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2,074,531

GAS BURNER

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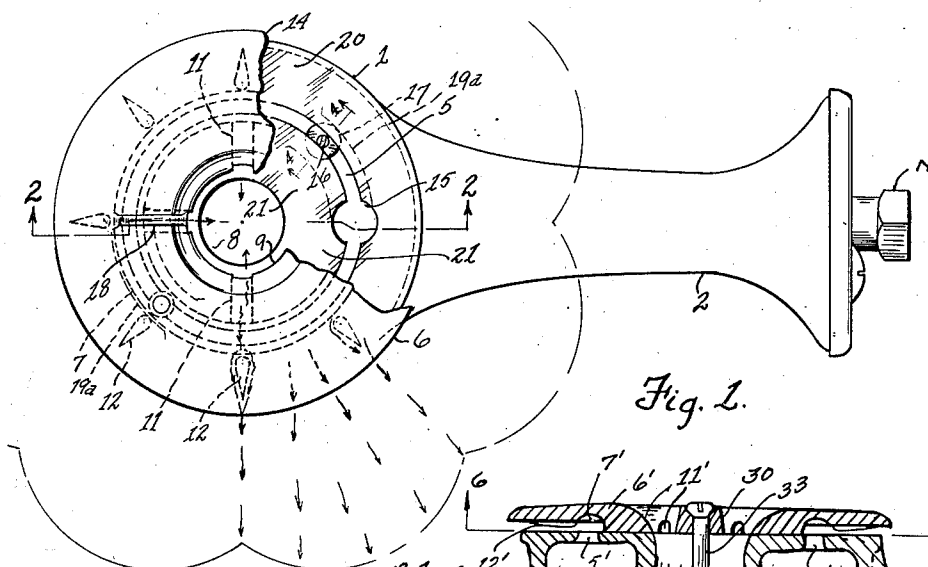


Fig. 1.

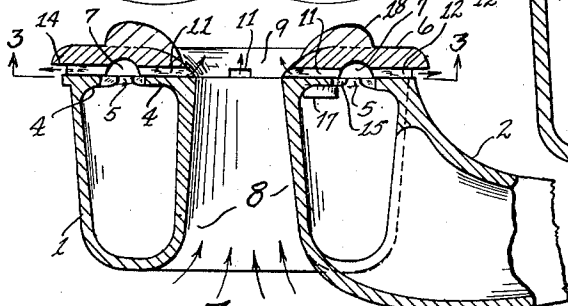


Fig. 2.

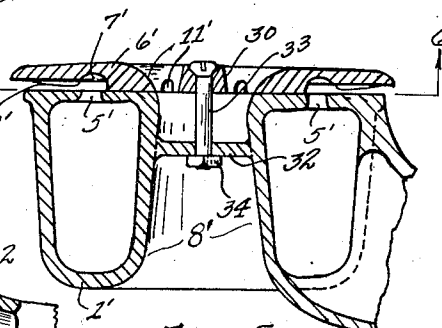


Fig. 5.

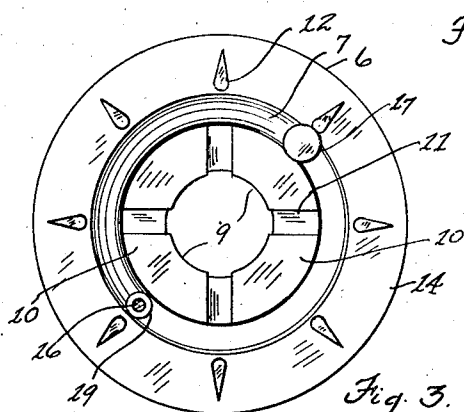


Fig. 3.

Fig. 6.

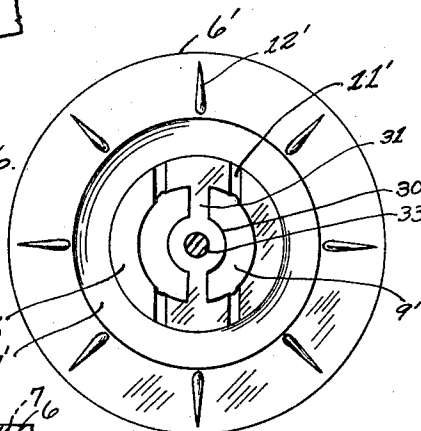


Fig. 4.

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UNITED STATES PATENT OFFICE

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GAS BURNER

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6 Claims. (Cl. 158—116)

This invention relates to gas burners and particularly to service burners for gas cooking ranges and the like.

