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B. A. GEURINK ET AL

GAS BURNER

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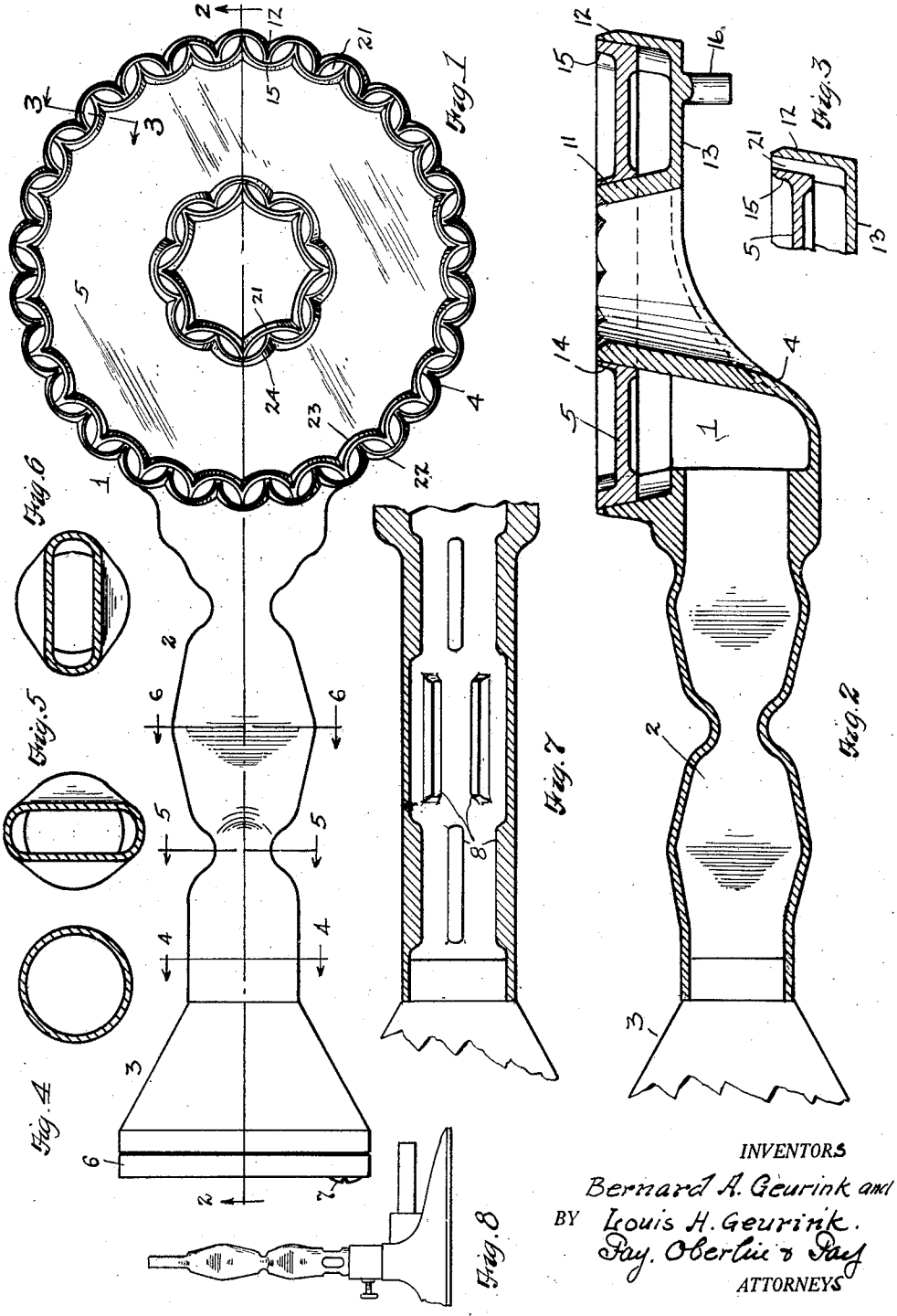

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GAS BURNER.

