July 6, 1948. J. L. BREESE 2,444,494

HYDROXYLATING POT TYPE HYDROCARBON BURNER

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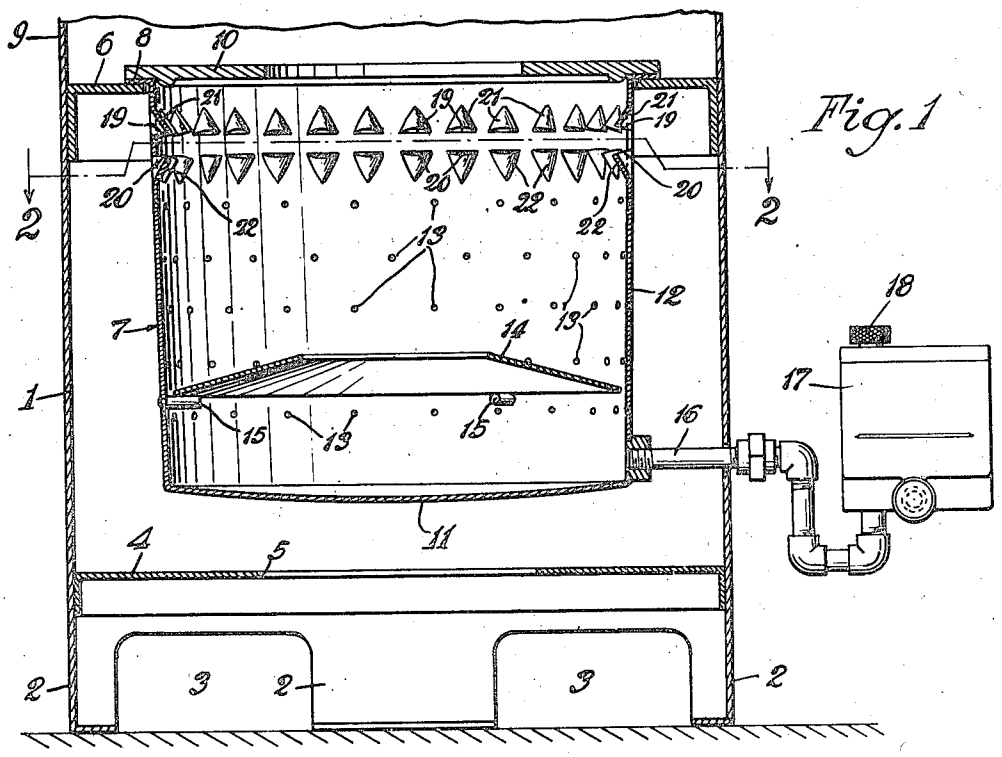

Fig. 1

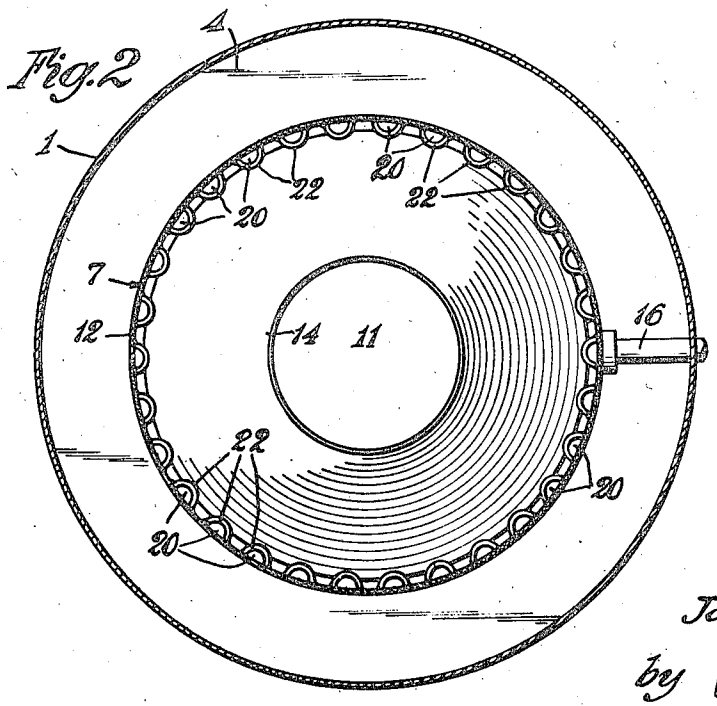

Fig. 2

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HYDROXYLATING POT TYPE HYDROCARBON BURNER

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1 Claim. (Cl. 158—91)

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My invention relates to an improvement in pot type burners and has for one purpose to provide improved means for delivering air to a liquid hydrocarbon burner. Another purpose is to provide improved means for supplying secondary air to the mixture of vaporized hydrocarbon and primary air, in a hydroxylating, pot type burner. An other purpose is to obtain silent combustion. Other purposes will appear from time to time in the course of the specification and claim.

This invention is illustrated more or less diagrammatically in the accompanying drawings, wherein:

Figure 1 is a vertical axial section of an embodiment of my invention;

Figure 2 is a section on the line 2—2 of Figure 1.

Like parts are indicated by like symbols throughout the specification and drawings.