Heretofore in gas cooking ranges, it has been the practice to utilize burners of the type having an annular hollow head provided with interiorly communicating radial arms and having small discharge vents positioned in rows along the arms and the body portion and discharging upwardly. In such burners there is a disadvantage in that the holes easily become clogged with foreign substances, especially foods which may boil over on the stove. Furthermore they are expensive to cast and the length of the discharge ducts is limited somewhat by the thickness of the walls of the arms.

To overcome some of these advantages, burners were subsequently developed which comprise generally a hollow body having a deflecting cap or nozzle which is received in the open top of the burner and provides substantially parallel upwardly outwardly extending walls forming an annular passage through which the gas can flow from the interior of the body and thereby be discharged as an annular flame extending around the body. In such instances it was the general practice to have the top wall of the cap in slightly overhanging relation to the under wall so as to provide a guard and prevent entrance of foreign substances into the annular discharge passage. In many burners of this latter type, however, there has been no provision for the discharge of gas and secondary air at the center of the burner and consequently a cold spot slightly larger than the burner body results. Furthermore, in many burners, the upwardly outwardly extending annular passage can become partially clogged easily and requires special parts in manufacture.

One of the principal objects of the present invention is to provide a burner of the general type last described in which provision is made to sustain a central flame and which is so constructed that it is economical to manufacture and assemble and clean.

More specific objects are to prevent clogging of the discharge ducts of the burner, to insure effective lighting entirely around the burner while at the same time preventing flash-backs into the burner, and to maintain a flame of substantially uniform condition at all points around the burner and at the center thereof when the burner is under the influence of extraneous air currents.

Other objects and advantages will become apparent from the following specification wherein reference is made to the drawing, in which:

Fig. 1 is a top plan view of the burner embodying the principles of the present invention, part thereof being shown in section for clearness in illustration;

Fig. 2 is a vertical sectional view of the burner illustrated in Fig. 1, part thereof being shown in section as indicated by the line 2—2 on Fig. 1;

Fig. 3 is a bottom plan view of the deflecting cap of the burner and is taken from a plane indicated by the line 3—3 on Fig. 2; and

Fig. 4 is a fragmentary sectional view taken on a plane indicated by the line 4—4 in Fig. 1 and illustrates the means for latching the cap onto the burner body; and

Fig. 5 is a view similar to Fig. 2 illustrating a modified form of the invention; and

Fig. 6 is a bottom plan view of the deflecting cap of the burner in Fig. 5 and is taken on a plane indicated by the line 6—6 on Fig. 5.

Referring to the drawing, the burner comprises a hollow annular body 1, the internal cavity of which is in communication with a mixing tube 2 into which the usual regulatable gas supply nozzle "N" discharges for supplying gas and inducing air into the burner body. The body cavity is preferably comparatively deep, as illustrated, and the side walls thereof are imperforate except where communicating with the mixing tube 2. The annular top wall 4 of the body is likewise imperforate except for the discharge passage means shown as an annular passage 5 through which gas and air entering the body from the mixing tube are discharged upwardly. Mounted on the top of the body 1 is a deflecting cap 6 having on its under face an annular channel 7 positioned to align with the annular discharge passage 5. The annular body defines a central air duct 8 through which air may rise upwardly toward the cap. The cap 6 is provided with a complementary air duct 9 coaxial with the duct 8 and forming a continuation thereof, the passage 9 opening through the top of the cap. Extending radially outwardly from the inner marginal limit of the cap and terminating outwardly at the inner edge of the channel 7 is a depending boss 10 which engages the upper surface of the wall 4 and supports the cap in proper position vertically of the body. Extending radially of the boss 10 are a plurality of grooves 11 which, when the cap is installed, in operating position, form with the top surface of the wall 4 a plurality of ducts leading from the channel 7 into the passage 9 for supplying a mixture of gas and primary air thereto for sustaining the central portion of the flame to be

maintained by the burner. The portion of the under surface of the cap beginning at the outer limit of the channel 7 and extending to the outer margin is offset from the plane of the under face of the boss 10 so as to be in spaced relation to the top wall 4 of the body and form an annular outwardly discharging duct.

Beginning at or near the outer limit of the channel 7 are a plurality of stream lined bosses 12, the bosses preferably being of such height as to fully bridge the space between the upper surface of the wall 4 and the overhanging under surface of the cap 6. The bosses 12 preferably extend directly radially and are equally spaced from each other around the cap 6, as better illustrated in Fig. 3. In a plane parallel to the under surface of the cap, the bosses 12 are wedge shaped, having their wide ends disposed adjacent the channel 7, and tapering outwardly therefrom so that gas issuing from the channel 7 and striking the bosses 12 will flow radially outwardly and be deflected around the bosses without an appreciable amount of turbulence, as will more fully appear hereinafter. Turbulence is further reduced due to the rounded contour of the wide, or leading, ends of the bosses 12. The bosses 12 preferably terminate at their outer limits, a short distance from the outer limits of the body 1, for example, about $\frac{1}{8}$ of an inch.

