May 16, 1944. J. L. BREESE ET AL 2,348,721

HORIZONTAL HYDROXYLATING BURNER

Filed May 11, 1942 3 Sheets-Sheet 1

Fig. 2

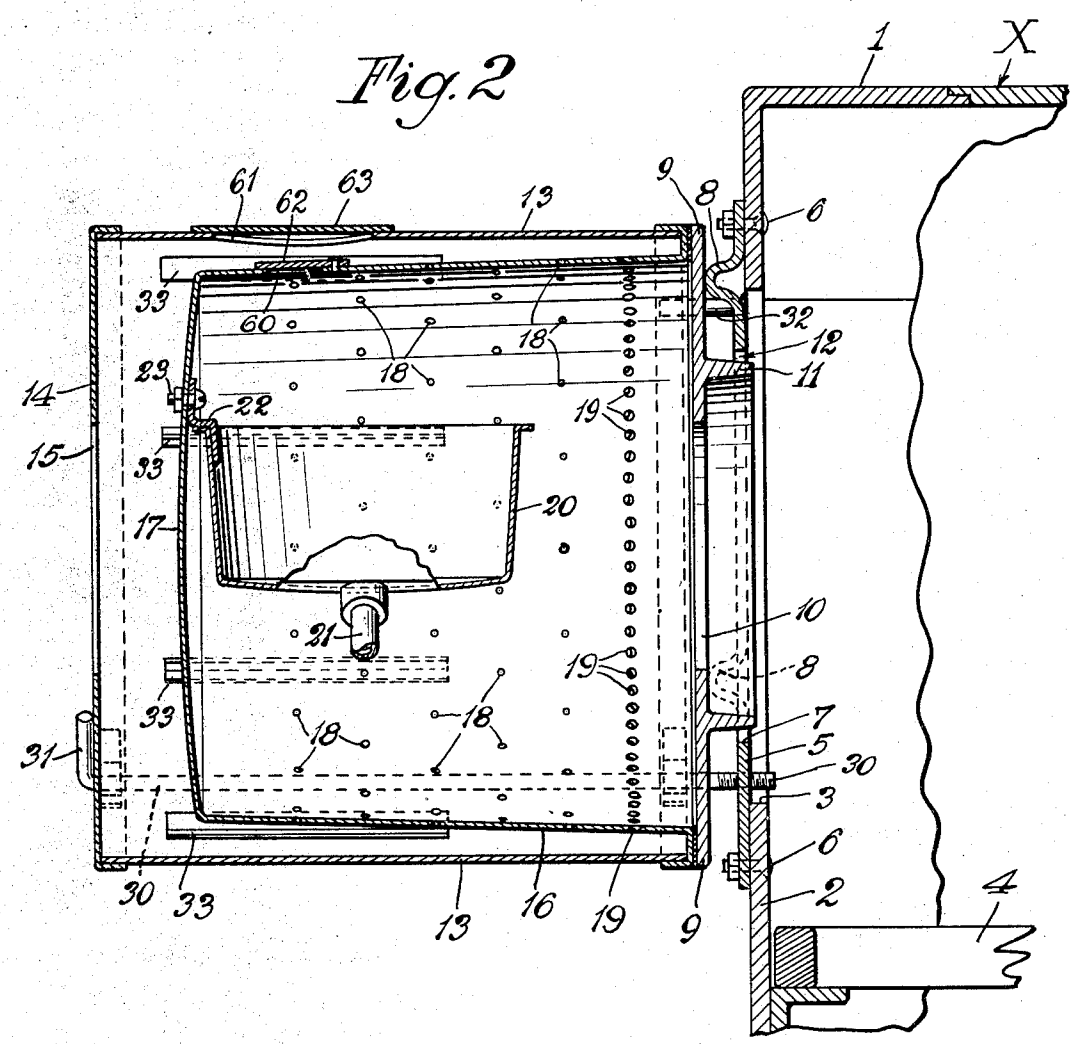
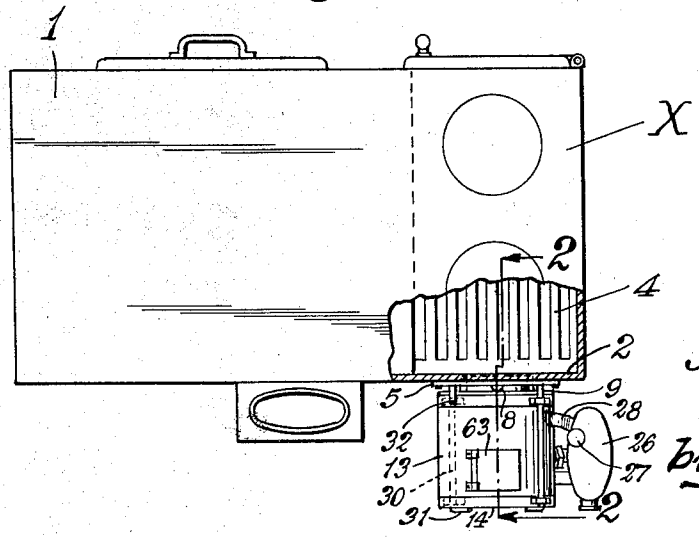


