Jan. 12, 1932. G. KEITH 1,840,453

GAS BURNER NOZZLE

Filed April 29, 1929

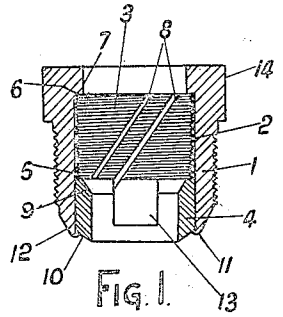


FIG. 1.

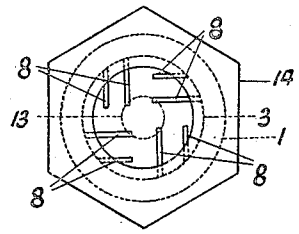


FIG. 2.

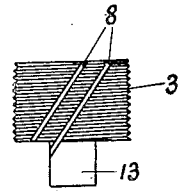


FIG. 3.

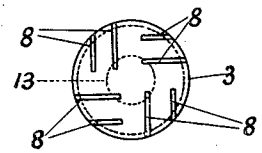


FIG. 4

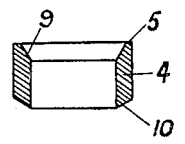


FIG. 5.

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UNITED STATES PATENT OFFICE

GEORGE KEITH, OF LONDON, ENGLAND, ASSIGNOR TO THE SURFACE COMBUSTION COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

GAS BURNER NOZZLE

Application filed April 29, 1929. Serial No. 358,853.

This invention relates to improvements in gas burner nozzles for use with a self-burning mixture of gas and air, as employed for example in gas-fired bread and biscuit ovens.

Gas burners when employed for indirect firing, being enclosed within a confined space shut off from the baking chamber, are required to operate under unusually difficult conditions.

Burner tubes formed with elongated slots as used for direct firing are unsuitable for indirect firing, being liable to be excessively overheated on account of the comparatively low velocity of issue. It is therefore requisite to fit to the burner tube, which is itself enclosed within an outer tube shut off from the baking chamber, a series of nozzles having outlets allowing for a comparatively high velocity of issue. Even so, the requirement that the nozzles shall be of some metal capable of working at red heat without oxidizing restricts the range of practicable designs.

In practice it is found that chromium steel alloy, containing approximately 12% of chromium, withstands very well the temperature conditions, so that the problem to be solved was to devise a burner nozzle which can be readily produced on a manufacturing scale notwithstanding the hardness and toughness of the metal, which is not liable to light back when using a highly heated self-burning mixture even when turned low down, which does not permit the flame to blow off, and which is free from tendency to whistle.

These and other requirements are satisfied by the nozzle of the present invention.

In the accompanying drawings Fig. 1 is a part vertical section and Fig. 2 a plan showing an assembled burner nozzle constructed in accordance with the invention; Figs. 3, 4 and 5 are detail views showing the inner elements of the burner detached.

The nozzle shown comprises an externally screw-threaded nipple 1 in the tubular bore 2 of which are located a solid cylindrical plug 3 and an annular retaining collar 4, the plug 3 being confined between the inner end face 5 of the collar 4 and an inwardly extending shoulder 6, the shoulder forming the boundary of the circular aperture 7. The plug 3 constituting the burner head is formed with four pairs of saw cuts or slots 8 extending from the periphery to a short distance from the axis and disposed skew to the latter so that rotational motion is imparted to the flames issuing therefrom. The upper end of the collar 4 is chamfered at 9 so as to expose a maximum slot area on the lower end of the plug 3.

In assembling the nozzle, the plug and the collar are inserted into the nipple 1. The lower edge 11 of the nipple is then beaded over the chamfered lower edge 10 of the collar so as to hold the whole together as shown in Fig. 1. To provide a sharp lower edge for beading, the lower end of the nipple is chamfered at 12.

13 denotes a cylindrical portion depending from the plug 3 and incidental to the mode of manufacture of the plugs which are machined in pairs, dumb-bell fashion, the parts forming a pair being interconnected by a member of which the cylindrical portion 13 constitutes one half. When the parts are separated, the cylindrical portions 13 afford gripping arbors during the subsequent slotting operation. The plug 3 is externally screw-threaded to permit convenient chucking of the blank from which a pair of plugs is formed.

The upper portion 14 of the nipple 1 is of polygonal cross section for engagement by a spanner, key or the like for use in screwing the nozzle into the wall of the burner tube.

It is found that the rotation of the flames effected by the skew arrangement of the slots prevents the flames from being blown off the nozzles and also prevents whistling due to incipient blowing off. Apparently the flames are thrown outwardly against the wall of the shoulder portion 6, which prevents the entrainment of inert products of combustion from the immediately surrounding region.

The rotation of the flames results in enlarging the area of the portion of the outer tube on which the flames impinge so that the outer tube is not heated in small spots only.

I claim:—

A gas burner nozzle comprising a nipple presenting a bore restricted at one end by an

internal shoulder, presenting a lateral boundary for the root portion of the gas flame, a substantially cylindrical solid stationary plug fitting said bore and abutting at one end on said shoulder, said plug formed with narrow tangential slots extending the entire length of said plug from the periphery to a short distance from the axis and disposed skew to the axis, said plug having no passage for gas other than said slots, said end of said plug limiting the base of the flame and a collar disposed within said bore engaging the opposite end of the plug and confining the plug within said bore, said parts being made of metal non-oxidizable under heat.

In testimony whereof I have signed my name to this specification.

GEORGE KEITH.