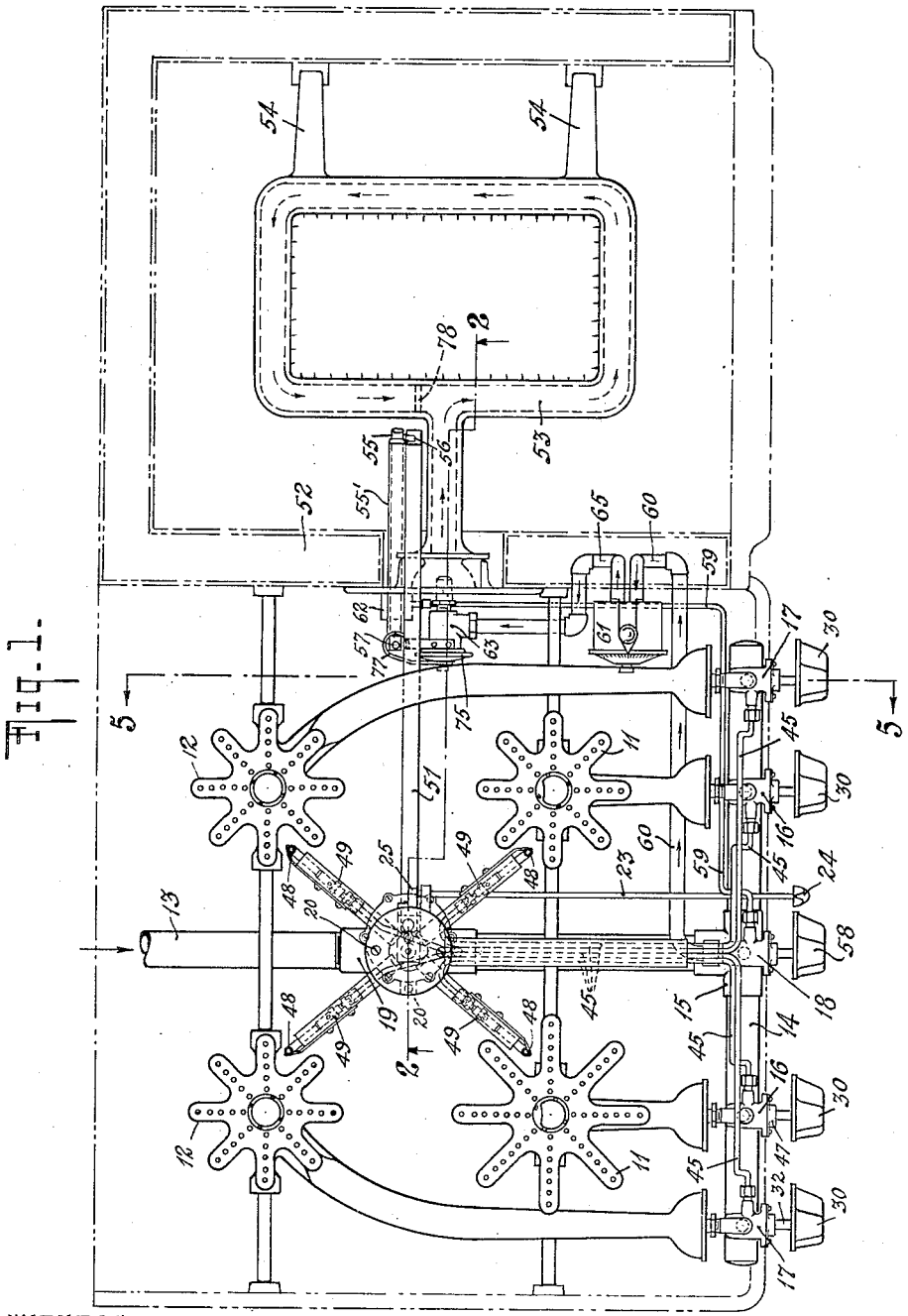
Dec. 8, 1936. F. J. BAST ET AL 2,063,834

GAS RANGE

Filed Dec. 22, 1932 4 Sheets-Sheet 1

FIG. 1.