Fig. 1



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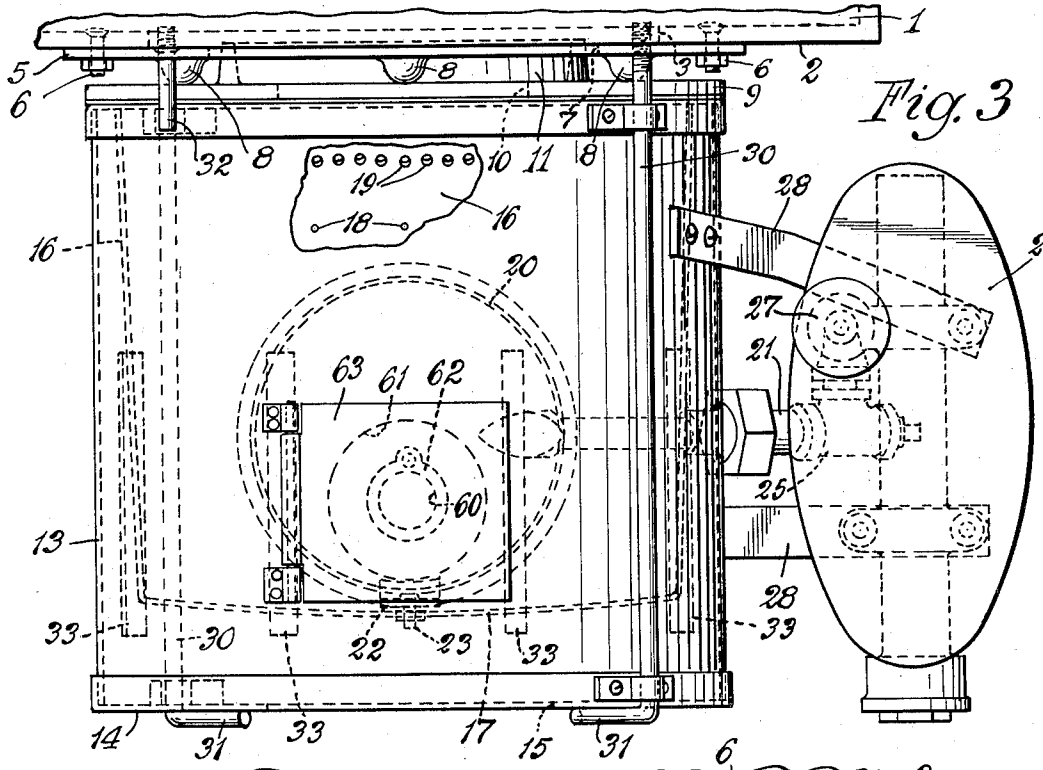


