May 19, 1936. C. J. JOHNSON 2,041,348

BUNSEN BURNER

Filed Oct. 29, 1934

Fig. 1.

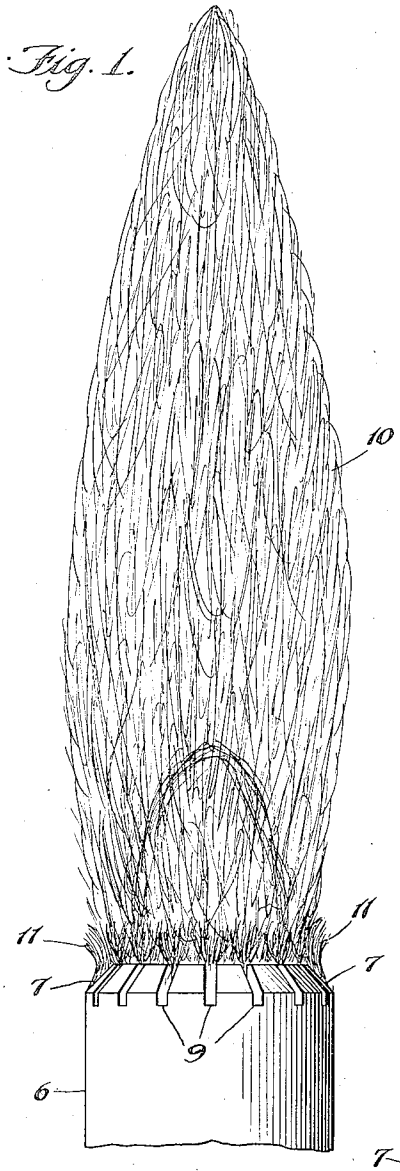


Fig. 4.

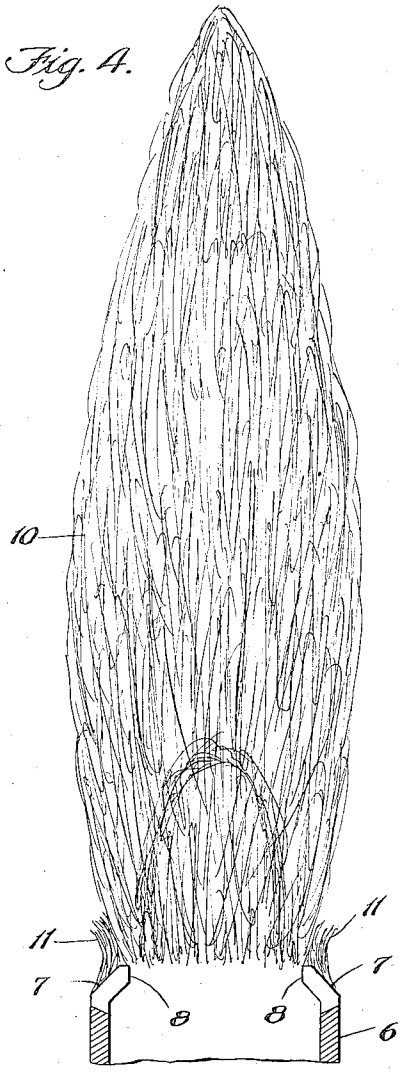


Fig. 2.

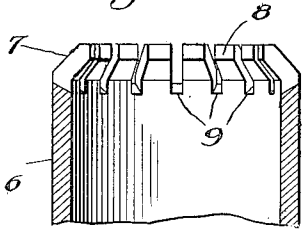


Fig. 5

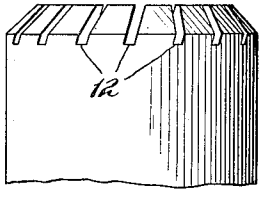
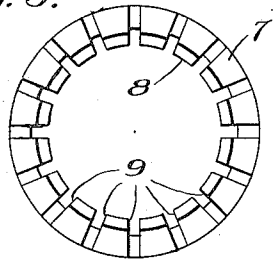


Fig. 3.



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BUNSEN BURNER

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5 Claims. (Cl. 158—111)

This invention relates to Bunsen burners for burning hydrocarbon fuels including oil, gas, oil vapors or the like, the general construction and operation of such burners being well known. Heretofore such burners have usually been provided with substantially straight or cylindrical tubes with discharge orifices of the same diameter as the tube, which construction has in general proved more or less satisfactory, particularly with manufactured gas such as heretofore commonly provided for heating and lighting purposes. When natural gas, or a mixture of natural gas with manufactured gas, was substituted for the usual manufactured gas, it was found that such types of Bunsen burners were unsatisfactory and substantially inoperative for commercial purposes. The higher heating units or B. t. u. of the natural gas required more air for complete combustion and this would cause the flames to disappear or separate from the burner or cause backfiring.