WITNESS

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GAS RANGE

Filed Dec. 22, 1932 4 Sheets-Sheet 2

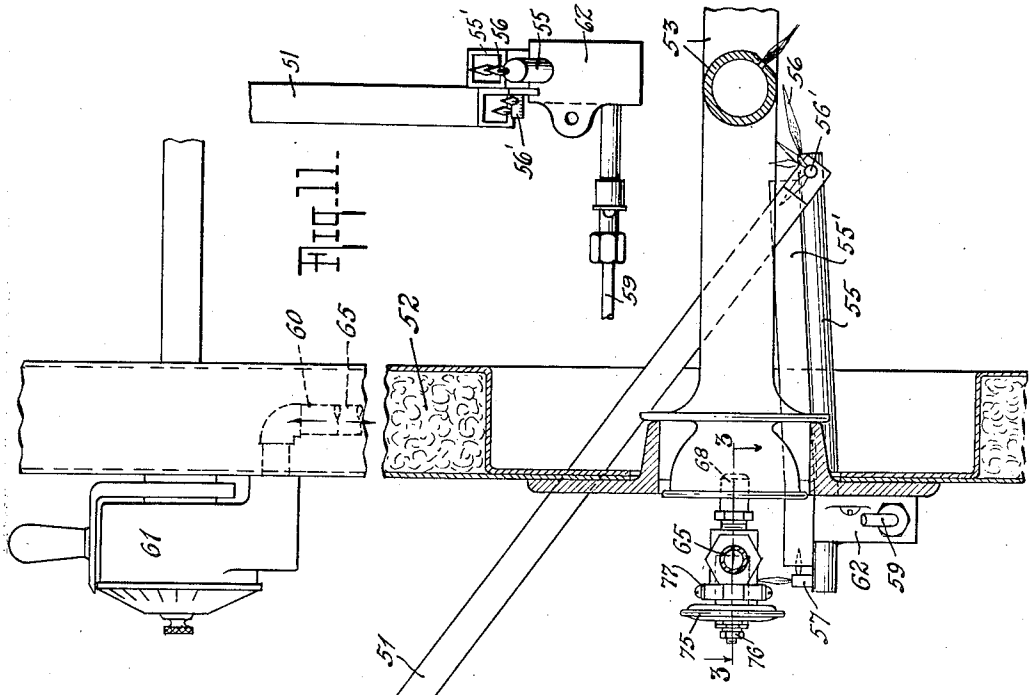


Fig. 1.

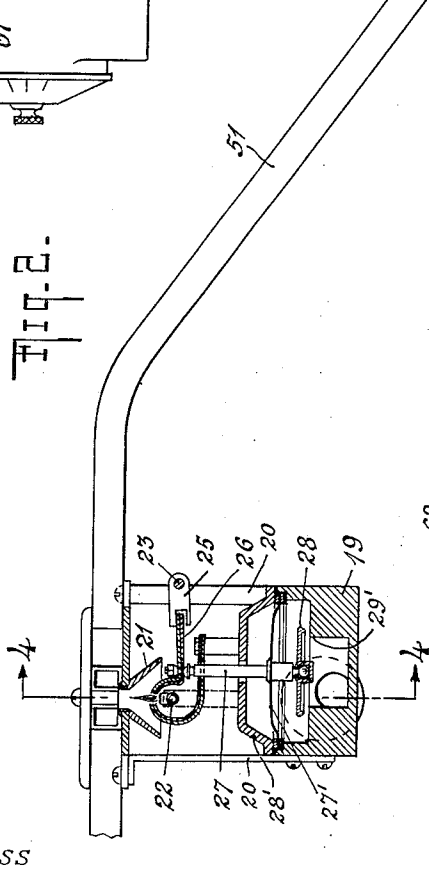


Fig. 2.

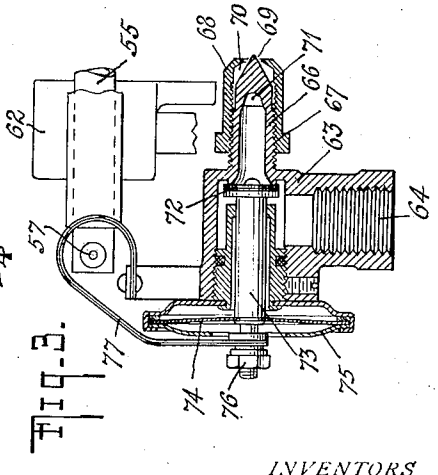


Fig. 3.