Fig. 3

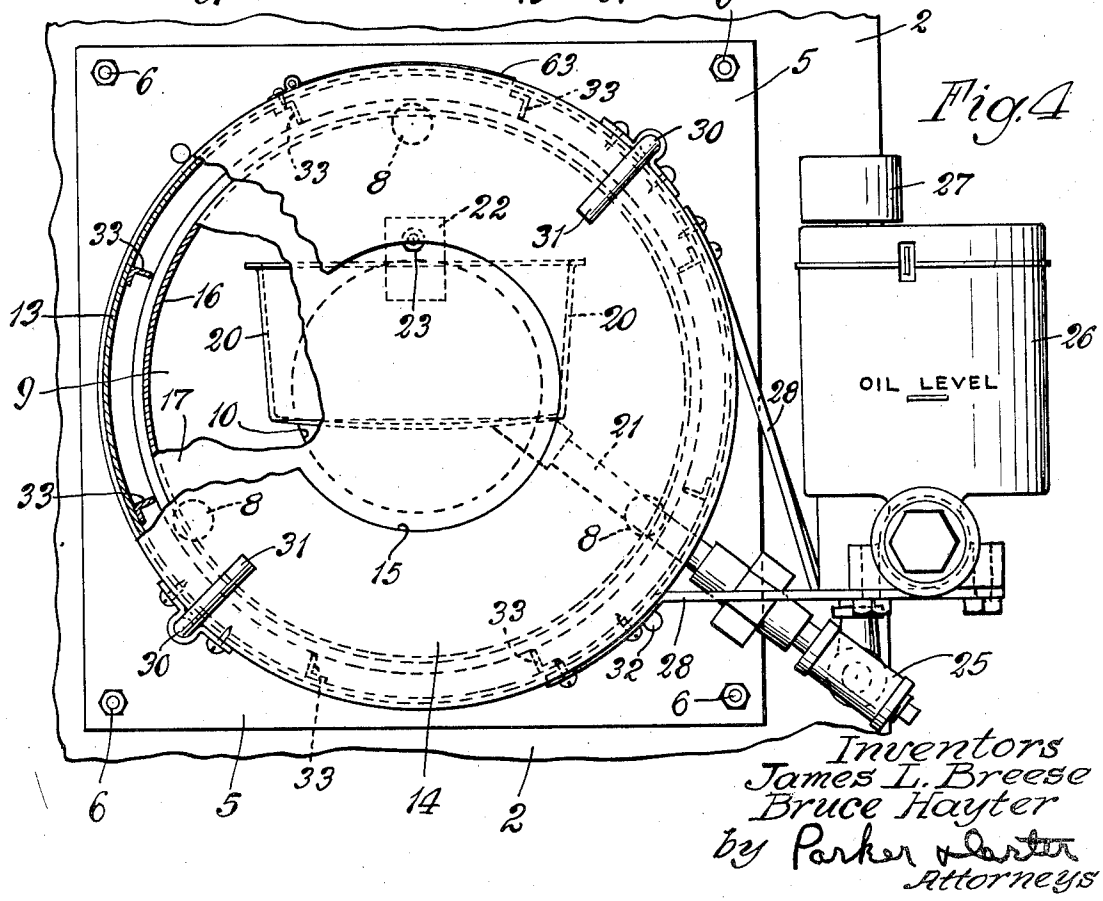


Fig. 4

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HORIZONTAL HYDROXYLATING BURNER

