven burner is provided with a burner lighter, a secondary pilot, 87' which is ignited from the pilot 55' and remains lighted at all times that the shut off valve 126 is open.

The secondary pilot 87' is interconnected with the oven burner fuel supply in such a manner that fuel is supplied to the secondary pilot at all times that the shut-off valve 126 is open and without regard to the fuel flow through the thermostatically controlled valve which supplies the burner 14'. As shown, the secondary pilot 87' is provided with a fuel supply 91' which connects through a union fitting 188 to a tubular extension 189 from that portion of the thermostat valve housing 127 which is in communication with the shut-off valve 126.

The operating connection between the thermostatically actuated valve 127 and the shut-off valve 126 is such that upon moving the control handle 124 from the "off" position the result of the initial movement is to rotate the gas shut-off valve toward open position, a rotation of approximately 90° being needed for moving the shut-off valve to full open position, as shown. The disc 134 is urged to closed position by the spring 141 and is opened by axial movement of the temperature responsive element 135. The element is threadedly attached to the valve 127 and moves axially upon rotation imparted through the gears 136, 137 and 138 connecting to the handle 124. The relationship between the disc 134 and element 135 is such that the handle may be turned the entire distance needed for moving the shut-off valve to full open position before the element is moved axially an amount sufficient to engage and lift the disc 134 thereby opening a passage through the thermostatic valve, and permitting the fuel to flow onward into the burner. Actuation of the valves in succession permits a fuel flow through the shut-off valve to the secondary pilot prior to opening of the disc 134 to supply the burner 14' so that the secondary pilot may be ignited in the time interval prior to admission of fuel to the burner 14' thus facilitating the ignition of gas from the outside pilot and so that there will be no escape of unburned fuel into the compartment enclosing that burner. Like the pilot 87, the pilot 87' has jet openings directed toward the burner so that positive ignition results as soon as fuel issues from the burner jets.

Ignition of the secondary pilot 87' is accomplished by provision of an ignition tube structure extending from adjacent the jet 88' of the secondary pilot and terminating adjacent the normally burning pilot 55' which is shown supported by a plate structure 56' which is carried by the burner supporting bars 30'. The pilot support 56' has a disk like central portion bounded by an up-turned flange 60' and has also an extending portion 81' slotted at 82' to receive the screw 83' by which the secondary pilot ignition tube 80' is affixed thereto. As shown, that end of the ignition tube 80' which is remote from the pilot is received in telescopic relationship within the end of a tubular fitting 190 which is fixed to and projects through the oven wall 15'; the opposite end of the tubular member 190 opening adjacent the pilot jet 88'.

Igniting means are provided for the cooking top burners 11' in the form of an ignition tube assembly 65' which is associated with the pilot 55' to convey fuel flow from the respective cooking top burners to the pilot for flash back and consequently ignition. As shown, an ignition tube extends from the pilot toward each burner 11'; the tubes being joined at the pilot end by provision of a barrel like housing 191 in which is provided a horizontally positioned baffle 192 having a central opening 193 concentrically related to the burner tip of the pilot 55'. The ignition tube assembly is supported upon the bars 30' by provision of spaced pins 70', and by contacting engagement of the faces of downwardly extending bosses which permit the barrel like housing 191 to be located within the confines of the flange 60' while spaced from the pilot support 56'. The ignition tube unit has formed on it a hood 85' which serves as a cover for the adjacent open end of the ignition tube 80' and provides also a means for directing a fuel flow from the secondary pilot toward the normally burning pilot 55'.

While the forms of apparatus herein described constitute preferred embodiments of the invention, it is to be understood that the invention is not limited to these precise forms of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. In a stove, cooking top burners, a pilot burner, a common supporting means for said cooking top burners and pilot burner, means for conducting a flow of fuel from said cooking top burners to said pilot for automatic ignition thereby comprising tubes extending from adjacent each cooking top burner and terminating adjacent the pilot, means joining said tubes into a unit assembly, a hood projection on said tube unit assembly, an oven burner positioned remotely from said pilot burner, an ignition tube extending from adjacent said oven burner and terminating short of the pilot burner, means for securing said oven burner ignition tube upon said burner supporting means, and means for removably supporting said cooking top ignition tube unit independently of said pilot and in fixed relationship with the pilot and the oven burner tube with the hood projection of the tube unit overlying the oven tube end.

2. In a stove, a cooking top and cooking top burners, said cooking top comprising a rim portion, said rim portion having formed therein means for reception of vessel supporting means, an integrally formed depending flange extending downwardly and inwardly from the inner edge of said rim portion and terminating closely adjacent the burners to provide a central opening for insertion and withdrawal of the burners therethrough, and cooking top burner supporting bars permanently attached to the inner opposite sides of said flange.

3. In a stove, a cooking top and cooking top burners, said cooking top comprising a rim portion having a flange extending therefrom, a pilot burner, attaching means for said burners, supporting means for said burners attached to said flange and comprising a pair of spaced bars having duplicate symmetrically arranged holes formed therein for reception of said burner attaching means.

4. In a stove having a wall providing separation between a cooking top and an oven compartment, cooking top burners, a pilot burner, supporting means for said cooking top and pilot burners, an oven burner positioned on the side of the wall remote from the cooking top, a readily removable ignition tube extending through the wall from adjacent the oven burner to the pilot light, means for removably attaching said tube to said burner supporting means, a removable ignition tube assembly for said cooking top burners comprising a plurality of joined tubes extending from adjacent the pilot burner to each of said cooking top burners, means on the ignition tube assembly engageable with the burner supporting means to provide a fixed positioning for the tube assembly with respect to said burners, and means on the ignition tube assembly overlying the oven ignition tube to direct fuel from said oven tube to the pilot, said oven tube being withdrawable from the stove upon removal of the tube assembly and removal of the oven tube attaching means.

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