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GAS RANGE

Filed Dec. 22, 1932 4 Sheets-Sheet 3

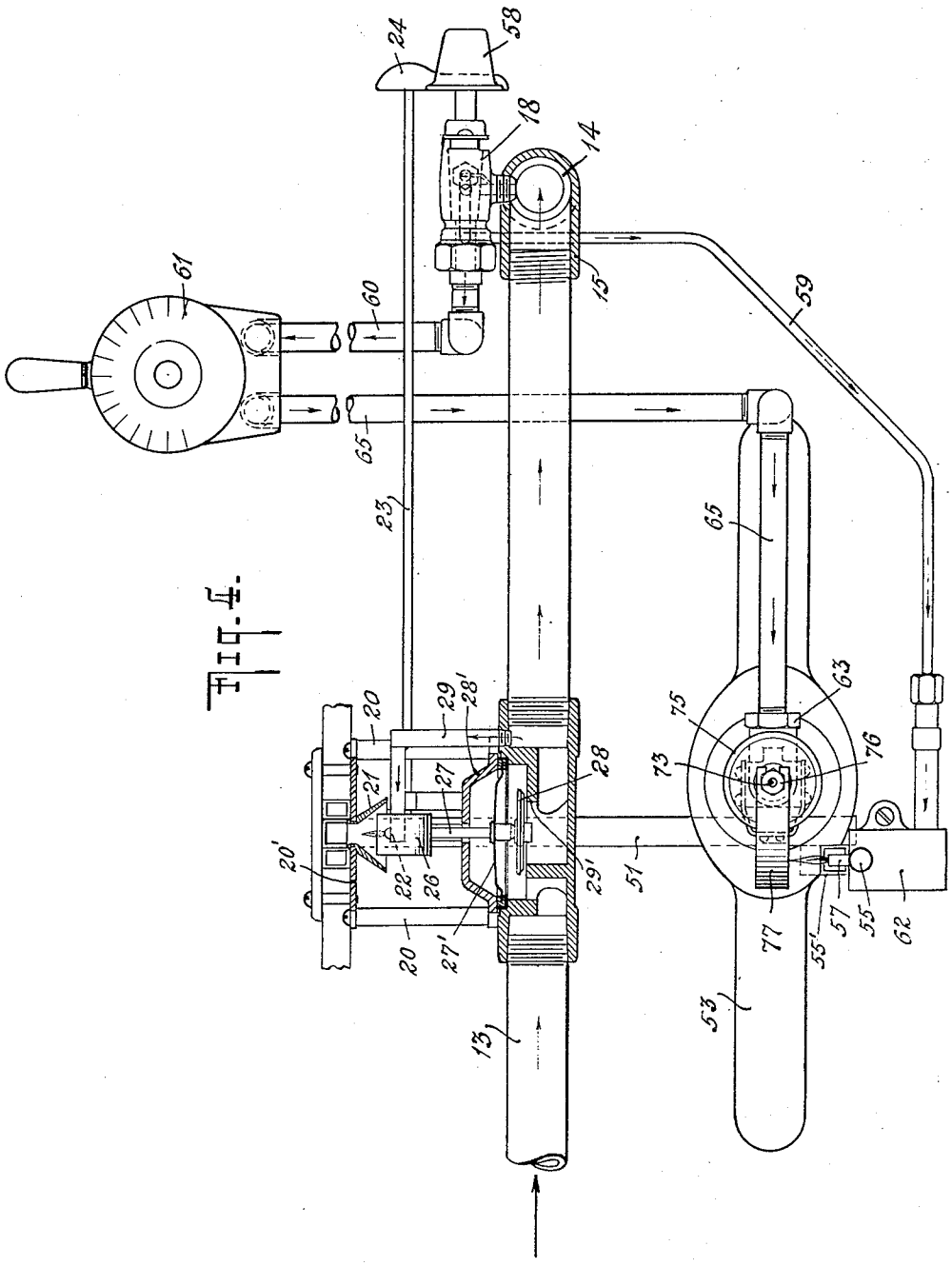



Fig. 4.

