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LIGHTER SYSTEM FOR GAS BURNERS

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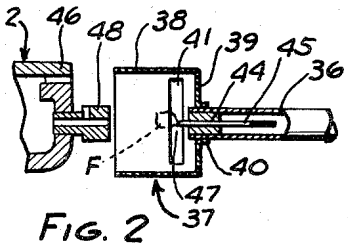

FIG. 2

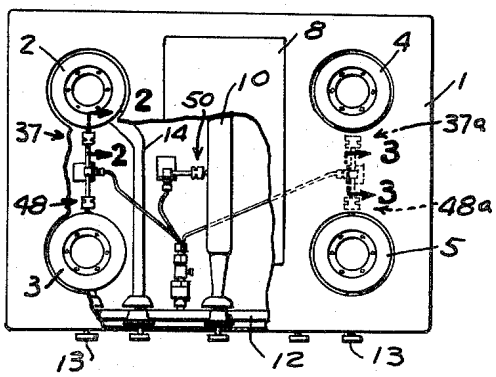

FIG. 1

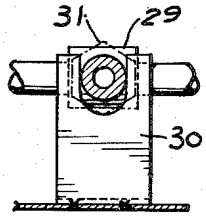

FIG. 3

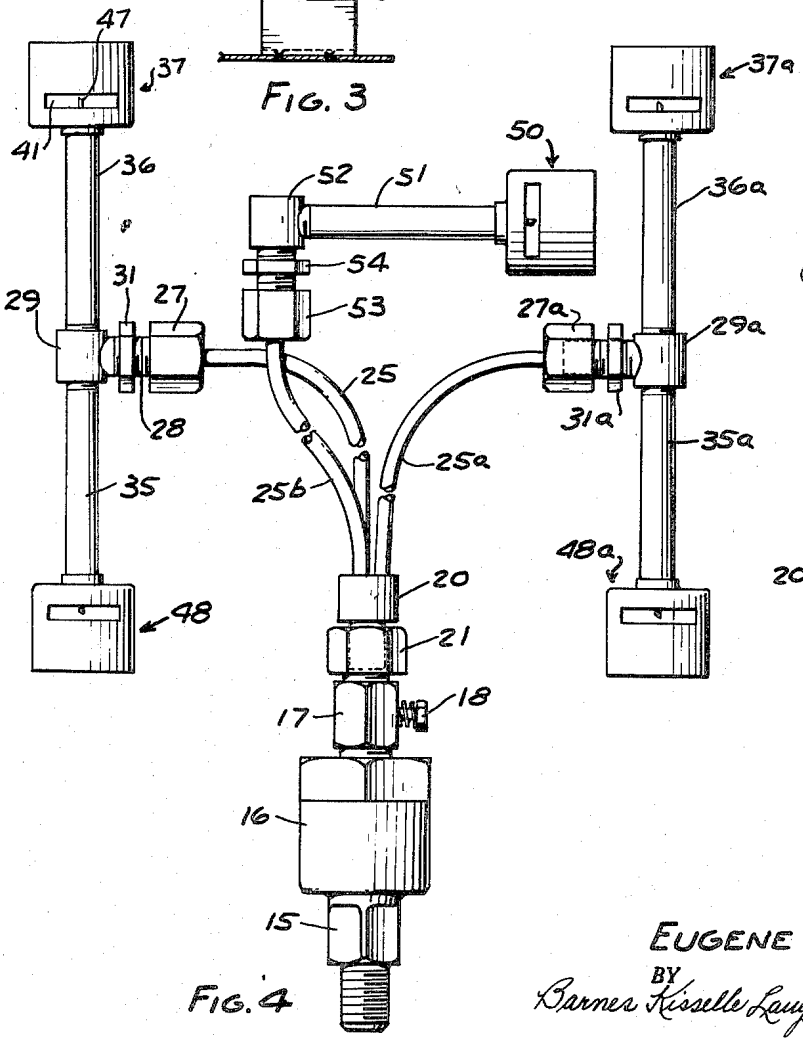

FIG. 4

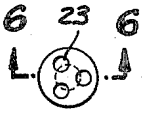

FIG. 5

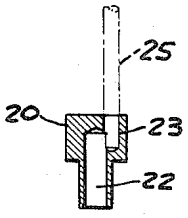

FIG. 6

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LIGHTER SYSTEM FOR GAS BURNERS

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3 Claims. (Cl. 158—115)

This invention relates to a lighter system for gas burners, and is particularly adapted for gas burners of gas ranges.