The principal object of the present invention is to provide an improved burner of the Bunsen type which will avoid objectionable features of the ordinary burners and which will tend to anchor or tie the flame to the end of the burner. Another object is to provide a gas burner of this character of simple, durable and inexpensive construction in which when the flame is ignited a small flame will be constantly maintained close to the discharge end of the tube to thereby maintain a flame in the mixture being discharged from the tube.

Other objects and advantages will appear from the following description taken in connection with the accompanying drawing, in which

Figure 1 is a side view illustrating the operation of my improved burner;

Figure 2 is a longitudinal sectional view;

Figure 3 is a plan view;

Figure 4 is an enlarged sectional view further illustrating the operation; and

Figure 5 is a side view showing a modification.

As shown in the drawing, 6 represents a tube of a burner of the Bunsen type. The upper or outlet end of the tube has an inwardly extending projection or flange 7 with an outlet opening 8 of less diameter than the inner diameter of the tube. A plurality of slots or openings 9 are provided around the end of the tube, these slots being conveniently formed by saw cuts or milling and preferably extend through the flange 7 and slightly into the end of the tube wall as readily seen from Figures 2 and 4. Any desirable number of these slots may be provided but it is preferred to have them spaced at relatively short intervals in order to accomplish the desired object. For instance, in a tube of approximately three-quarters of an inch in diameter I have found that sixteen slots have provided satisfactory operation. These slots must be sufficiently narrow so that flames will be maintained around the outer periphery of the discharge and without ignition passing through the slots and causing burning inside of the tube.

In the operation of the burner the fuel, gas or the like, is mixed with air in the usual manner and the mixture then passes out through the open or discharge end of the tube where it is ignited. This forms the main flame as indicated at 10. At the same time a certain amount of the gases will pass out through the slots or openings 9 around the discharge end and will be ignited, forming auxiliary or sub-flames 11 around the periphery of the burner. These flames are drawn by suction or the air draft so that they merge with the main flame at a short distance above the outlet and in this manner serve to prevent the flame from leaving the end of the Bunsen tube. The series of small flames coming through the ring of slots surrounding the discharge end anchors the main column or flame to the end of the Bunsen tube. In this manner they not only serve to prevent the flame from passing away from the end of the tube but also tend to prevent backfiring.

In the burner shown in Figures 1 to 4 the slots are radially arranged and substantially parallel with the tube but they may be arranged at an angle as shown by the slots 12 in the modified form of the burner shown in Figure 5. This arrangement provides some further advantages in that the flames in the slots are so positioned relative to each other and to the main flame that they serve more effectively to maintain ignition in the burner. It will be noted that in both forms the arrangement whereby the slots open directly into the main outlet passageway provides auxiliary flames which are not separated or disassociated from the main flame but are directly connected therewith, thus serving effectively to secure the desired results. In any event one or more of such slots or openings may be used to assist in maintaining the flame and I do not wish to be limited to any particular form or number of such slots, the size of which in general is determined as in other forms of burners, these being proportioned so that they prevent passage of the flame through the slot to the inner surface.

Having thus described my invention, what I claim is:

1. A Bunsen burner tube having an inwardly projecting flange at its discharge end and having one or more slots in the discharge end thereof which extend entirely through the walls thereof and open directly into the main outlet passageway to provide for auxiliary flames around the main flame which are directly connected therewith.

2. A Bunsen burner including a burner tube having a restricted discharge opening and having

a plurality of slots extending entirely through the walls of the tube around the discharge opening to permit a portion of the combustion mixture to pass therethrough and maintain auxiliary flames around and directly connected with the main flame of the burner.

3. A burner tube having an inwardly extending flange around the discharge end with slots extending entirely through the flange and adjacent portions of the tube.

4. A Bunsen burner including a tube having an inwardly extending projection at its discharge end and having a plurality of slots around the discharge end arranged at an angle to the axis of the tube.

5. A gas burner comprising a tube, the discharge end of the tube being formed with an inwardly projecting flange, said tube and flange being formed with a series of substantially radial slots, each being of substantially uniform width throughout its length, and extending from the upper end of the tube to a point below said flange, for the purposes stated.

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