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GAS RANGE

Filed Dec. 22, 1932 4 Sheets-Sheet 4

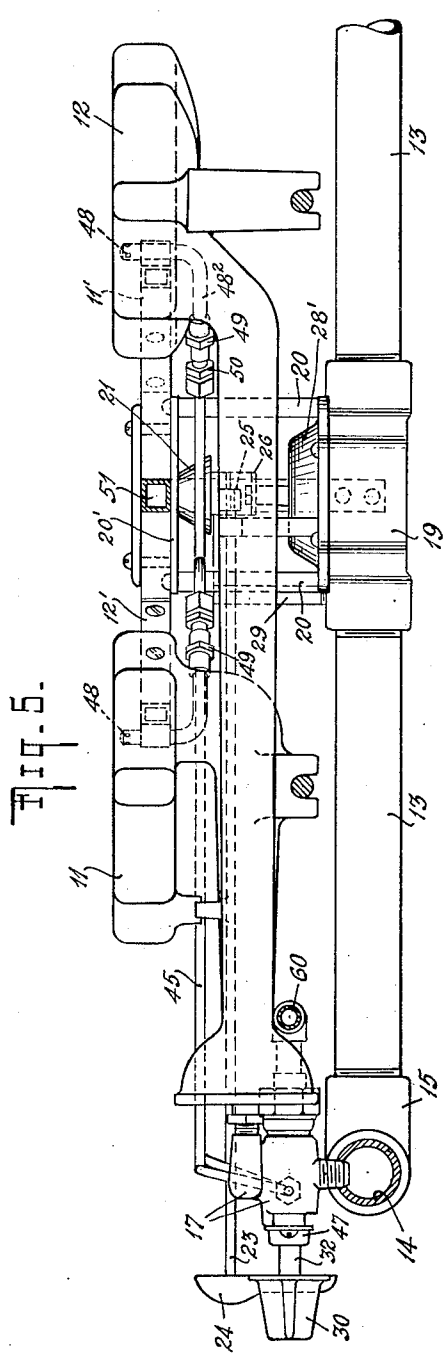


Fig. 5.

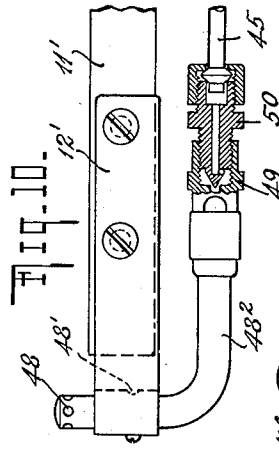


Fig. 10.

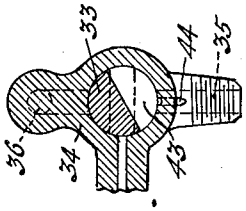


Fig. 9.

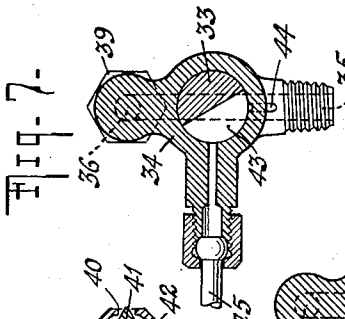


Fig. 7.

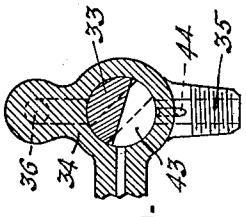


Fig. 8.

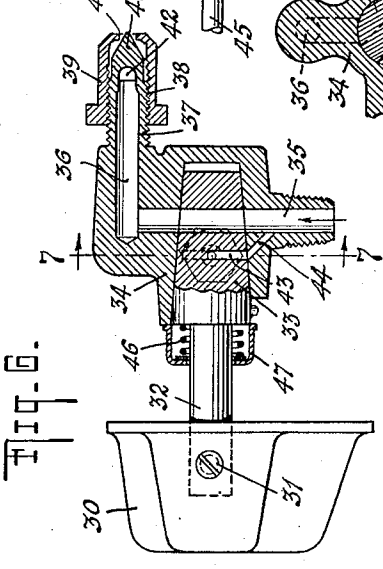


Fig. 6.

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Patented Dec. 8, 1936

2,063,834

# UNITED STATES PATENT OFFICE

2,063,834

## GAS RANGE

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Application December 22, 1932, Serial No. 648,388

2 Claims. (Cl. 158—117.1)

The invention relates to gas ranges and more particularly to a novel construction of a gas range, including an oven, in which the system and apparatus used for the ignition of the burners are automatic in operation.

One of the objects of the invention is to provide a construction whereby the ignition of the separate burners from a main pilot is automatic in operation, so that no gas supply is present in the individual burners until the valve controlling the flow of gas to such burners is opened automatically by the main pilot. A further object of the invention is to provide a novel system of control for the main pilot and for the auxiliary pilots affected thereby. A still further object of the invention is to effect the automatic shut-off of gas supply by the main pilot, if for any reason such main pilot light is extinguished. A further object of the invention is to provide a construction and system of igniting the oven burner of the range without danger of explosion, back-fire, or flame flare.