The invention has to do with a system wherein each gas burner has its own individual pilot flame, and it is an object of the invention to provide a small but stable pilot flame, to provide for a minimum of oxidation, in connection with both of which, there is a balance of heat input and heat dissipation. A further object is to provide a burner system which is structurally relatively flexible, so that it can be mounted and used with facility, and wherein small feeder tubes are provided for conducting gas to the several pilot flames. The small feeder tubes, however, result in a relatively high velocity of the gas which would result in relatively long tenuous unstable flames, and in accordance with the invention larger terminal conduits are provided which not only serve to reduce the velocity and provide a relatively short fat stable flame, but also provides metal volume for absorbing and dissipating heat. Other objects and features will be appreciated as the following detailed description is considered in conjunction with the accompanying drawing which shows one system made in accordance with the invention.

Another object of the invention is to prevent or minimize the possibility of disassociating or cracking the gas into base components. This is done by maintaining at a relatively low temperature, a small burner with a small passageway therein so as to not disassociate the gas components as it flows therethrough, while at the same time maintaining a relatively high temperature at the burner tip to provide flame stability.

Fig. 1 is a general view with parts cut away showing a lighter system installed in an exemplary gas range.

Fig. 2 is a large cross sectional view taken on line 2—2 of Fig. 1 showing the relationship of a pilot burner with a gas burner.

Fig. 3 is an enlarged cross sectional view taken on line 3—3 of Fig. 2 illustrating a mounting.

Fig. 4 is an enlarged view illustrating an exemplary lighter system.

Fig. 5 is a view of a manifold type of fitting for introducing gas into several feeder tubes.

Fig. 6 is a sectional view taken on line 6—6 of Fig. 5 showing internal structure.

The structure shown in Fig. 1 is intended to give an example of a gas range, the same being provided with a top panel 1 and provided with four burners 2, 3, 4 and 5 which are exposed through suitable openings in the top panel. In the structure shown, there are four such burners but the number may vary. Centrally disposed between the burners is a griddle plate 8 underneath which is burner 10. The burner 10 is shown as being of elongated form but other forms of burners may be employed at this location. Gas is supplied through a suitable conduit or manifold 12 and the gas flow to the several burners may be controlled by a valve for each burner, the operating

handles of the valves being indicated at 13. Each of the burners has the usual mixing tube, one of which is indicated at 14, into which the gas is projected from the manifold 12 by the respective valve.

The system will be appreciated by reference to Fig. 4 which shows a fitting 15 to be screw threaded into the manifold 12 and a body 16 which may contain filtering material. A fitting 17 leads from the filter 16 and it may have gas flow means controlled by an adjustable valve member 18 to control the flow of gas to the lighter system. There is a manifold type of fitting 20 which may be secured to the fitting 17 by a pressure fitting or nut 21. The manifold fitting 20, as shown in Figs. 5 and 6, has a passage 22 for receiving the gas and three outlet passages 23. The outlet passages are formed so that each intersects the passage 22. Three feeder tubes 25, 25*a* and 25*b* have their ends inserted in the apertures 23 and these ends may be secured in place by means of a hard solder or, in any event, a solder capable of withstanding the heat to which it may be submitted.

In the form shown, there are three feeder tubes although the number depends upon the number and arrangement of the burners. One feeder tube 25 is secured as by means of a compression fitting nut 27 to the threaded portion 28 of an element 29 in the nature of a T fitting. This T fitting may be supported by a suitable bracket 30 (Fig. 3) and held in position by a nut 31. Extending from the T fitting are two terminal tubes 35 and 36. On the end of the terminal tube 36 is a pilot housing 37 (Fig. 2) in the nature of a cup open at one end and having a peripheral wall 38 and a bottom 39. This housing may be suitably formed of sheet metal and its bottom is apertured for the reception of the tube and the bottom may be flanged at 40 for this purpose. The circumferential wall 38 is provided with two oppositely positioned relatively elongated slots or openings 41.

