May 21, 1935. J. R. MacGREGOR 2,001,739

GAS BURNER

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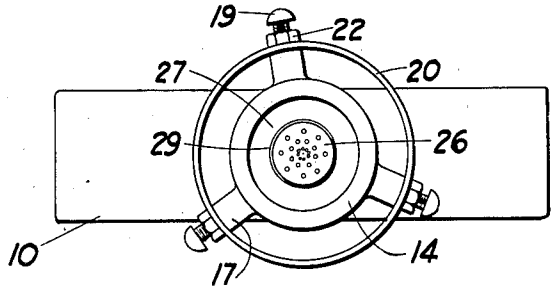

Fig. 2

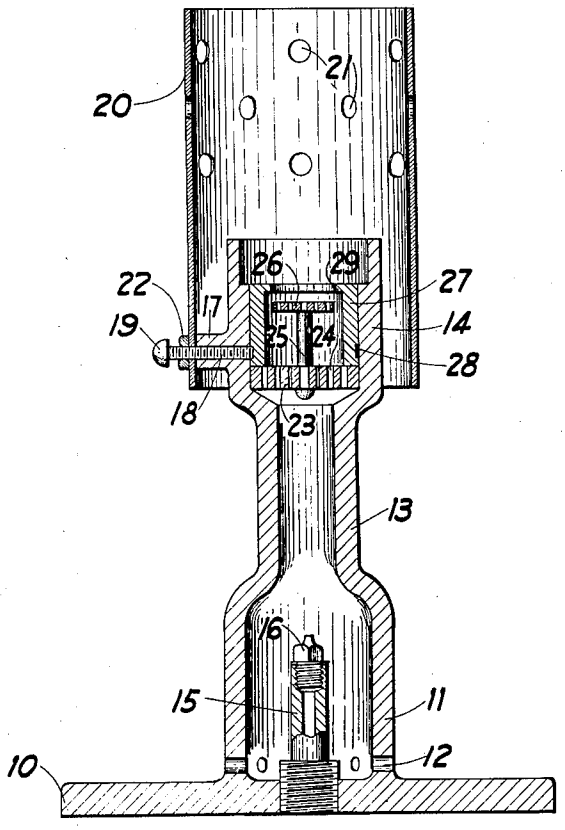

Fig. 1

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GAS BURNER

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6 Claims. (Cl. 158—112)

This invention relates to gas burners and particularly to one which is adapted to burn a liquefied petroleum gas such as is marketed in pressure cylinders and utilized at the usual tank pressure of 50–150 pounds per square inch. This burner is well adapted to burn successfully and smokelessly that type of fuel at widely varying rates, which may range from 0.10 to 15 cubic feet per hour. It has been found useful in portable heaters intended to prevent freezing perishable products being transported in sub-zero weather. Such a heater is disclosed and claimed in the copending application of Carl A. Claesson, Serial No. 666,558, filed April 17, 1933.

It is an object of this invention to provide a simple and reliable gas burner that will successfully handle widely varying flows of gas generated from a liquefied petroleum gas of high heat value, such as is marketed in pressure cylinders and utilized at the usual tank pressure of 50–150 pounds per square inch, and without the use of a pilot or auxiliary ignition device.

Another object is to provide a gas burner which will not be subject to extinguishment by accidental drafts, such as are encountered in a portable heater used in refrigerator cars in winter, even though the minimum or pilot gas flame be burning.

Another object is to provide a gas burner that will not coke or become sooty at low gas rates, and in which the gas may quickly be turned to a high or low flow rate as by an automatic temperature controller, without danger of flashing back into the burner tube or becoming extinguished.

These and other objects and advantages will become apparent from the description which follows, and from the accompanying drawing, which forms a part of this specification and illustrates a preferred embodiment of the invention.

In the drawing:

Figure 1 is a vertical sectional elevation of a gas burner embodying the invention.

Figure 2 is a plan view of the burner shown in Figure 1.

Referring more particularly to Fig. 1, the numeral 10 illustrates a base plate or support on which the burner proper may be mounted. The tube of the burner is illustrated as being of varying diameter, the lower and larger portion 11, being provided near the base 10 with a number of air ports 12. The intermediate portion of the tube is preferably somewhat reduced in cross-section as at 13, to form a modified Venturi throat and insure adequate air inspiration. The upper end 14 of the tube is again larger in diameter to accommodate the spaced perforated discs or baffles which will be described below.

The gas nozzle 15 is concentric with the burner tube axis and is preferably fitted with a removable nozzle tip 16 having a small diameter bore, say that made by a No. 80 drill or about 0.0135 inch. This is desirable for two reasons: first, the requirement for a reasonably high velocity gas jet at low gas rates, in order to entrain an adequate amount of air through ports 12 to obtain a proper mixture; and second, to prevent too great a rate of gas flow by adequate throttling when full gas tank pressure of 50–150 pounds per square inch is admitted to nozzle 15. The tip 16 is preferably mounted some distance above the air ports 12, in order to prevent accidental drafts through these ports from interfering with the jet of gas from 16, particularly at low gas rates.