Filed May 11, 1942 3 Sheets-Sheet 3

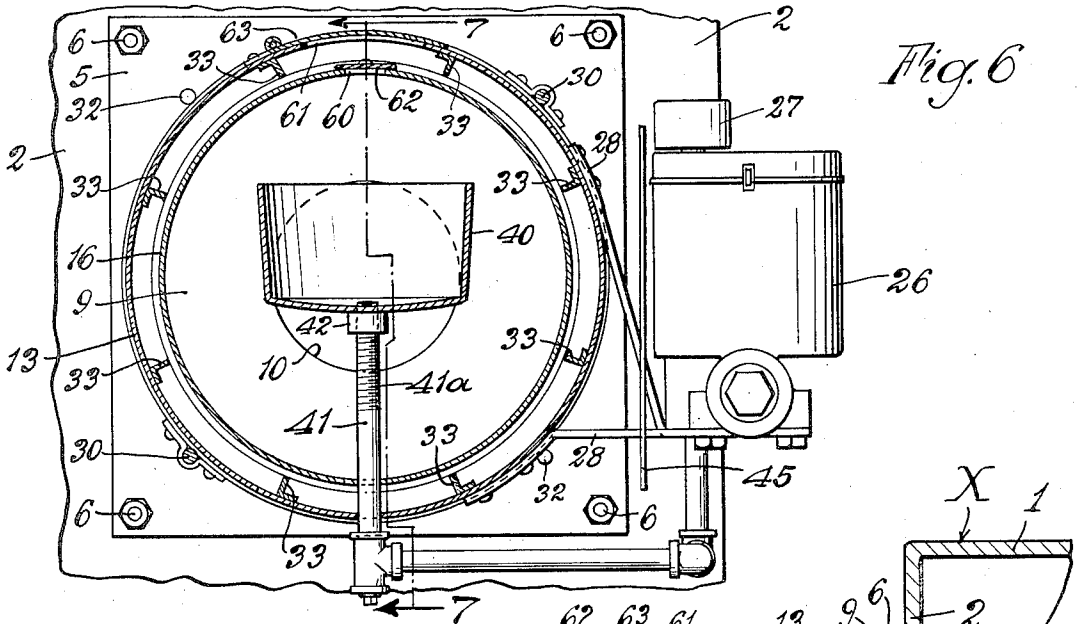


Fig. 6

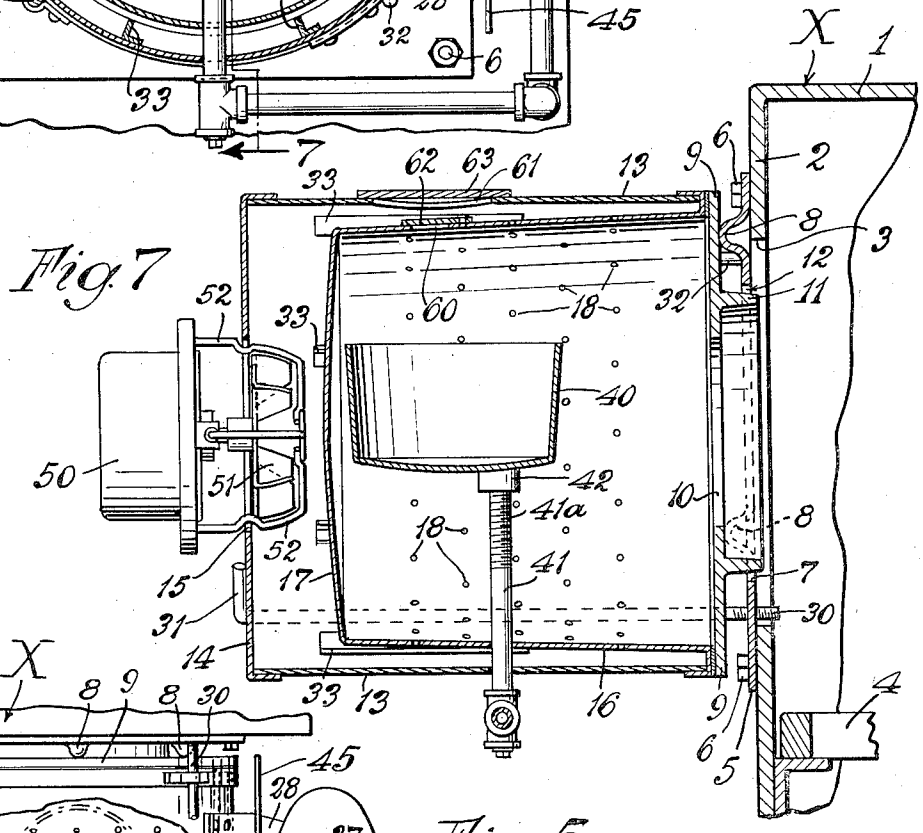


Fig. 7

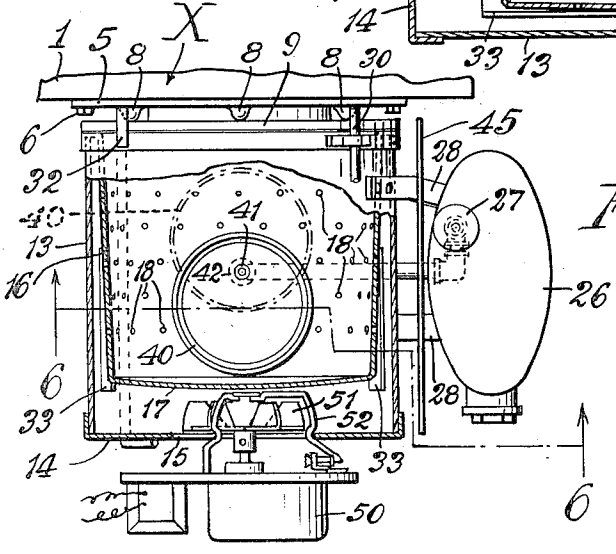


Fig. 5

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UNITED STATES PATENT OFFICE

2,348,721

HORIZONTAL HYDROXYLATING BURNER

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Application May 11, 1942, Serial No. 442,414

16 Claims. (Cl. 158—91)

Our invention relates to an improvement in oil burners and has for one purpose the provision of an oil burner which may be secured to the outside of a stove, furnace, or range.