A feature of our invention is the fact that there is no possibility of leakage of gas from any burner of the range. A high degree of safety is attained by means of our construction since so long as the main pilot remains lighted, the turning on of any gas line leading to any burner, no matter to how small a degree, will cause ignition of such burner. Thus, the accidental turning on of gas without ignition thereof is eliminated. If the main pilot is not lighted and a cock is turned on, as by a child at play, no gas is supplied to any burner; on the other hand, if the main pilot is burning, the turning on of a cock will ignite a burner.

A particular embodiment of the invention is illustrated in the accompanying drawings, in which Fig. 1 is a plan view of the system showing the burners in position and the oven and cooking range in outline; Fig. 2 is a detailed section approximately on line 2—2 of Fig. 1 showing the main pilot, the oven pilots, and the flash tube connecting the latter to the main pilot; Fig. 3 is a detailed horizontal plan, in section, on line 3—3 of Fig. 2 of the oven pilot valve control mechanism; Fig. 4 is a detail of the main pilot and oven burner taken on the line 4—4 of Fig. 2; Fig. 5 is a section approximately on the line 5—5 of Fig. 1 showing gas cock and burners in full lines; Fig. 6 is a vertical sectional detail on line 5—5 of Fig. 1 through one of the burner cocks; Fig. 7 is a section on the line 7—7 of Fig. 6, showing the valve in the position in which both the main supply and the pilot supply of gas are open; Fig. 8 is a sectional view on line 7—7 of Fig. 6 similar to Fig. 7 showing the position of the valve when the main supply of gas is shut off and the supply of gas to the pilot is open; Fig. 9 is a section on line 7—7 of Fig. 6 similar to Figs. 7 and 8 showing the position of the valve when both the main supply and the pilot supply of gas are shut off; Fig. 10 is a detail of the burner tip showing the adjustable needle valve structure in section; and Fig. 11 is a detail end view from the right of Fig. 2 showing the internal oven burner pilot and associated parts.

In Fig. 1 11, 11 are the two front cooking burners and 12, 12 the two rear cooking burners. The main gas supply pipe 13 extends from the rear of the range forwardly to join the manifold 14 by means of the T-pipe 15. The two front burners 11, 11 are controlled by cocks 16, 16 and the two rear burners 12, 12 are controlled by cocks 17, 17. The oven cock 18 is positioned in the center of the manifold immediately opposite the main inlet pipe 13. The entire group of cocks 16, 17 and 18 are positioned above the manifold 14, thereby eliminating the danger of sediment such as oil, grease, etc., dropping from such manifold into the cocks and fouling them.

Centrally of the four cooking burners and mounted upon the safety valve casing 19, which may be inserted into the inlet pipe 13, is the main pilot structure (see Figs. 2 and 4). Such main pilot structure may be supported in position in any suitable manner, for instance, on standards 20, 20 supporting a disc 20' from which depends a hood 21 shielding the flame of the main pilot 22 from stray currents of air.

The main pilot is controlled by rod 23 provided at its end extending forwardly of the manifold 14 with a handle 24. To light the main pilot it is only necessary to turn the handle 24, turn on one of the cocks 16 or 17, and apply the lighting medium to a burner or burner pilot. The turning of the handle 24 causes the rod 23 to turn about its axis and raise the forked end of the member 25 mounted on the end thereof, thereby raising the end portion of the expansible bimetallic element 26, and causing the valve stem 27 to move upwardly, carrying with it the valve member 28 so as to unseat the same from its valve seat (see Fig. 2). The valve stem 27 is secured at the center of a diaphragm 27' mounted for snapping movement peripherally within the casing 19, so that the operation of the valve will take place with the precision characteristic of this type of valve structure. A cap

28' serves to encase the valve structure of the casing 19. When valve 28 has been moved from its seat, connection is established between the portion of the inlet pipe 13 extending rearwardly of the casing 19 and the front portion thereof, gas flowing through the pipe 29 in the direction of the arrows in Fig. 4 to the main pilot 22. The handle 24 is held in its turned position only for the short period of time necessary for the gas supply flowing through pipe 29 to reach the pilot, become ignited, and burn for a sufficient period of time to heat the curved portion of the metal element 26 so as to cause the same to expand and hold the valve 28 in its open position. Should the handle 24 be released before the pilot lights or should the pilot become extinguished, the resiliency of the element 26 and the snapping of the diaphragm 27' will close the main gas valve and return the handle 24 to its original position. When the expansible metal element 26 has been heated sufficiently to cause it to expand and in such expanded position hold the valve 28 removed from its seat, the handle 24 may be released, retaining its open position. The flow of gas through the casing 19 and pipe 13 will then continue so long as the main pilot remains lighted. It will be noted that valve seat 29' is located horizontally of the casing 19 and approximately midway its width whereby a sinuous path of the gas flowing through said casing is obtained, the flow of such gas from one end of the casing to the other being interrupted when the valve 28 is seated.

