Nov. 13, 1928. 1,691,607

H. E. KERR

GAS BURNER

Filed April 2, 1926 2 Sheets-Sheet 1

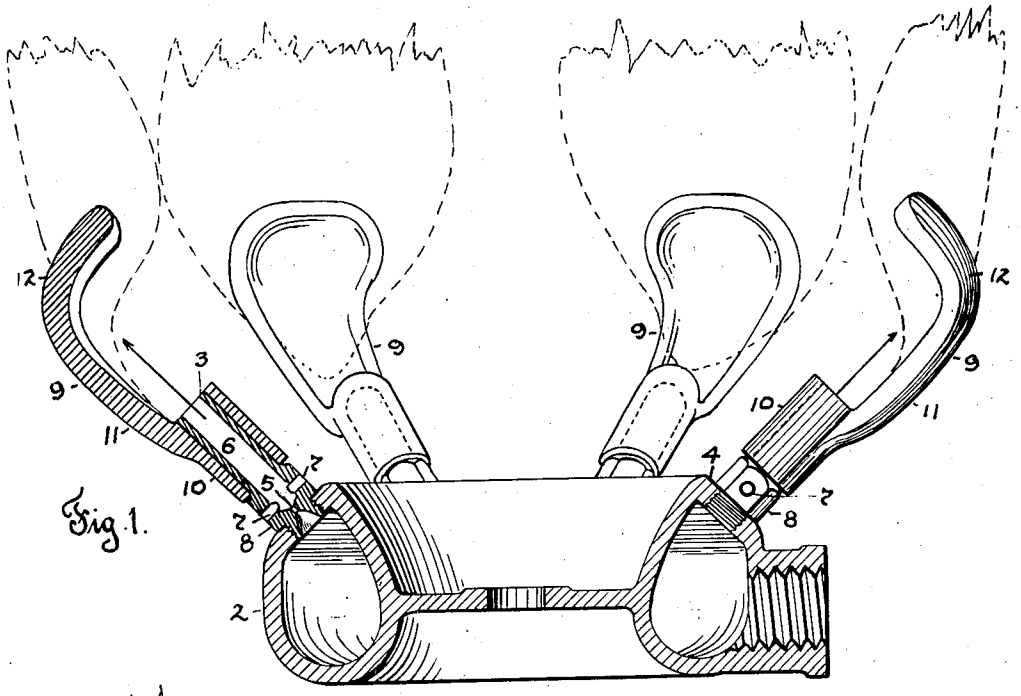


Fig. 1.

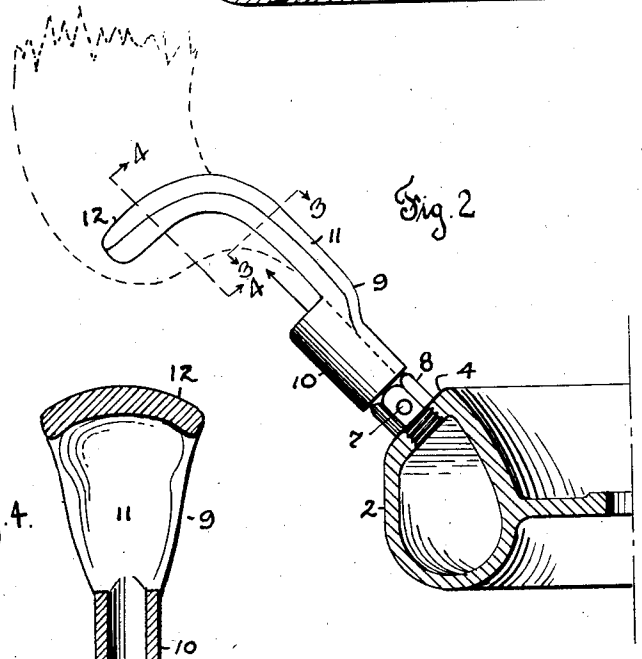


Fig. 2

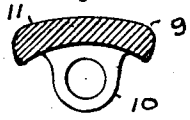


Fig. 3.

Fig. 4.



Fig. 5

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Fig. 6.

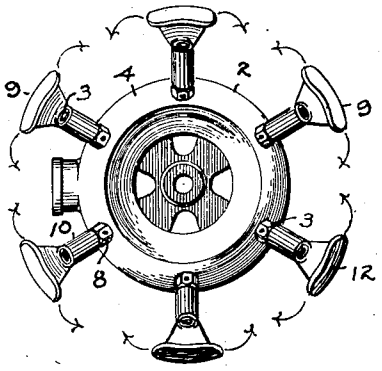


Fig. 7.