In order to protect the burner proper from foreign matter dropped thereon, the burner cap is of sufficient diameter to overhang the outer limits of the body 1, as indicated at 14.

To secure the cap firmly in position on the body 1, the annular passage 5 is provided with a plurality of enlarged openings 15 and the cap is provided with corresponding downwardly depending stems, such as indicated at 16, terminating at their lower end in enlarged heads 17. The heads 17 are sufficiently large in diameter so that they cannot pass through the passage 5 but can pass through the respective openings 15. Consequently to mount the cap in place, the heads 17 are aligned with and passed through the openings 15 until the cap rests in position on the upper surface of the body. The cap is then turned slightly through the medium of the wing lugs 18 to offset the heads 17 from the openings 15 and engage them with the under surface of the top wall, 4 thus forming a sabre locking connection therewith. If desired, wedge surface areas 19a, bevelled downwardly from the under surface wall 4 in the direction of rotation of the cap for fastening it, may be provided for engaging the heads 17 and wedging the cap firmly in place. Suitable bosses 19 may be cast onto the cap 6 and tapped centrally to receive the pins 16 for holding the latching heads 17 in proper spaced relation to the cap.

As previously mentioned several advantages result from the burner illustrated which, in the proportions shown in the drawing, is effective for most gas ranges. First, it should be noted that the upper outer face of the wall 4 defines a plane. Consequently, the entire body can be cast in one piece and, at most, the only finishing job required on the body 1 is flat grinding of the flat upper face of the wall 4. Correspondingly, the lower faces of the boss 10 and bosses 12 may lie in the same plane so that the cap can be completely finished, if roughly cast, merely by grinding the entire exposed under surface of the bosses 10 and 12 against a flat grinding surface. Thus both the cap and body may be finished on a

flat grinding surface without any special cuts being required. Each, of course, can be done in a single operation. Secondly, it should be noted that a radially wide surface is provided between the passage 5 and the outer limit of the body as indicated at 20. Correspondingly, a radially wide surface is provided between the passage 5 and the central passage 8, as indicated at 21. Consequently, the resulting discharge ducts of the burner, defined by the under surface portions of the cap 6, and the upper surface of the wall 4 are elongated sufficiently radially so that the burning gas will not backfire into the interior of the body, their length in the direction of flow of gas not being limited to the thickness of the walls of the body or cap.

Referring next particularly to the bosses 12 and the manner in which they operate due to the stream lining effect, the mixture of gas and air impinging thereon from the channel 7 flows smoothly therearound and the separate portions reunite before discharging into the air, issuing from between the bosses 12 not as jets separated from each other but as a continuous annular stream. Consequently, a very regular rosette of flame is provided around the burner, the radial indentions thereof being clearly defined but so far spaced from the burner that lighting of any one portion immediately flashes around the burner and lights all. Experience has demonstrated that with such bosses formed other than stream lined, the portion of the gas and air mixture issuing therepast is divided into a plurality of tongues, one tongue between each pair of adjacent bosses. Thus the gas and air is partially compressed and not as effectively aerated. Still more objectionable is the fact that lighting of the tongues of the mixture issuing from between any two adjacent bosses, in such instances, will not effect lighting of the remainder. As to burners of this general character in which no bosses corresponding to the bosses 12 are provided, the flame wavers badly, any slight draft driving the gas back into the burner on that side on which the draft impinges and correspondingly elongating the flame on the opposite side. With the bosses 12, however, an exceedingly heavy draft is required to prevent the issuance of gas toward the extraneous air stream. Consequently the flame is more uniform and regular under all conditions entirely around the burner. Again, by the arrangement shown, gas and primary air are fed to the center of the cap and discharged upwardly therefrom, ample secondary air being provided for sustaining combustion of the central portion of the flame by the passages 8 and 9.

In Figs. 5 and 6 a modification of the foregoing burner is illustrated, the parts in Figs. 5 and 6 corresponding to those in Figs. 1 and 2 being designated by corresponding primed numerals.

The main differences in the modification reside in the manner of mounting the cap 6', the form of the bosses 12' and the positions of the grooves 11'.

The cap 6' is provided with a pad 30 carried by a spider 31, the arms of which are preferably "stream lined" upwardly. A bridge or spider 32 is cast in the passage 8' preferably about one third of the burner height down from the top so that the air passing thereby may reassume its upward flow before being again deflected by the spider 31. If the spider 32 were too close to the spider 31 and their arms of the two were offset, it is obvious that the passage 8' would be substantially blocked thereby.