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This invention relates to a gas burner. More particularly it comprises a gas burner of the type wherein air is mixed with the gas at one end of said burner and the mixture consumed at the other end of said burner, certain novel features of construction insuring the thorough mixing of the gas and air and the proper combustion of said mixture.

In burners of this type, as heretofore constructed, under certain conditions of low gas pressure the flame has been found to snap back causing an explosion within the passageway for the mixture of gas and air and the extinguishment of the flame at the outside thereof. Such action of the burner is dangerous in that if such flame continues to burn under imperfect conditions of combustion within the burner, poisonous gases would be generated and if the flame is extinguished altogether the flow of gas through the apparatus may result in an explosion or endanger life through asphyxiation.

The object of the present invention is to obviate the dangers above referred to and to provide a burner of simple construction which will insure the thorough mixing of the gas and air and their proper combustion at the orifice of the burner. A further object of the invention is to improve the nozzle end of the burner so that the same may utilize a very large quantity of air and produce perfect combustion. Still another object of the invention is to simplify the construction so that a loose plate may be employed with a burner producing a vertical flame and at the same time provide a device which may be readily inspected and maintained in perfect operating condition. Other objects of the invention will appear in the course of the following description. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail a certain structure embodying the invention, such disclosed means constituting, however, but several of various structural forms in which the principle of the invention may be used.

In said annexed drawing:—

Fig. 1 is a top plan view of our invention as embodied in the stove type burner; Fig. 2 is a longitudinal sectional elevation taken centrally of the view shown in Fig. 1; Fig. 3 is a detail view taken along the line 3—3 shown in Fig. 1, looking in the direction of the arrows; Figs. 4, 5 and 6 are transverse sectional views taken along the lines 4—4, 5—5 and 6—6 shown in Fig. 1; Fig. 7 is a fragmentary view showing a modified form of the gas passageway of the burner, and Fig. 8 is a side elevation of the conventional Bunsen burner as modified to include certain features of the invention.

As is clearly shown in Figs. 1 and 2, the gas burner when of the type utilized on domestic gas stoves, is preferably made as an integral casting embodying a jet or nozzle section 1, a gas mixture chamber 2, and an air valve portion 3. The jet or nozzle section of the burner comprises an annular base portion 4 and a loose top plate 5, which provide at their meeting edges a plurality of orifices, as will be hereinafter described. The gas mixture chamber or passageway 2, conveys to the jet portion of the burner the combustible mixture of gas and air received in the usual manner from the valve portion 3 of the burner, which is of the conventional form found in gas stoves for domestic use and is of conical shape and provided on its rearward face with a pair of valve plates 6 having a central opening (not shown) for a jet from the source of gas supply and a plurality of registering openings arranged about the same and adapted to be secured in adjustment with any desired degree of opening by means of a set screw 7. It has been found that these openings may be made very large because of the efficiency of the burner and it has also been found that notwithstanding such enlarged openings the flame does not snap back.

The body of the gas and air mixture chamber or passageway, as is clearly shown in Figs. 1, 2, 5 and 6 is of irregular configuration, the interior thereof presenting a series of inclined walls alternately disposed at different angles at spaced intervals in the length of said passageway. In the form illustrated the circumferential size of the tube is not changed, but its cross-sectional shape is varied throughout its length. Thus, as is shown in Fig. 4, at a point adjacent the valve end of the device, the gas mixture passageway presents a circular cross-section, while at a point somewhat nearer the jet portion of the device the gas mixture passageway presents an elliptical cross-section, as is shown in Fig. 5, having its larger di-

ameter in a vertical direction, while at a point still somewhat closer to the jet portion of the device the gas mixture passageway presents an elliptical cross-section having its larger diameter in a horizontal direction, as is shown in Fig. 6. Thus, as the mixture of the air and gas passes from the valve end of the device to the jet portion thereof, it will be thoroughly intermixed through the cross currents set up by the irregular conformation of the interior wall of said passageway.

The particular shape of the gas and air mixture chamber may be greatly varied according to the uses to which the burner is to be put. In the form of device shown in Fig. 7, depressions 8 in the gas mixture passageway are formed longitudinally instead of transversely of said tube and are placed at different radial angles alternately so as to provide an irregular inner wall for said passageway.