If for any reason, either by accident or design, the main pilot light should go out, for instance, or if it is purposely extinguished as when the gas range is not to be used for any extended length of time (which may be conveniently accomplished by closing the valve by turning handle 24), the expansible element 26, by cooling after the light has been extinguished, will contract and the valve stem 27 will be lowered, seating the valve 28 upon its seat, thereby shutting off the gas supply through the pipe 13. This construction therefore results in an automatic shutting off of the gas supply from the main pipe to all portions of the range when the main pilot light has been extinguished.

Coming now to the description of the mechanism employed in igniting an individual burner of the cooking range, a cock for each of such individual burners is illustrated in Fig. 6, in which 30 is the handle secured by set screw 31 to the end of the valve stem 32, the tapered plug 33 comprising the valve housed within the housing 34. Through a substantial portion of the housing 34 extends the main inlet channel 35 connected to the main gas inlet, the channel 36 communicating with the channel 35 and extending at right angles to the latter and through the projection 37 extending from the housing. The projection 37 is provided with exterior threading 38 to receive the nozzle 39 having an opening 40 through which the tapered end 41 of the projection 37 extends. Exit of the gas from channel 36 takes place through openings 42 in the sides of the tapered end 41, the gas flowing through the opening 40 in an annular stream.

The tapered plug 33 is provided with a slot 43 extending from its peripheral edge to its diametral center, such slot coming in communication with the channel 44 in the housing 34 in certain positions of the tapered plug, establishing connection between the pilot pipe 45 and the main gas inlet channel 35. A spring 46 within the cap 47 secured to the housing 34 retains the tapered plug in position within such housing.

In order to ignite an individual burner the handle 30 for that particular burner is turned, placing the tapered plug 33 into the position illustrated in Fig. 8, in which communication between the main inlet channel 35 and the pilot pipe 45 is established, but communication between the main supply channel 35 and the channel 36 is shut off. An auxiliary supply of gas from the pilot tube 45 will then be forced through opening 48' to the main pilot 22, the flash-back from such main pilot through flash tube 11' being sufficient to ignite the burner pilot igniter flame at 48' and thence the pilot 48. The plate 12' attached to the flash tube 11' supports the pilot tube 48[2].

As the handle 30 is further turned, connection is established between the main supply channel 35 and the channel 36 permitting gas to flow through such channels and to the individual burner (see Fig. 7 for the position of the tapered plug at this point).

In order to extinguish the individual burner, the handle 30 is turned back into its original position, in which position the tapered plug 33 is in the position illustrated in Fig. 9, in which the communication between the channels 35 and 36 and between the channel 35 and pilot pipe 45 are both shut off. It will be noted that the individual pilot light for each burner stays lighted while the burner is on. Also, that the burner pilot is first ignited, remains ignited while the burner is ignited, and cannot be extinguished until after the burner has been shut off. Inasmuch as the burner pilot is fully ignited before any gas is supplied to the individual burner, such burner pilot may be used as a heating medium sufficient to keep the food container hot.

Each of the pilot pipes 45 is provided with an adjustable needle valve structure, such as is illustrated in enlarged detail in Fig. 10. Such adjustable needle valve structure may be of any usual construction and is therefore not described herein in detail. The use of such adjustable needle valve structure enables our apparatus to become standard for all localities, whatever kind or quality of gas may be used in such localities. For instance, if in the particular locality in which our apparatus is to be used, the gas should be different in characteristics, f. i., quality, pressure, or heat value, from gas used in other localities so as to require a larger or smaller amount of such gas to be fed to the pilot, a slight adjustment of the needle valve 49 may be made by rotating the member 50, as by a flat wrench, so as to bring the point of the needle valve 49 to a greater or lesser distance from the aperture controlled by the needle valve.