Another purpose is the provision of a pot type burner in which the axis of the pot is horizontal or at least substantially deflected from the vertical.

Another purpose is the provision of an improved pot type burner in which the pot is employed to control the inflow of air and separate means are employed for receiving the fuel to be vaporized by the heat of combustion in the pot.

Another purpose is the provision of a burner which may be readily applied to and removed from heaters, stoves, or the like.

Another purpose is the provision of a burner in which a liquid fuel is delivered to a vaporizing element which is preferably open or partially open, and which is substantially surrounded by and preferably spaced from a vaporizing housing or shell.

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

We illustrate our invention more or less diagrammatically in the accompanying drawings, wherein:

Fig. 1 is a plan view of our burner as applied to a cook stove;

Fig. 2 is a vertical section on a larger scale, taken along the line 2—2 of Figure 1;

Fig. 3 is a top plan view of the structure shown in Fig. 2;

Fig. 4 is an end elevation with parts in vertical section;

Fig. 5 is a plan view on a smaller scale, with parts in horizontal section, of a modified form of the device;

Fig. 6 is a section on an enlarged scale along the line 6—6 of Fig. 5; and

Fig. 7 is a section along the line 7—7 of Fig. 6.

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

It will be understood that, whereas the invention is shown as applied to a cook stove, it may be applied to any other suitable heating unit, such as a furnace or a space heater.

Referring to the drawings, 1 generally indicates a heater to which the burner is applied. 2 is any suitable front member of such a heater, with an inlet aperture 3. 4 indicates grate bars of a conventional cook stove to which the burner is applied, but the bars have no function when our heater is used, and may be removed. 5 is a base or supporting plate, which may be secured to the front member 2 of the stove by any suitable means, for example the bolts 6. The plate 5 is centrally apertured as at 7, and this aperture for convenience may be circular and of smaller diameter than the aperture 3 in the stove. The plate 5 is provided with any suitable spacing means, for example lugs 8. Against these is drawn a burner proper which includes the abutting flame ring 9, herein shown as having a central flame aperture 10 of substantially smaller diameter than the aperture 7 of the plate 5.

11 is an inwardly extending annular flange spaced inwardly somewhat within the aperture 7 to provide an air inlet ring or clearance 12. Associated with the flame ring 9 is an outer cylinder 13, with its end 14 and air inlet aperture 15. 16 is a burner pot with an end 17 and a generally cylindrical side wall formed with a plurality of primary air inlet apertures 18 located at various distances from the end 17. If desired, the end 17 may also have air inlet apertures. Any suitable means for admitting secondary air may be employed, but we illustrate a single row of secondary air inlets 19 which are inwardly tilted toward the open end of the pot. Also, the clearance or gap 12 may be used to admit secondary air.

20 is a vaporizing pan herein shown as open topped. 21 is a fuel pipe extending thereto and also adapted to serve as a support therefor, although the pan may be additionally supported or centered by a connection with the side or bottom of the pot. We illustrate for example in Fig. 2 a clip 22, which may be welded or otherwise secured to the pan 20 and may be welded or bolted, as at 23, to the pot bottom 17. The fuel pipe 21 is shown as extending to a T-connection 25, by which it is connected to any suitable float chamber or other fuel control device, indicated at 26.

The rate of flow may be controlled for example by the exterior manual element 27, although it will be understood that the control may be automatically maintained as desired. Any suitable means not herein shown in detail may be employed for delivering fuel from a suitable source to the chamber 26, and a float valve or other suitable means may be employed for maintaining a predetermined oil level within the chamber 26. The chamber 26 and its associated parts may be mounted upon the outer member 13, for example by brackets 28. It will be under-

stood, of course, that the control chamber 26 may be otherwise supported, but it is advantageous that the entire unit be mounted on or supported, directly or indirectly, upon the heater unit or upon the plate 5, so that the entire structure may be unitarily withdrawn from the stove. Any convenient means for securing the structure to the stove may be employed, but we illustrate for example tie rods 30, screw threaded to the plate 5 and provided with upturned locking ends 31, abutting against the bottom 14 of the outer cylinder. Aligning or centering studs 32, in addition to the tie rods, may be provided.

It will be understood that any suitable means for supplying air under pressure may be employed. As shown in Fig. 5 and following, we illustrate a preferably removable booster motor and fan unit, and it will be understood that such a unit may be inserted through or positioned in the aperture 15, as in the form of Fig. 2. Longitudinal vanes 33 are provided in the space between the cylinder 13 and the pot 16 to assist in directing air longitudinally through said space and for preventing eddy currents.