Referring to the drawings, 1 generally indicates an outer housing having a plurality of feet 2 between which are air inflow spaces 3. The housing is partly closed by a horizontal partition 4 centrally apertured as at 5. 6 is an angle ring which receives the upper outwardly extending flange 8 of a burner pot 7. 9 indicates an upper portion of the housing 1, which serves as a combustion chamber, or a heat radiating member. Any suitable draft means, not herein shown, may be provided for disposing of the heated gases and by-products of combustion. One end of the pot is partially closed by a centrally apertured flame ring 10. The pot is shown as having a slightly concave bottom or closed end 11 and a generally cylindrical side wall 12 provided with a plurality of primary air inlet apertures 13, circumferentially spaced about the wall 12 and located at various distances above the pot bottom. Located above, or beyond the lowest of the primary air inlet apertures 13 is a centrally apertured pilot baffle ring 14 supported on any suitable pins or supports 15. A liquid fuel is supplied to the pot along the pipe 16, the rate of flow being controlled by any suitable control means generally indicated as 17. I illustrate, for example, a known type of float valve assembly with a manual control knob 18 for controlling the flow of fuel along the pipe 16. However, it will be understood that any suitable control means, manual or automatic, may be provided for varying the rate of flow of liquid fuel along the pipe 16 or for maintaining a uniform rate of flow, when a uniform rate is desired. It will be understood that whereas I have shown a vertically axised pot, the pot may be horizontally

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axised or the axis may be variously inclined in relation to the vertical.

It will be understood that in pot type burners of the present type, a liquid hydrocarbon is vaporized by the heat of combustion taking place in or above the pot. The liquid hydrocarbon is admitted to the interior of the pot and is initially partially vaporized by the heat of hydroxylation taking place in the pot. As the liquid hydrocarbon is vaporized in the pot it rises and is surrounded by a film of secondary air. The radiant heat from the ensuing complete combustion supplies the remainder of the additional heat necessary to vaporize all of the liquid hydrocarbon. There is a differentiation in action between the so-called primary air and the so-called secondary air admitted to the interior of the pot. With reference to the present structure, the air entering through the primary apertures 13, has a different action than the air entering through the secondary apertures 19 or 20. All of the oxygen in the air entering through the primary apertures 13 is fully consumed in the process of hydroxylation. The oxygen in the air entering through the secondary apertures is only partially consumed, but all of the vaporized hydrocarbons surrounded by the secondary air are entirely consumed.

When fuel is being supplied to the pot for a high fire, combustion takes place at a level defined by an imaginary surface at the confluence of the air delivered through the apertures 19 and 20 of Figure 1. The flame flows through the central aperture of the flame ring 10 and into the combustion chamber 9.

The present structure provides a particularly efficient means for supplying the secondary air and for providing a silent and efficient combustion. I employ, for example, two rows of secondary air inlets 19 and 20. Each such row, in the form of Figure 1, is shown as formed by striking in the metal of which the pot is formed to provide guides or deflectors. The deflectors 21 of the upper apertures 19 direct the air downwardly and inwardly into the pot. The deflectors 22 of the lower row of secondary air inlet apertures 20 direct the air upwardly and inwardly into the pot. Preferably the deflectors are arranged in pairs as shown in Figure 1, in such fashion that the jet of air downwardly directed from each guide 21 meets the jet of air upwardly directed by the corresponding guide 22.

It will be realized that whereas I have described and illustrated a practical and operative device, nevertheless many changes may be made in the size, shape, number and disposition of parts

without departing from the spirit of my invention. I therefore wish my drawings and description to be taken as in a broad sense illustrative or diagrammatic, rather than as a limitation to my precise showing.

The use and operation of the invention are as follows:

In pot type liquid hydrocarbon burners it is highly important to provide an adequate supply of secondary air to a primary mixture in such a fashion that combustion noises are substantially prevented. It is important that the secondary air be provided in such quantities and at such location that the final mixture will burn steadily clear back to the wall of the pot, or to some other fixed plane or surface near the point of admission of the secondary air supply. In the present structure the secondary air is supplied in impinging jets which engage at a short distance inwardly from the wall of the pot and which provide an ample supply of secondary air at the point of admission. In practice the form of Figure 1 provides quiet and efficient combustion, with an ample supply of air at the base of the jet. The impingement of the two inclined jets holds down the speed of flow of the final jet and prevents any tendency for the final jet to burn away from the inner face of the pot. Thus I obtain the advantage of the admission of the air at a relatively low rate and of the provision of an ample supply of air at the base of the secondary jet.

A primary cause of noisy combustion is the tendency of the base of the flame to leave the immediate vicinity of the orifice through which the air enters. By providing impinging jets I control or limit the speed of the air jet flow, and at the same time insure an ample supply of secondary air at the base of the flame, adjacent the inner face of the pot wall.

I claim:

In a burner pot for pot type burners, a pot member having a generally cylindrical circumferential wall and a closed end, the other end of the pot being open, said circumferential wall

having a plurality of primary air inlet apertures circumferentially spaced thereabout and located at various distances from the closed end, said pot wall having two circumferentially extending rows of secondary air inlets located adjacent the open end, the inlets of the row nearest the open end of the pot being inwardly inclined toward the closed end, the inlets of the other secondary row being inwardly inclined toward the open end, the corresponding inlets of the two rows being positioned and adapted to deliver impinging jets of air into the interior of the pot, and means for delivering a liquid fuel to the interior of the pot, each such secondary air inlet having aligned therewith a directing portion of the pot wall, offset inwardly from the side wall of the pot, the inner edges of said inwardly offset directing portions assisting in defining the inlets associated therewith.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,275,608	Schaub	Aug. 13, 1918
1,754,573	Ruegsegger	Apr. 15, 1930
1,940,879	Pickup	Dec. 26, 1933
2,187,261	Breese	Jan. 16, 1940
2,200,861	Peoples	May 14, 1940
2,212,078	Sabins	Aug. 20, 1940
2,259,743	Fletcher	Oct. 21, 1941
2,286,489	Jones	June 16, 1942
2,302,707	Pollock	Dec. 8, 1942
2,326,221	Hill	Aug. 26, 1943
2,381,744	Hayter	Aug. 7, 1945

FOREIGN PATENTS

Number	Country	Date
20,038	Australia	Aug. 15, 1935
817,368	France	May 24, 1937