The upper end 14 of the burner tube is illustrated as being provided with three equally spaced radial bosses 17 which are bored and threaded as at 18 for machine screws 19. Three screws 19 are used to secure the shroud or shield 20 around and above the top of the burner, to serve as a protection to the low or pilot flame when little heat is required, and also to admit auxiliary air to the flame when high gas rates are employed and the flame fills and burns out of the top of the shroud 20. Perforations 21 are made in shroud 20 at some distance above the top of burner tip 14, and appear to increase its effectiveness. Locknuts 22 may be added to screws 19 to hold the shroud in place against the bosses 17.

Inside the upper end 14 of the burner tube and spaced from the end thereof is a perforated metal disc or flash back preventer baffle 23. This is drilled with a number of small holes 24, for example 30 holes about 0.05 inch in diameter. Secured to disc 23 and spaced therefrom by a metal stud 25 is a second smaller disc or baffle 26, which may also be perforated with approximately the same number of holes. A metal sleeve 27 fits snugly in the bore of the upper end 14 and rests on top of the outer unperforated edge of the lower disc 23.

A groove 28 around sleeve 27 is adapted to receive the ends of machine screws 19, previously mentioned, which lock sleeve 27 and discs 23 and 26 in place. An inwardly turned flange 29 at the upper end of sleeve 27 is preferably substantially flush with the outer edge of upper disc 26 and is preferably spaced about $\frac{1}{16}$ inch above it. This provides an inwardly curved path for the

greater part of the gas-air mixture from the space within sleeve 27 above disc 23 and has been found to effectively prevent the burner flashing back or becoming extinguished at low gas rates.

Thus it is apparent that a very simple and compact burner structure has been illustrated and described, which has been found most successful in extended tests, and which adequately fulfils the requirement of suitable combustion of high heat value liquefied petroleum gas at very widely varying rates and at full tank pressure. The invention appears to reside in the particular arrangement of air ports, gas nozzle, mixing tube and particularly in the spaced baffles and the flange means at the burner tip to direct the flow of gas and air inwardly toward the axis of the burner. It has been found effective in operations involving a gas flow as low as 0.10 cubic foot per hour and may thus serve in place of the usual auxiliary pilot burner during intermediate periods between full flow operation at rates of gas flow as high as 15 cubic feet per hour or more.

Although a specific construction embodying this invention has been described and illustrated, it is to be understood that the invention is not limited to that arrangement, and all such modifications and changes as come within the scope of the following claims are embraced thereby.

I claim:

1. A gas burner comprising a vertical tube, air ports in said tube, a gas nozzle extending into said tube and terminating substantially above said air ports, a perforated baffle in said tube above said nozzle, a second perforated baffle spaced above said first named baffle with its periphery spaced from the bore of said tube, a flange extending inwardly from the bore of said tube above said second named baffle, with its inner edge substantially aligned with the periphery of said baffle, and a shroud surrounding said tube and extending above the top thereof.

2. A gas burner comprising a vertical tube, air ports in said tube, a gas nozzle extending into said tube and terminating above said air ports, a perforated baffle in said tube above said nozzle, a second perforated baffle spaced above said first named baffle with its periphery spaced from the bore of said tube, and a flange extending inwardly from the bore of said tube above said second named baffle, with its inner edge substantially aligned with the periphery of said baffle.

3. A gas burner comprising a vertical tube, means for forming an air-gas mixture in said tube, a perforated baffle in said tube intermediate its length, a second perforated baffle spaced above said first named baffle with its periphery spaced from the bore of said tube, and a flange extending inwardly from the bore of said tube above said second named baffle, with its inner edge substantially aligned with the periphery of said baffle.

4. A gas burner comprising a vertical tube, means for forming an air-gas mixture in said tube, a perforated baffle in said tube intermediate its length, a second baffle spaced above said first named baffle with its periphery spaced from the bore of said tube, and a flange extending inwardly above said second named baffle and forming with said baffle an inwardly curving path for said gas-air mixture.

5. A gas burner comprising a vertical tube, means for introducing an air-gas mixture into said tube, a perforated baffle in said tube intermediate its length, a second baffle spaced above said first named baffle and of smaller diameter than the bore of said tube, and means above said second named baffle to direct said air-gas mixture toward the axis of said tube.

6. A gas burner comprising a vertical tube, means for introducing an air-gas mixture into said tube, a baffle in said tube intermediate its length, a second baffle spaced above said first-named baffle and of smaller diameter than the bore of said tube, and a flange extending inwardly above said second-named baffle and forming therewith an inwardly curving path for said air-gas mixture.

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