The jet portion of the burner comprises, as has been indicated, an annular base portion 4, and a loose top plate 5. The annular base portion has an upstanding central flange 11, which is joined with a circumferential flange 12 by means of an integral bottom plate 13. Said bottom plate is depressed at the point where it merges with the laterally extending gas and air mixture chamber or passageway and thus provides a shallow chamber within the nozzle portion of the burner when the top plate is in position.

The central flange 11 is preferably in the form of an upwardly tapered truncated cone and, as shown in Fig. 1, is formed in octahedral shape, the sides being formed in a series of short arcs facing outwardly from the center of the device the edge thus presenting a serrated or scalloped appearance. The circumferential flange 12 is preferably inclined outwardly and upwardly and likewise has a serrated or scalloped appearance, the edge presenting a series of short arcs facing inwardly with respect to the center of the device.

The top plate 5 of the jet portion of the burner comprises an annular member having a shallow central flange 14 and a circumferential flange 15. The circumferential portion of the plate is inclined upwardly and outwardly and presents a serrated or scalloped outer circumferential edge formed of a series of short arcs facing outwardly from the center of the device. The central aperture of the top plate has an inwardly and upwardly inclined wall presenting a serrated or scalloped edge formed of a series of short arcs facing inwardly toward the center of the device. As is clearly shown in Fig. 1, when the top plate is seated about the upstanding central flange of the base the marginal arc-shaped portions of the top plate will engage with the similarly shaped portions of the base, the points of juncture of the several series of arcs on the top plate being interposed between similar points in the arc-shaped portions of the flanges of the base member. Thus, as is clearly shown in Fig. 2, the marginal surfaces of the top plate will be in close contact with the flanges of the base at the points where said arcs join in said top plate and base, respectively. Between such points of contact, as is clearly shown in Fig. 3 of the drawing, the top plate and marginal flanges will be spaced from each other providing a series of lenticular gas orifices 21 about the inner and outer circumference of the annular jet portion of the burner.

Through the construction just described there is produced a thorough mixture of the air and gas as it passes the inclined surfaces on the interior of the gas mixture passageway, and a still further mixture as it emerges from the lenticular angularly disposed orifices of the jet portion of the burner. The thorough combustion of the gas and air mixture is further assisted by the fact that the individual upstanding arc-shaped flanges forming the orifices of the jet portion of the burner have beveled outer sides 21, 22, 23, 24, respectively, and that at the meeting points of said respective arc-shaped sections there are formed vertical grooves which serve as channels through which the surrounding air is drawn during the process of combustion. This influences the height and shape of the cones of flame over the separate orifices and improves the action of the burner.

In order to support the burner in the usual manner upon a gas stove, an integral stud 16 may be secured to the under side of the jet portion of the burner at a point opposite the enlargement at one side thereof. Similar supports may be provided where desired.

It is to be understood that while the body of the burner apart from the top plate has been described as a single integral casting, it is not intended to limit the invention to such particular construction and it is contemplated that the burner may be made in separate parts and assembled, or that if desired, the gas and air mixture chamber may be of metal tubing having its sides indented to provide the interiorly inclined walls.

Other modes of applying the principle of our invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

We therefore particularly point out and distinctly claim as our invention:—

1. A gas burner comprising a tubular gas passageway, a valved intake member at one

end thereof and a jet member at the opposite end thereof, said jet member being angularly disposed with respect to said tubular gas passageway, an an inner and outer series of lenticular orifices formed in said jet member, each alternate orifice being angularly disposed with respect to its immediately adjacent orifices.

2. A gas burner comprising a tubular gas passageway, a valved intake member at one end thereof and a jet member having an annular base portion provided with inner and outer flanges in the form of a series of small arcs, the concave portions of the arcs of the respective flanges facing toward each other, and an annular top plate having inner and outer edges shaped in the form of a series of small arcs having their concave portions facing outwardly, said arc-shaped parts of said base and top plate respectively interfitting when assembled to provide two circular series of lenticular gas orifices, each alternate orifice being angularly disposed with respect to its immediately adjacent orifices.

Signed by us, this 5th day of July, 1923.

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