While we have described the construction of the cock and piping system with respect to a single individual burner, it is to be understood that such construction and system are applied to each of the burners comprising the cooking unit of the gas range. The pilot pipe 45, described with respect to a particular burner, is thus duplicated with respect to each of the remaining three burners, all of such pipes running from the respective cocks controlling each burner above the manifold 14 and back to the main pilot supporting structure and from thence to the individual pilots 48.

Turning now to a description of the ignition system for the oven, the oven cock 18 is positioned

in the center of the assembly immediately above the center of the manifold **14** so that the manifold and auxiliary piping system can be used for either right-hand or left-hand ovens, i e, gas ranges having ovens either to the right of the cooking burners or to the left thereof. The oven ignition system is illustrated in Figs. 2 and 4 of the drawings in which **51** is the flash tube leading from the main pilot through the oven wall **52**, to the interior of the oven. The oven burner **53** is of the usual construction supported on the oven wall by brackets **54**, **54** and having the inlet portion thereof projecting through the oven wall. In accordance with our invention, the portion of the burner projecting through the oven wall is provided with a safety valve hereinafter to be described in detail, a pipe **55** having auxiliary pilot **56** at the end thereof within the oven and auxiliary pilot **57** at the end thereof outside of the oven and immediately below the safety valve, and auxiliary flash tube **55'** disposed above the pipe **55** and having open ends in proximity to both of the pilots **56** and **57**.

To effect the ignition of the oven burner when the main pilot is burning, the handle **58** of the oven cock **18** is turned, establishing connection between the main supply of gas and the oven pilot pipe **59**. The structure of the oven cock **18** is substantially the same as that of the cocks for each individual burner, except that the upper portion of the housing **34**, with the upper portion of the channel **35** and the entire channel **36**, has been eliminated, the connection from channel **35** for the passage of the main supply of gas being made through a channel running centrally of the tapered plug **33**, such latter channel being connected to a pipe **60** leading to the oven regulator **61** (see Fig. 4). Upon turning the handle **58** of the oven cock **18**, connection is first established between the main supply channel **35** through the channel **44** to the oven pilot pipe **59** entering a compartment **62** provided on the side of the oven and thence into the pipe **55**, the gas from the pilot pipe **59** flowing into the compartment **62** and thence to the pipe **55**, a part of the gas flowing through auxiliary pilot **57** into the portion of the flash tube **55'** situated exteriorly of the oven and then into that portion of such flash tube which is situated interiorly of the oven.

As soon as the auxiliary supply of gas is supplied to the pipe **55**, the gas issues from the open end thereof (apertures in a boss **56'** projecting laterally from the pipe **55**) and rises through the flash tube **51** to igniting relation with the main pilot at the end of such flash tube **51**. The gas is ignited by the explosion due to contact of such gas with the flame of the main pilot **22**, the flame from such ignited gas igniting in turn the gas at the end of the pipe **55** adjacent the oven burner **53** (auxiliary pilot **56**), the flame from such point being flashed back through the tube **55'** to ignite the auxiliary pilot **57** located at the end of pipe **55**, outside of the oven wall and immediately below the safety valve. The general construction of the safety valve is shown in enlarged detail in Fig. 3 and comprises a casing **63** having inlet **64** connected to the main supply pipe **65** leading from the oven regulator **61** and a projection **66** provided with exterior threading **67** to receive the spud **68** having an opening **69** through which the tapered end **70** of the projection **66** extends. Exit of the gas from the channel within the projection **66** takes place through openings **71** in the sides of the tapered end **70**, the gas flowing through the opening **69** in an annular stream. The safety valve structure comprises a valve member **72** mounted on the end of a valve stem **73** secured at the center of a diaphragm **74** mounted for snapping movement peripherally within the casing **75**, adjusting nut **76** being provided at the threaded end of the valve stem **73**. On the valve stem **73** is mounted the end of an expansible bimetallic element **77** curved about the pilot **57**.

When the pilot **57** has been ignited by the flashback from the main pilot through the flash tubes **51** and **55'**, the heat from such auxiliary pilot **57** expands the metal element **77**, causing the same to draw the valve stem **73** outwardly, thereby unseating the valve element **72** and establishing communication between the channel **64** and the apertures **71** and **70**, so that the main supply of gas flows to the oven burner **53**. By reason of an enlarged opening at the end of the pipe **55**, the flame from such pipe is enabled to reach the gas issuing from the oven burner and ignite the same (see Fig. 2). The oven burner **53** has thus been ignited and so long as the auxiliary pilot **57** remains lighted, the thermostatic metal element on the safety valve outside the oven will remain expanded, permitting the inflow of gas from the main supply to the oven burner. When the oven burner is desired to be extinguished, the main supply of gas can be shut off by returning the handle **58** of the oven cock **18** to its original position. If for any reason, however, the auxiliary pilot **57** should go out, the thermostatic metal element **77** will contract and be effective through the safety valve just described to shut off the main supply of gas to the oven burner.

