July 21, 1953 E. E. TAVENER 2,646,113

COMBUSTION CELL GAS BURNER

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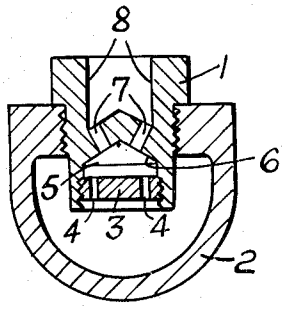


FIG. 1

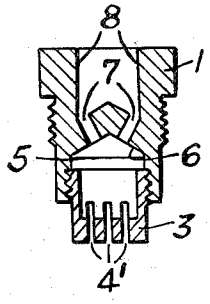


FIG. 2

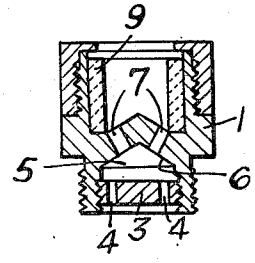


FIG. 3

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COMBUSTION CELL GAS BURNER

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1 Claim. (Cl. 158—116)

1

This invention relates to burners adapted to burn aeriform fuel, such as coal gas or a vapour, for example from paraffin, induced by an air blast injector or other means and fed under pressure to the burner inlet.

Such burners may be used for burning vapour for heating bakers' ovens and the like, generally in places where a supply of combustible gas is not available or where ordinary oil burners cannot be satisfactorily used.

For convenience, the fuel is hereafter referred to as "gas."

Rich gases, including those derived from oil, have slow burning characteristics, and it is therefore necessary that, when such gases are used as fuel, the velocity of the combustible mixture from the burner nozzle should be slower than is usual with the use of coal gas, for example.

Conversely, the highest permissible velocity is desirable to permit the burner to be turned down without danger of "lighting back."

Satisfactory results are obtained with the use of a burner constructed according to the present invention which provides for two-stage restriction of flow through the nozzle and for preheating of the air and gas mixture.

The present invention consists essentially in a burner nozzle having an internal chamber provided with restriction-forming inlet orifices and with restriction-forming outlet orifices, which diverge from one another, said outlet orifices directing the air-gas mixture passing therethrough against the internal walls of a mouth-forming chamber within and from which combustion proceeds.

The burner nozzle may be of metal or/and a refractory.

In the accompanying drawing, Fig. 1 is a transverse section showing one of a set of burner nozzles tapped into a manifold connected to the supply of combustible mixture. Figs. 2 and 3 illustrate modified forms of burner nozzle.

Referring to Fig. 1, the part of the burner nozzle 1 within the manifold 2 is fitted with an internal baffle member 3, preferably screw-threaded into said part, and formed with a set of orifices 4 discharging into a chamber 5 within the burner nozzle, against the roof or end wall 6 of which chamber 5 the mixture issuing from the orifices 4 impinges. The said roof or end wall 6 may be integral with or thermally connected with that part of the burner nozzle projecting beyond the

2

manifold 2 and is formed with a set of relatively divergent orifices 7. The two-stage restriction presented by the two sets of orifices 4 and 7 reduces the exit velocity to an extent depending on the areas of the respective sets of orifices. Deflection of the mixture by the roof or end wall 6 and the spreading of the jets discharged through the orifices 7 and impinging on the internal wall of a mouth-forming chamber 8 further retard the mixture, so that its exit velocity is sufficiently slow for combustion, and the flame will "hang on." Combustion proceeds within and from the chamber 8.

It is well known that preheating increases the rate of burning, and the impingement on the hot surface of the roof or end wall 6 and on the hot internal wall of the chamber 8 provides a useful amount of preheating.

When turned down, a burner is liable to "light back" or "strike back" and thus to ignite the mixture in the manifold and the piping to the point of admixture of the air and gas. With the use of the burner described, this liability is considerably reduced in that the restriction orifices would tend to quench any reversely directed flame.

The orifices 4 may be round orifices or may be in the form of slots as in the burner nozzle illustrated in Fig. 2 in which slots 4' replace the orifices 4 illustrated in Fig. 1.

The invention contemplates the use of a metallic burner nozzle with a refractory lining, as 9, within the mouth-forming chamber, illustrated in Fig. 3. The lining 9 becomes hotter than the metal and thus accelerates combustion. It is thus possible to permit higher velocity of the mixture issuing from the orifices 4 and 7. The lining 9 also protects the metal and lengthens the life of the nozzle.

What is claimed is:

A burner nozzle for gaseous fuels having a mouth-forming chamber with a side wall within and from which chamber combustion proceeds, and means forming an internal chamber in the nozzle provided with flow-restricting gas inlet orifices, said means including an end wall separating said internal chamber from said mouth-forming chamber, said end wall being provided with flow restricting gas outlet orifices leading from said internal chamber into said mouth-forming chamber, said outlet orifices diverging from one another in the direction of flow of gase-

ous fuel from the internal chamber to the mouth-forming chamber and each outlet orifice having an outlet opening located in a position for impinging gaseous fuel against the interior of the side wall of the mouth-forming chamber, said inlet and outlet orifices providing the only means of access of gaseous fuel to said mouth-forming chamber, whereby all the gaseous fuel supplied to the nozzle flows through said inlet and outlet orifices and is directed outwardly against the inside surface of the side wall of said mouth-forming chamber by said diverging outlet orifices.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,596,667	Levey et al.	Aug. 17, 1926
1,995,122	Hess	Mar. 19, 1935
2,005,801	Olsen	June 25, 1935
2,367,119	Hess	Jan. 9, 1945
2,427,545	Berger	Sept. 16, 1947
2,464,333	McGlaughlin	Mar. 15, 1949
2,510,482	Scharbau et al.	June 6, 1950
2,511,380	Stadler	June 13, 1950
2,525,432	Stadler	Oct. 10, 1950