In the form of Fig. 5 and following, the vaporizing pan 40 is mounted on a generally vertical oil pipe 41, which extends up through the bottom of the heater unit. The pan 40 is provided with an eccentric hub 42, which is mounted upon the upper end of the pipe 41. It will be understood that by varying the position of the pan 40 in relation to the fuel pipe 41 the position of the pan may be varied. As will be clear from Fig. 5, it may be located adjacent the bottom 17 of the pot, or may be positioned substantially nearer the flame aperture 10. It will be observed also that in the pot as shown in Fig. 7 the secondary air inlet apertures 19 are omitted, and the gap 12 is relied upon to provide whatever secondary air is necessary. It will be understood also that, if desired, the lip or ring 11 may be omitted in order to permit the secondary air to flow more directly inwardly toward the mixture passing from the pot.

In the form of Fig. 6, a shield 45 is interposed between the control or float chamber 26 and the heater, and it will be understood that a similar shield may, if desired, be employed in connection with the form of Fig. 2 and following.

The motor fan unit, including the motor housing 50, a fan 51, and a securing clip 52, is illustrated in Figs. 5 and 7. Any suitable conductive connection may be provided, and it will be understood that when the fan 51 is in motion, air under pressure is drawn through the aperture 15 into the space between the pot and the outer cylinder 13, and the air pressure is thereby increased.

The fuel pipe 41 is illustrated as screw threaded throughout a substantial portion of its length, as at 41*a*, and it will be understood that it may be cut to any desired length to permit a variation in height of the cup or pan 40. Members 41 of varying length may be substituted.

In both forms of the device we provide any suitable access holes for initially lighting the fuel in the vaporizing pan 40. We illustrate for example aligned apertures 60 and 61 in the pot 16, and the outer cylinder 13, and these may be provided with any suitable removable shutters or closures 62 and 63, hinged or pivoted for ready opening and closing.

In the operation of the device and assuming that the user wishes to initiate combustion, a supply of fuel is admitted to the pan 40, and it may be ignited by dropping a match into the pan. When minimum combustion is desired, the motor and fan unit is removed or left switched off. Once combustion is initiated, the primary air admitted through the apertures 18 mixes with the hydrocarbon vaporized by the heat of combustion to form a primary mixture. This primary mixture circulates toward the flame aperture 10. If the fuel supply is kept to a minimum, the apertures 18 will admit also sufficient air for the secondary air supply, and the completed mixture will burn within the pot not far from the top of the pan 40. When the fuel supply is increased, the apertures 18 provide primary air for the mixture, and the secondary air to complete the mixture is delivered either through the apertures 19 of the form of Fig. 2, or through the gap 12 between the members 5 and 11. The amount of fuel which can be vaporized and burned can be increased by the employment of means for increasing the air pressure or air passage through the device, and the practical means for that purpose is the motor and fan unit shown in Figs. 5 and 7. When full air pressure is used in conection with maximum fuel oil delivery, a blast of flame extends generally horizontally into the stove, and in practice is of sufficient length fully to heat the stove compartment illustrated at "X" in Fig. 1.

It will be observed that the primary air is admitted all the way around the vaporizing pan or vessel 40 both above and below it. In the forms of the device herein shown, the bottom 17 is left unbroken, but it will be understood that air may, if desired, be admitted through the bottom. It will be observed that we provide a vaporizing vessel subjected to the heat of combustion, which is entirely surrounded by means for admitting primary air. Preferably an open topped vessel is used, but it may in some circumstances be convenient to use a vessel the top of which is partially covered. While the axis of the pot may be varied, or, in other words, the axis along which the air is delivered and the flame is directed, we find it advantageous in many practical installations to provide a pot the axis of which is generally horizontal or generally parallel with the surface of the oil being vaporized in the pan 40.

It will be realized that, whereas we 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 our invention. We therefore wish that the description and drawings be taken as in a broad sense illustrative or diagrammatic, rather than as a limitation to the precise showing.

We claim:

1. In combination, a burner assembly including an apertured base plate adapted to be secured to the front of a stove or furnace over an aperture therein, and a burner mounted on said plate and including a housing, a burner pot having a mouth and positioned in spaced relation within said housing, a flame ring partly closing the mouth of said burner pot and apertured in alignment with the aperture of the base plate, a fuel vaporizing pan positioned within said pot, a fuel conduit extending through said housing and pot to said pan, level controlling means for the fuel within said pan mounted upon said outer housing and means for admitting air to the space within said outer housing and into said pot.