As shown in Fig. 2 the end of the terminal tube is closed by a plug 44 and extending through the plug is a small tube in the nature of a hypodermic needle 45. Gas flowing through the terminal tube passes through the needle and the escaping gas supports a small relatively fat stable flame as indicated at F. The pilot housing is placed in suitable proximity to a gas burner, the gas burner 2 being illustrated in Fig. 2, and one or more of the ports thereof, as indicated at 46. The burner 2 may be equipped with a spud or jet device 48 positioned to pass gas into the pilot housing when gas is supplied to the burner tube for ignition purposes. The outer end of the needle is preferably formed in a diagonal manner as illustrated at 47 for purposes which will presently appear.

On the end of the terminal tube 35 is a similar pilot housing 48. The feeder tube 25*a* extends to similar terminal tubes 35*a* and 36*a* and the parts and the pilot burner housings are the same as those just described and, accordingly, have the same reference characters applied thereto with the addition of the letter *a*. The feeder tube 25*b* supplies gas to the pilot burner 50. In this case, however, there is only one terminal tube 51 extending from suitable fitting or fixture 52, the feeder tube 25*b* being connected thereto by the compression fitting 53 and the threaded portion having a nut 54 by means of which the fitting 52 may be mounted. When the system shown in Fig. 4 is mounted in a gas range structure as shown in Fig. 1, the several pilot housings are located in proximity to the burners as, for example, the pilot housing 37 is in proximity to the burner 2 and the other pilot burner housings are in proximity to the three other burners as indicated. The burner housing 50 is in proximity to the burner 10.

In use, gas is constantly supplied through the several feeder tubes and pilot flames, as indicated at F, burn

constantly adjacent each of the burners. When gas is supplied to a burner such, for example, as the burner 2, as by opening the valve therefor by means of the handle 13, gas passing out through the port 46 is ignited by the flame F (Fig. 2) and the ignition chains around the periphery of the burner to ignite gas issuing from all ports.

The feeder tubes 25, 25*a* and 25*b* are small in diameter and thus flexible so that the assembly can be mounted with facility and the small flexible feeder tubes may be fashioned or bent by hand if need be in order to fit the same into the structure of the stove. The feeder tubes being small result in relatively high velocity of the gas flowing therethrough. For example, a satisfactory feeder tube is one which is about .069" inside diameter. The gas flowing from such a tube would result in a relatively long tenuous unstable flame. Therefore, the small feeder tube is connected into the larger terminal tubes, such as tubes 35 and 36. The velocity of the gas flowing through the terminal tubes is thus lower and results in the more bulbous or fat stable flame indicated at F (Fig. 2). A satisfactory terminal tube is one about .16" inside diameter. It will be appreciated that some feeder tubes are longer than others but within the limitation of the usual gas burning equipment, such as a gas range, the difference in the length of the tubes is inconsequential.

The relatively large terminal tubes provide a mass of metal at the pilot burner to thus absorb and dissipate the heat. In this connection the needle burner 45 preferably projects out through the plug 44 about ⅛". It is necessary in order to maintain a stable pilot flame that the needle at its end whereat the pilot flame burns be maintained in a hot condition. At the same time, however, it is necessary to so construct the pilot burner as to prevent or minimize oxidation. If the small burner tube be placed in the end of the tube the size of a small feeder tube, the small burner tube would get too hot and would result in oxidation. Moreover, if the outer end of the burner tube projected a relatively great distance from the mass of heat absorbing metal the needle would get too hot too far back from its tip end with the result that with gases of certain types there would be cracking of gas within the needle which may leave deposits of solid material in the small passage of the needle. On the other hand, a needle which is too cold will not support a stable flame. A satisfactory needle is one about .035" outside diameter and about .023" inside diameter for usual city gas and bottled gases. For situations where so-called liquid petroleum gases or bottled gases are mixed with air resulting in faster burning, a satisfactory needle is one having about .049" outside diameter and about .033" inside diameter. The distance the needle projects into the terminal tube is of little consequence with respect to controlling the temperature of the needle.