It will be noted from Fig. 1 that a wall **78** is placed within the oven burner **53** at a point to one side of its inlet, so that the gas flowing into the oven burner is forced to follow the direction of the arrows indicated on such Fig. 1, pushing the air contained in the burner before it and out through the openings in the burner. We have found that this simple expedient prevents the very dangerous back-fire or explosion which occurs when an oven of the usual construction, not provided with the wall **78**, is ignited, such explosion or back-fire being due to the abnormal amount of air entering into the mixture of air and gas at the entrance to the burner, thereby providing an explosive, instead of a burnable, mixture. By providing the wall **78** at the point indicated, we prevent a circuitous path of the gas through the oven burner pushing all of the air contained in the burner to the point of entry of the gas into the burner and causing an undue amount of air to be admixed with the incoming gas. The gas following the single path through the burner and being forced out of such burner before it can come in contact with the incoming gas and contaminate the same with an undue amount of air, the explosive mixture of gas and air is prevented from forming, the air being pushed out by the inflowing gas through the apertures in the burner.

While we have described a specific embodiment of our invention, it is obvious that various modifications therein, particularly in the arrangement of parts, may be made without departing from our invention.

We claim:

1. The combination with a gas range, of an oven, an oven burner, and an ignition system therefor, comprising a main gas supply pipe for the gas used in the range and in the oven, a manifold, a gas supply pipe from said manifold to the oven burner, a main pilot mounted on

said main gas supply pipe, a flash tube leading from the main pilot to a point within the oven, an auxiliary gas pipe, connected to the main gas supply pipe, and leading from the end of the flash tube within the oven to a point outside of the oven and having an auxiliary pilot at the end thereof outside of the oven and provided with a plurality of jets, and a second auxiliary pilot at the end thereof within the oven in igniting relation to the oven burner and having a plurality of jets, a pilot pipe to said auxiliary pipe, an auxiliary flash tube mounted on said auxiliary pipe, and a thermal-responsive safety valve in the oven burner gas supply pipe mounted on the wall of said oven in proximity to the auxiliary pilot on the end of the auxiliary pipe extending outside of the oven, the jets of said oven pilot being effective to charge said flash tube and ignite the oven burner, and the jets of said auxiliary pilot being effective to charge the auxiliary flash tube and to heat said thermal-responsive valve to supply gas to the oven burner, the operative relationship between the main pilot and the auxiliary pilots being such that gas flowing from the pilot pipe into the auxiliary pipe flows through the flash tube to the main pilot, is ignited thereby and flashed back to the auxiliary pilot within the oven, an independent flash is thence conducted through the auxiliary flash tube to the auxiliary pilot outside of the oven, such latter auxiliary pilot being effective to open the safety valve in the oven burner gas supply pipe.

2. In a gas range ignition system, the combination of a range, an oven, and an oven burner, a main gas supply pipe for the gas used in the range and oven, a manifold, a gas supply pipe from said manifold to the oven burner, a main pilot mounted on said main gas supply pipe, a flash tube leading from the main pilot to a point within the oven and in proximity to the oven burner, an auxiliary flash tube extending from said point to the outside of the oven, an auxiliary gas pipe leading from the end of said auxiliary flash tube within the oven to a point outside of the oven, a pilot at the outer end of said auxiliary gas pipe, a main gas inlet valve for the oven, an expansible thermostatic element positioned thereon and controlling the open and closed position thereof and affected by the exterior pilot of the auxiliary flash tube when ignited, a pilot at the other end of the auxiliary flash tube in proximity to the oven burner and in igniting relation thereto, and a pilot gas line leading to the auxiliary gas pipe, the operative relationship of the elements being such that when the pilot gas line is opened, the gas flowing therethrough will be flash-ignited by the main pilot, an independent flash being conducted through the auxiliary flash tube, igniting its pilot at the end adjacent to the main oven gas valve, causing said valve to open and causing ignition of the oven burner by the pilot flame at the other end of the auxiliary flash tube.

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