The pad 30 is drilled to receive a bolt 33 which extends through a passage in the bridge 32, a nut 34 being provided on the bolt 33 for drawing the cap 6' firmly against the top wall of the body.

5 The central supporting boss 10' is provided with grooves 11' which are directed eccentrically relative to the center of the cap and at an angle to the radius through the center of the cap to the outlet ends of the grooves. It is most advantageous to provide oppositely directed pairs of aligned parallel grooves, the grooves of each pair being offset from the diameter of the cap so as to lie outwardly from the outer limits of the pad 30. This results in two advantages, namely; the jets of gas from these grooves will not impinge on the pad 30 and the jets from opposite aligned grooves impinge on each other near the center of the cap and thus are rendered turbulent and are more effectively aerated and applied to any utensil above the burner.

The bosses 12' do not bridge the space between the cap and top wall of the body but are rounded on their under surface so as to provide a more efficient stream lining.

25 It is apparent from the foregoing description that the burners described have the advantages of simplicity in manufacture, requiring only plane surface grinding; that the parts may readily be cast; that a flame is maintained uniformly around the entire burner and centrally thereof so that the gas is most effectively aerated. Furthermore lighting of the gas around the entire burner is readily effected by lighting at any desired single point and backfiring and distortion of the flame by drafts are eliminated. It is further apparent that the burner described can be readily cleaned either in assembled condition or, when required, by removing the cap, all operating parts thereof being readily accessible.

40 Having thus described my invention, I claim:

1. A gas burner comprising an annular hollow body having a mixing tube communicating with the interior thereof, and an annular top wall extending from both the inner and outer body margins in overhanging relation to the body cavity and having passage means in spaced relation to the outer and inner limits of the top wall, an annular cap on said body having an under surface in superposed spaced relation to the said top wall, and a plurality of groups of spaced bosses between the cap and body, one group being positioned between the passage means therein and the inner limit of the top wall and the other group being positioned between the said passage means and the outer limit of the top wall, whereby said cap and top wall define a plurality of inwardly and outwardly extending discharge ducts.

2. A gas burner comprising a body member having a mixing tube communicating with the interior thereof and having an annular gas discharge passage, and a plurality of circumferentially spaced elements within said passage, said elements being gradually reduced in section laterally in the direction of flow of gases from the body through said passage whereby the

stream of gases issuing from the passage between adjacent elements is directed for merging its margins with the margins of adjacent streams.

3. In a gas burner comprising a hollow body having means to admit a mixture of gas and air thereinto and an elongated gas discharge passage, a plurality of elongated spaced elements in said passage extending from their inner ends lengthwise in the direction of discharge, each of said elements being of gradually decreasing width in the direction of discharge of said gas from an inner end portion to its outer end.

4. A gas burner comprising an annular hollow body having a mixing tube communicating with the interior thereof and a top wall overhanging the body cavity a distance greater than the thickness of the body wall, the body having a passage communicating with the body cavity and with the outside atmosphere at the overhanging margin of the top wall, an annular cap on said body in superposed relation to the top wall and having a central opening aligned with the central opening of the annular body, and a downwardly projecting boss on the under surface of said cap having its bottom surface complementary to a portion of the top wall for positioning the cap with portions of the under surface of the cap in spaced relation to said top wall.

5. A gas burner comprising a hollow body having a mixing tube communicating with the interior thereof and a top wall, a cap on top of the body having portions of its under surface in spaced relation above said top wall and defining with said top wall a substantially annular discharge passage discharging radially from the body, said body having a supply passage spaced from one margin of the top wall for supplying a combustible mixture from the body over said top wall, a plurality of circumferentially spaced bosses in said discharge passage, said bosses being wedge-shaped in cross section in the plane of the discharge passage and having their larger ends disposed nearer said supply passage than the smaller ends, said bosses tapering in the direction of flow of said mixture through the discharge passage, and said larger ends of the bosses being rounded to reduce frictional losses and turbulence of the combustible mixture passing through said discharge passage.

6. A gas burner comprising a hollow body having a mixing tube communicating with the interior thereof and a top wall and having a passage for discharging a combustible mixture from the body over said top wall, a deflector superposed upon the body and having that portion of its under surface extending from adjacent said passage to a marginal limit of the top wall in spaced relation to said top wall and defining with the top wall an annular discharge passage for discharging the combustible mixture outwardly from the body, a plurality of circumferentially spaced radially extending bosses in said discharge passage, and said bosses being streamlined in the direction of flow of said mixture through said discharge passage.

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