The pilot burners are thus arranged and constructed to support a very small pilot flame. Preferably the flames are of such small size as to produce about 50 B.t.u.'s per hour. Flames of this size do not produce objectionable hot spots in the top of the range. The openings 41 in each housing provide air for supporting the flame. The openings 41 also provide for relief of products of combustion not only from the pilot flame itself but also from the flame of the gas issuing from the jet device 48. It will be understood that a flame burns at the jet device 48 all the while gas is supplied to the burner tube. In this connection, it is to be noted that the exposed end of the needle burner terminates within the contour of or, in other words, between the side walls of the openings 41. This is a preferred arrangement and it provides proper air for the burning of the small pilot flame while at the same time the housing protects the flame from drafts. The openings 41 may be in any position either above and below the pilot flame or on the sides thereof and thus no particular care need be devoted to the rotatable position of the pilot housing. While the tip of the burner lies between the side walls of the openings, the pilot flame, as indicated in Fig. 2, may project somewhat beyond the openings.

With the arrangement herein, and with the burner needle and terminal tube structure as described, a balance is effected between the heat output of the pilot flame and the heat dissipation. The burner needle, as aforesaid, projects from the plug 44 and the end of the terminal tube, only about ⅛" so that heat is readily absorbed and dissipated in the mass of metal. However, to facilitate and insure that the extreme end of the needle will be sufficiently hot to aid in supporting a stable flame, its extreme end is formed diagonally as illustrated so that the extremely small amount of metal at its tip end will be adequately heated. Yet, the burner tube rearwardly from its tip end is not heated to the point where there is liable to be cracking of gas within the needle burner nor is it heated to the point whereat deleterious oxidation would occur. Conversely if the needle does not project far enough from the end of the terminal tube and its plug, the heat is dissipated too rapidly resulting in a relatively cold needle tip and an unstable flame.

I claim:

1. Ignition means for a gas burner comprising, a feeder tube of relatively small interior diameter for conducting gas from a source of supply, a terminal tube of relatively large internal diameter into which the feeder tube communicates, a burner tube for receiving gas from the terminal tube, said burner tube being substantially in the form of a hollow needle having an internal diameter smaller than the internal diameter of the feeder tube and having an end which projects from the end of the terminal tube whereat a pilot flame is to burn in proximity to the gas burner, the said end of the burner tube projecting from the end of the terminal tube a distance such that the output of heat of the pilot flame is so balanced with the dissipation of heat, that the end of the burner tube remains in heated condition, thus stabilizing the pilot flame, and the burner tube upstream from said end remains relatively cool to substantially prevent oxidation and cracking of gas within the burner tube, said feeder tube having an interior diameter in the vicinity of .069", the terminal tube having an interior diameter in the vicinity of .16", and the burner tube having an interior diameter in the range from about .023" to about .033", said end of the burner tube projecting from the end of the terminal tube about ⅛".

2. Ignition means for a gas burner comprising, a feeder tube of relatively small interior diameter for conducting gas from a source of supply, a terminal tube of relatively large internal diameter into which the feeder tube communicates, a burner tube for receiving gas from the terminal tube, said burner tube being substantially in the form of a hollow needle having an internal diameter smaller than the internal diameter of the feeder tube and having an end which projects from the end of the terminal tube whereat a pilot flame is to burn in proximity to the gas burner, said burner tube having an interior diameter in the range from about .023" to about 0.33", said end of the burner tube projecting outwardly from the end of the terminal tube about ⅛", whereby with the resulting heat dissipation rate, said end of the burner tube in the vicinity of the pilot flame remains heated to stabilize the flame and the tube upstream therefrom remains relatively cool to substantially prevent oxidation and cracking of gas therein.

3. The combination defined in claim 2 wherein said terminal tube has a closed end from which said burner tube projects outwardly, said burner tube having an upstream end spaced from the walls defining said closed

end and projecting into said terminal tube at least about ⅛" to prevent clogging of said burner tube.

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