2. In combination, a burner assembly includ-

ing an apertured base plate adapted to be secured to the front of a stove or furnace over an aperture therein, and a burner mounted on said plate and including a housing, a burner pot having a mouth and positioned in spaced relation within said housing, a flame ring partly closing the mouth of said burner pot and apertured in alignment with the aperture of the base plate, a fuel vaporizing pan positioned within said pot, means for admitting air through said housing and into said pot and means for delivering a liquid fuel to said pan.

3. In combination, a burner assembly including an apertured base plate adapted to be secured to the front of a stove or furnace over an aperture therein, and a burner mounted on said plate and including a housing, a burner pot having a perforated side wall and a mouth and positioned in spaced relation within said housing, a flame ring partly closing the mouth of said burner pot and apertured in alignment with the aperture of the base plate, a fuel vaporizing pan positioned within said pot, means for delivering a liquid fuel thereto, and means for delivering air under pressure to the space between said housing and said burner pot for passage through the perforated side wall of the pot into proximity to the vaporizing pan.

4. In a horizontal, pot type hydroxylating burner, in combination with a heater structure having a substantially vertical wall with a flame admitting aperture therein, a burner pot having an outer end and an open inner end, a centrally apertured flame ring partially closing the open inner end of the pot, the central aperture of said flame ring being adjacent to and axially aligned with the flame admitting aperture of the heater structure, the wall of said pot having a plurality of primary air inlet apertures distributed circumferentially about the pot and located at various distances from the outer end of the pot, means providing for the admission of secondary air adjacent to the open inner end of the pot, an open topped vaporizing cup located within the pot, means for delivering a liquid fuel thereto, and an outer housing surrounding the pot in spaced relation, said outer housing being apertured to permit the admission of air to the space between the housing and pot.

5. In a horizontal, pot type hydroxylating burner, in combination with a heater structure having a substantially vertical wall with a flame admitting aperture therein, a burner pot having an outer end and an open inner end, a centrally apertured flame ring partially closing the open inner end of the pot, the central aperture of said flame ring being adjacent to an axially aligned with the flame admitting aperture of the heater structure, the wall of said pot having a plurality of primary air inlet apertures distributed circumferentially about the pot and located at various distances from the outer end of the pot, means providing for the admission of secondary air adjacent to the open inner end of the pot, an open topped vaporizing cup located within the pot, means for delivering a liquid fuel thereto, said cup being located within the pot, intermediate the outer end of the pot and the area of admission of the secondary air, and an outer housing surrounding and spaced from the pot, said outer housing being apertured to permit the admission of air to the space between the housing and pot.

6. In a horizontal, pot type hydroxylating burner, in combination with a heater structure having a side wall with a flame admitting aperture therein, a burner pot having an outer end and an open inner end, a centrally apertured flame ring partially closing the open inner end of the pot, the central aperture of said flame ring being adjacent to and axially aligned with the flame admitting aperture of the heater structure, the wall of said pot having a plurality of primary air inlet apertures distributed circumferentially about the pot and located at various distances from the outer end of the pot, means providing the admission of secondary air adjacent to the open inner end of the pot, an open topped vaporizing cup located within the pot, means for delivering a liquid fuel thereto, an outer housing surrounding and spaced from the pot, said outer housing being apertured to permit the admission of air to the space between the housing and pot, the pot having a laterally directed part fitted between the housing and the flame ring to be clamped thereby and unitary means for securing the pot, the outer housing, and the flame ring in fixed operative relation to the heater structure.

7. In a horizontal, pot type hydroxylating burner, in combination with a heater structure having a side wall with a flame admitting aperture therein, a burner pot having an outer end and an open inner end, a centrally apertured flame ring partially closing the open inner end of the pot, the central aperture of said flame ring being adjacent to and axially aligned with the flame admitting aperture of the heater structure, the wall of said pot having a plurality of primary air inlet apertures distributed circumferentially about the pot and located at various distances from the outer end of the pot, means providing for the admission of secondary air adjacent to the open inner end of the pot, and an open topped vaporizing cup located within the pot, means for delivering a liquid fuel thereto, an outer housing surrounding and spaced from the pot, said outer housing being apertured to permit the admission of air to the space between the housing and pot, said open topped cup having a closed bottom and a circumferential side wall, the upper edge of said side wall being located substantially closer to the overlying portion of the pot than to the underlying portion of the pot.