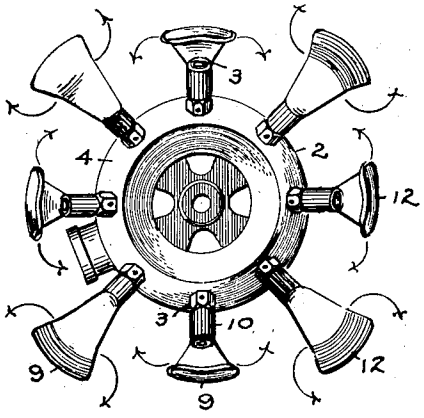


Fig. 8.

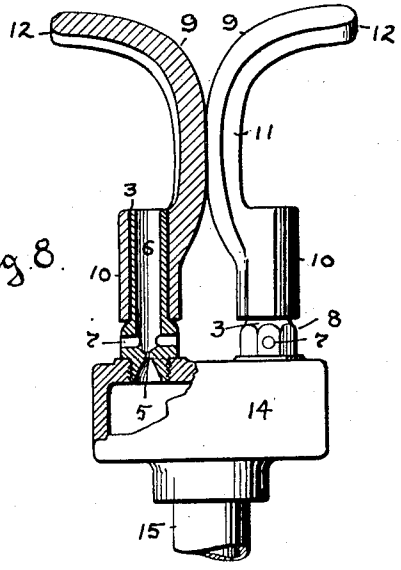
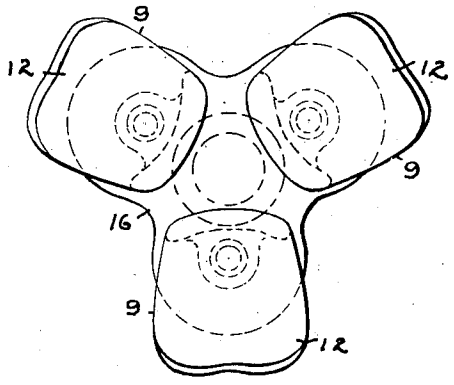


Fig. 9.



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UNITED STATES PATENT OFFICE.

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GAS BURNER.

Application filed April 2, 1926. Serial No. 99,213.

My invention relates to an improvement in gas burners, and my object is to provide a burner in which a commingling tube is adapted to jet a mixed stream of air and gas at high velocity against a baffle member which is preferably a separate element sleeved on the tube, whereby a supplemental mixing effect is obtained and a spreading sheet of flame maintained opposite the mouth of the tube. The gas orifice in the tube is so small that it causes a fine stream of gas to jet through the open mouth of the tube with such force that it is impossible to maintain a flame under normally high gas pressure operations unless the flow of gas is checked after it issues from the mouth of the tube. The baffle member which I mount upon the commingling tube not only checks the gas stream but also serves to effect a more intimate mix of the gas and air which passes through the tube, it being understood that the air which is drawn into the commingling tube is not sufficient in itself to maintain a flame at the mouth of the tube excepting at such times as the gas pressure is reduced or not sufficient to jet the gas against the baffle mixer with spreading and intermixing effect. A separate baffle member sleeved rotatably on the commingling tube permits variable settings to be made whereby the flame may be caused to spread in different directions relatively to the mouth of the tube, and where a plural number of such devices are grouped together the flames may be either concentered or diffused to play on smaller or larger heating surfaces. These desirable results are further fostered by grouping a plural number of such devices on angularly related lines substantially as herein shown and described and as delineated in the accompanying drawings, in which Fig. 1 is a sectional view of a burner embodying my invention, and Fig. 2 is a sectional view of a part of the same burner showing the baffle mixer rotated or turned to deflect the flames downwardly and outwardly. Fig. 3 is a cross-section of the baffle member on line 3—3 of Fig. 2, and Fig. 4 is a sectional view of the same element on line 4—4 of Fig. 2. Fig. 5 is a cross-section of the hub or sleeve portion of the baffle member, showing that it may be made hexagonal instead of round, if preferred. Fig. 6 is a top view, on a reduced scale, of a burner such as delineated in Fig. 1, the arrows indicating in a general way the circumscribed area within which the flame is developed. Fig. 7 is a similar view of the same burner with the alternate baffle elements turned downwardly in the manner as illustrated in Fig. 2, and the arrows in this view indicate the direction and spread of the flames from each mixing unit. Fig. 8 is a side view, partly in section, of a modified form of burner having two mixing units arranged back to back in upright position, and Fig. 9 is a top view of another modified form of burner in which three mixing units are grouped together.

