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HYDROXYLATING POT TYPE BURNER

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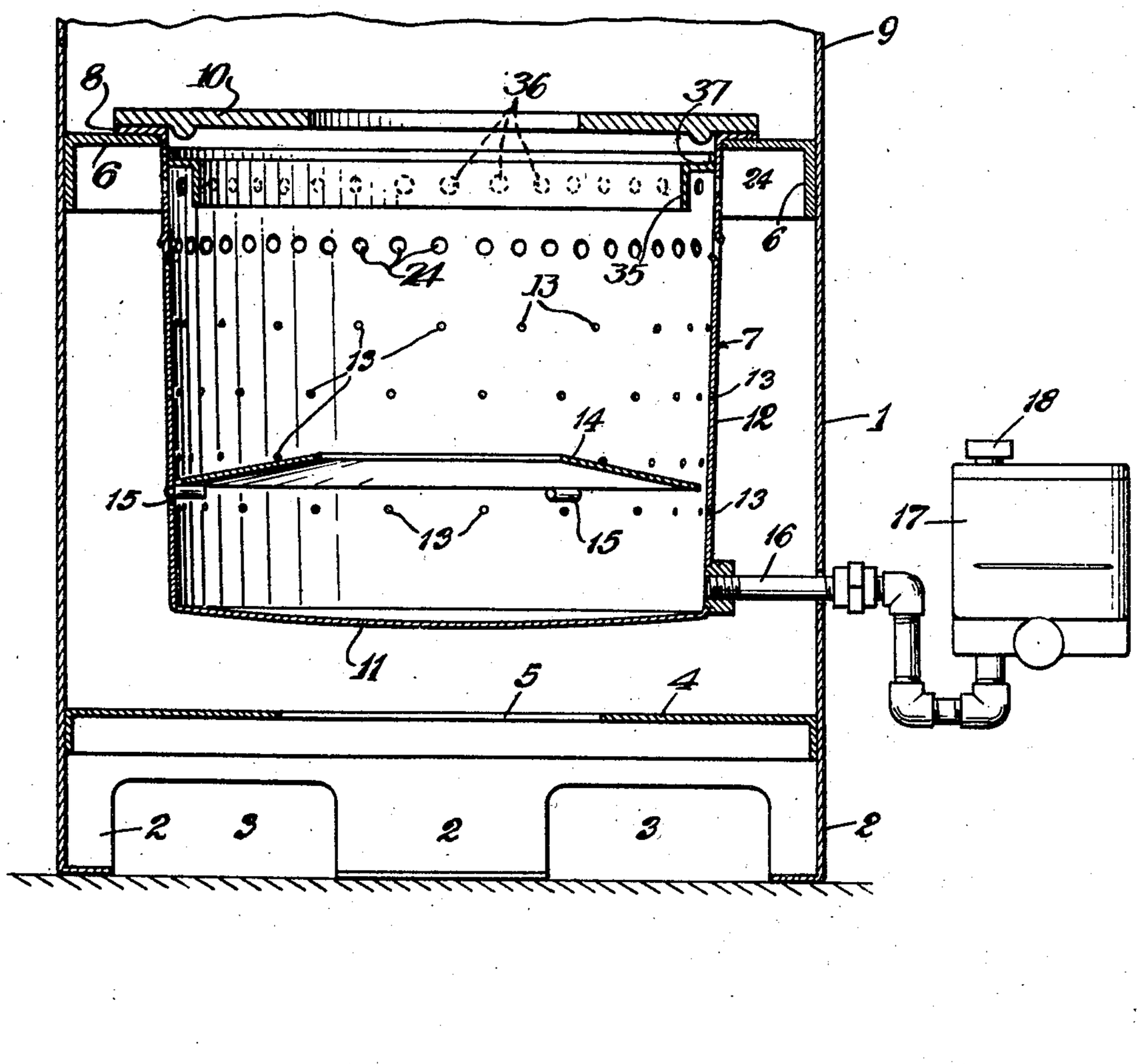

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HYDROXYLATING POT TYPE BURNER

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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.

Another purpose is to obtain silent combustion.

Other purposes will appear from time to time in the course of the specification and claim.

My invention is illustrated more or less diagrammatically in the accompanying drawings, wherein the figure is a vertical axial section of an embodiment of my invention.

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

Referring to the drawing, 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 the 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 slight 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 axised or the axis may be variously inclined in relation to the vertical.

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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 this 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 24. 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 24 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 the area of inflow of the secondary air through the apertures 24. 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 maintaining a silent and efficient combustion. I employ for example the single upwardly tilted row of secondary air inlets 24 which direct jets of air upwardly and inwardly toward the axis of the pot.

Positioned just above the secondary air inlet apertures 24, I provide an internal deflecting sleeve 35. The space between the sleeve 35 and the opposite part of the pot wall is provided with a plurality of supplemental air inlet apertures 36. Since the space is closed at the top by the outer flange 37 of the sleeve 35, this additional air is directed downwardly toward the apertures 24 in a path closely along the inner face of the wall. I may employ a smaller number of apertures 36 than of the apertures 24 or, if desired, I can employ a like number. However, the structure shown in the figure is satisfactory and practical.

It will be realized that whereas I have described and shown 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 in all the forms shown herein, there is provided quiet and efficient combustion, with an ample supply of air at the base of the jet. The impingement of the two relating inclined currents of air holds down the speed of flow of the jets and prevents any tendency for the jets 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 side wall and an open end, the side wall of the pot having a plurality of primary air inlet apertures circumferentially spaced thereabout and located at various distances from the ends of the pot and secondary air inlet apertures adjacent the open end of the pot, said apertures being larger and more closely spaced than the primary apertures, a centrally apertured flame ring partly closing the open end of the pot, a deflecting sleeve located within the pot and between the open end of the pot and the secondary air inlet apertures, the space between the upper end of said sleeve and the side wall of the pot being closed, the lower edge of said sleeve being located adjacent but slightly above said secondary air inlet apertures, the pot having additional apertures adapted to admit air to the space between said sleeve and the pot wall at a level above said secondary air inlets.

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