8. In a horizontal pot type hydroxylating burner, a burner pot having an open end and a circumferential wall, said wall having a plurality of primary air inlet apertures distributed circumferentially thereabout and longitudinally therealong, an open topped vaporizing cup located within said pot and intermediate the ends thereof, means for delivering a liquid fuel to the interior of said cup and means for controlling the level of the liquid fuel within said cup, said cup being spaced inwardly from the wall of said pot.

9. In a horizontal pot type hydroxylating burner, a burner pot having an open end and a circumferential wall, said wall having a plurality of primary air inlet apertures distributed circumferentially thereabout and longitudinally therealong, an open topped vaporizing cup located within said pot and intermediate the ends thereof, means for delivering a liquid fuel to the interior of said cup and means for controlling the level of the liquid fuel within said cup, said cup being spaced inwardly from the wall of said pot, and a centrally apertured flame ring partially closing the open end of the pot, the pot

wall having a plurality of secondary air inlet apertures located circumferentially thereabout between the flame ring and the cup.

10. In a horizontal pot type hydroxylating burner, a generally horizontally axised burner pot, having an open outlet end, a circumferential wall having a plurality of small primary air inlet apertures adapted to admit relatively small jets of air to the interior of the pot, an open topped fuel vaporizing cup mounted within the pot and spaced away from said wall, means for supplying a liquid fuel to the interior of the cup, and means for supplying secondary air to the mixture of primary air and vaporized fuel adjacent the outlet end of the pot.

11. In combination, in a hyroxylating burner, a generally horizontally axised burner pot, having a circumferential wall provided with a plurality of scattered primary air inlet apertures adapted to admit relatively small jets of air to the interior of the pot, an open topped fuel vaporizing cup mounted within the pot and spaced away from said wall, means for supplying a liquid fuel to the interior of the cup, said pot having an open end adapted for communication with a heater space, some of said primary air inlet apertures being located at levels above the top of the cup and others at levels below the top of the cup.

12. In combination, in a hydroxylating burner, a generally horizontally axised burner pot, having a circumferential wall provided with a plurality of scattered primary air inlet apertures adapted to admit relatively small jets of air to the interior of the pot, an open topped fuel vaporizing cup mounted within the pot and spaced away from said wall, means for supplying a liquid fuel to the interior of the cup, said pot having an open end adapted for communication with a heater space, said circumferential wall being provided, adjacent said open end, with a plurality of secondary air inlet apertures more closely spaced than the primary air inlet apertures and of greater diameter.

13. In combination, in a hydroxylating burner, a generally horizontally axised burner pot, having a circumferential wall provided with a plurality of scattered primary air inlet apertures adapted to admit relatively small jets of air to the interior of the pot, an open topped fuel vaporizing cup mounted within the pot and spaced away from said wall, means for supplying a liquid fuel to the interior of the cup, said pot having an open end adapted for communication with a heater space, and a centrally apertured flame ring partially closing the open end of the pot.

14. In a horizontal pot type hydroxylating burner, a burner pot having an open end and a circumferential wall, said wall having a plurality of primary air inlet apertures distributed circumferentially thereabout and longitudinally therealong, an open topped vaporizing cup located within said pot and intermediate the ends thereof, means for delivering a liquid fuel to the interior of said cup, said cup being spaced inwardly from the wall of the pot with its top located above the axis of the pot.

15. In combination, a horizontally axised burner pot having a flame opening at one end, the wall of said burner pot being provided with a plurality of spaced apertures for the admission of air thereinto, a fuel vaporizing pan located within said pot rearwardly of said flame opening and generally horizontally aligned with said flame opening, and means for positioning said pan within the pot at different distances from said flame opening.

16. In a horizontal pot type hydroxylating burner, a generally horizontally axised burner pot, having an open outlet end, a circumferential wall having a plurality of small primary air inlet apertures adapted to admit relatively small jets of air to the interior of the pot, an open topped fuel vaporizing cup mounted within the pot and spaced away from said wall, means for supplying a liquid fuel to the interior of the cup, means for supplying secondary air to the mixture of primary air and vaporized fuel adjacent the outlet end of the pot, an outer housing surrounding said pot, and means for delivering air under pressure to the interior of said housing and the space about said pot.

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