The burner comprises a gas distributing body or manifold 2 of any suitable shape, upon which any desired number of relatively small commingling tubes 3 may be mounted. As shown in Figs. 1 to 7, body 2 is a hollow ring with a flat inclined wall 4 annularly at its top into which a series of brass tubes 3 are screwed at uniformly spaced intervals radially of the ring. These tubes incline outwardly and upwardly and are divergingly related, and a small gas orifice 5, located axially within the base end of the tube, permits a fine stream of pure gas, either natural or artificial, to be projected into and through a larger bore or chamber 6 within the tube. One or more lateral openings 7 in the hexagonal enlargement or lower end 8 of the tube permits a small amount of air to be entrained by the stream of gas issuing from orifice 5, and the air intake 7 and the mouth of orifice 5 are preferably closely related to more effectively entrain the air. The diameter of the tube and the length thereof are such that the fine stream of gas is jetted, under normal operating conditions, not only through the tube but also some distance beyond the mouth thereof, and although air is entrained with the gas the mixture is not sufficiently complete to effect perfect combustion and constant burning thereof at the rapid rate of speed at which it issues. However, upon reducing the pressure by valve or otherwise a small flame can be maintained at the mouth of the tube without backfire. But upon increasing the pressure and jetting the gas in increased volume through the tube the flame will be blown out unless a back pressure is established at some distance from the mouth of the tube. A more intimate mixture with the air is also required to produce a blue flame and perfect combustion. I obtain this desired back pressure and ad-

ditional air mixture by attaching a spoon-shaped element 9 directly to the tube; preferably by means of a round or hexagonal hub portion 10 having a longitudinal bore adapted to sleeve over the round part of the tube in rest position against its enlargement 8. Element 9 comprises a concaved branch 11 of flaring shape cast integral with hub 10 and extending from one side thereof on substantially parallel lines with the axis of the tube, although the concaved recess or cavity in the inner face of the branch may diverge slightly on inclined lines relatively to such axis until merged with a similar concaved surface of a curved lip or flange 12 which is bent at substantially right angles and forms a shallow cup or pocket directly opposite the mouth of the tube and some distance therefrom, the distance or space between the cup and the mouth of tube 3 being approximately the same as the length of the tube. Thus the gas stream which passes through the tube is projected approximately the same distance beyond the mouth of the tube before striking the curved concaved surface of the flange or cup 12. The gas stream is thereby diffused within the open cup or pocket and a cushioning body of gas and air constantly maintained in advance of the stream or jet, whereby a more intimate and thorough mixture of gas and air is effected and a spreading sheet of blue flame obtained. This flame naturally rises to a higher elevation but may be directed either toward the center of the burner body, or in the opposite direction and to a greater distance from the center, by rotating the element upon the tube so as to project the flange or cup 12 either upwardly or downwardly as delineated in Figs. 1 and 2. In Fig. 6 all of the baffle elements are turned up which confines the flame within a small circumscribed area, whereas in Fig. 7 the elements are turned alternately up and down to show the greater spread of flame where the elements are turned down.

In Fig. 8 I show a modified form of the invention, a relatively small flat-sided head 14 being mounted upon a gas supply pipe 15, and only two tubes 3 being attached in spaced upright position upon the top of the head. Each tube is provided with a supplemental element 9, for baffling and mixing the gas and air delivered thereto by the commingling tube, and the pair of elements are placed back to back to direct the separate flames produced by each unit in opposite directions. In Fig. 9 I show a top view of a small gas distributing head or manifold 16 of clover leaf shape having three upright tubes and auxiliary mixers and spreaders therefor arranged back to back to direct the separate sheets of flame in three directions. Other modifications of the same nature may be made and still fall within my concept and scope of the invention.

What I claim, is:

A gas burner, comprising a hollow gas distributing body, a series of short tubes extending upwardly from said body, a baffle member spaced apart from the mouth of each tube approximately the same distance as the length of the tube, and each tube having an axial gas orifice of small diameter adapted to jet a stream of gas at high velocity a substantial distance beyond the mouth of the tube under normal gas pressures, and each tube also having intake ports of restricted area to permit a limited amount of air to be entrained by the gas stream without causing combustion within the tube itself under the back pressure established by said baffle member.

In testimony whereof I affix my signature.

HARRY E. KERR.