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LIQUID FUEL BURNER

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Fig. 1.

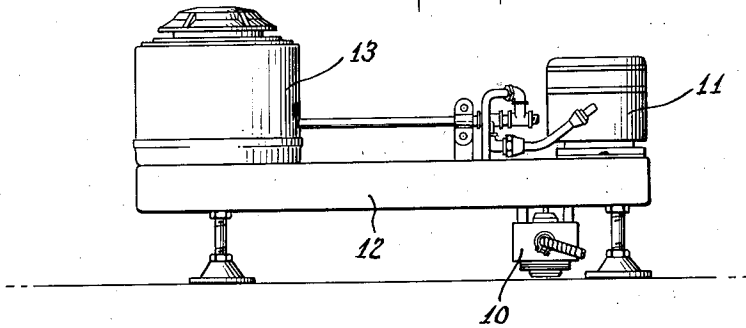


Fig. 2.

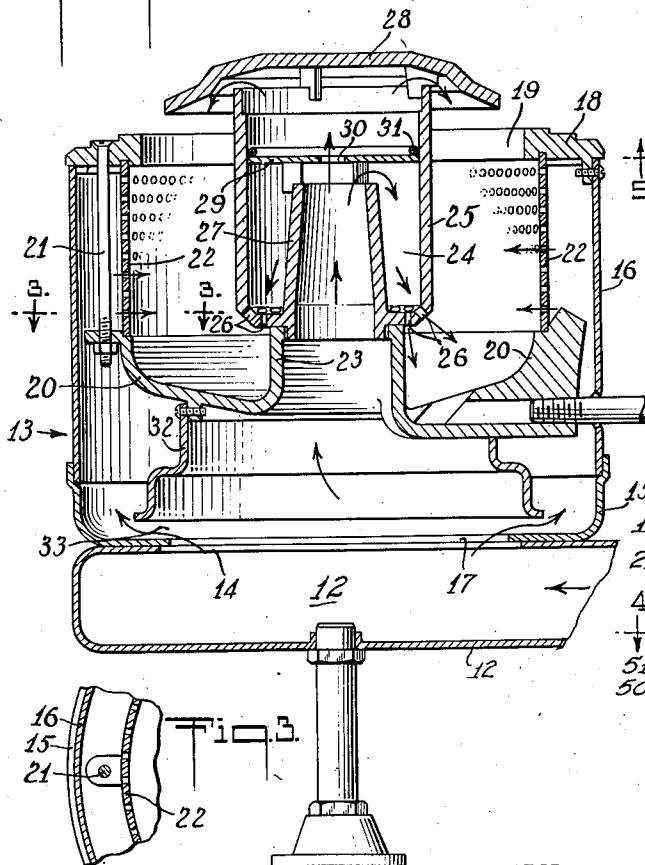
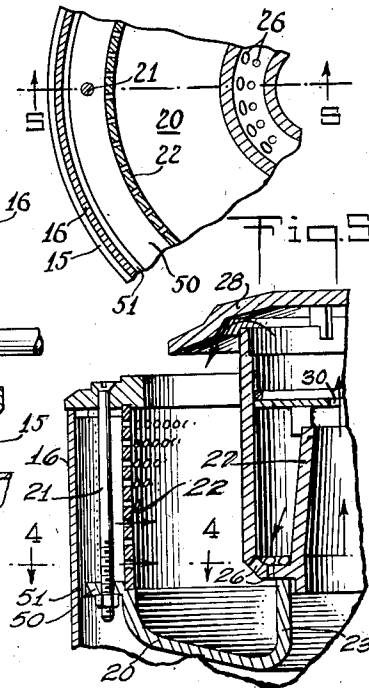


Fig. 4.



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LIQUID FUEL BURNER

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8 Claims. (Cl. 158—91)

The present invention relates to liquid fuel burners, and is more particularly directed toward pot type burners supplied with liquid fuel for vaporization in the pot and employing a blower to supply air for combustion.

In prior designs of vaporizing pot burners of the type referred to, the vaporizing pot, together with the outer perforated sleeve and the central air distributor, are received within an outer housing into which the blower delivers the air, and, owing to the configuration of the interior of the burner, a higher air pressure was available at the perforated sleeve than in the central air distributor, so that the jets from the central air distributor were relatively weaker than the jets from the sleeve. The ratio of pressure was of the order of 2 to 1.

The present invention contemplates improvements in the type of burner above referred to wherein means is provided for baffling the air flow to the outside of the perforated sleeve, so that the air pressure on the sleeve is substantially less than the air pressure on the central air distributor. It has been found that when the air flow to the outer sleeve is restricted by such baffling means there is improved combustion in the pot during high fire and also during low fire in that there is improvement in the consumption of fuel residues.

The present invention also contemplates improvements in such vaporizing pot type burners according to which the central air distributor is shaped so that the air passing to the openings in the central air distributor is caused to sweep over a greater amount of heated surface so that hotter air is delivered to the central jets.

Other and further improvements will be apparent as the description proceeds.

The accompanying drawing shows, for purposes of illustrating the present invention two embodiments in which the invention may take form, it being understood that the drawing is illustrative of the invention rather than limiting the same.

In this drawing:

Figure 1 is a side elevational view of a liquid fuel burner with controls and blower;

Figure 2 is an enlarged sectional view through the burner;

Figure 3 is a fragmentary horizontal sectional view on the line 3—3 of Figure 2;

Figure 4 is a fragmentary horizontal sectional view showing a modified form of construction, and taken on line 4—4 of Figure 5; and

Figure 5 is a fragmentary vertical sectional view taken on the line 5—5 of Figure 4.

In Figure 1 the motor operated blower for the burner is indicated at 10, the constant level and metering valve at 11, the conduit for supplying air to the burner at 12 and the burner structure at 13.

The air conduit 12 has an opening at 14 under the center of the burner 13. The burner 13 is provided with an outer casing having a lower stamping 15 welded to a cylindrical portion 16. The stamping 15 has a large opening 17. The cylindrical portion 16 supports a ring 18 having an opening 19 somewhat smaller than the outside of the housing.

An annular vaporizer or pot 20 is supported below the ring 18 by bolts 21 and a perforated sleeve 22 is placed between the pot and the upper ring. The vaporizer or pot 20 is annular and has an upwardly extending inner wall indicated at 23 which supports a central air distributor 24 having an outer cylindrical wall 25, a number of openings indicated at 26 for delivering air down into the pot, and an inner chimney or stack 27. The central air distributor supports a flame spreader 28 spaced above its upper edge and also carries a baffle ring 29 spaced above the top of the stack 27. This baffle ring has a small central opening 30 through which air passes toward the flame spreader and is held in place by a split ring 31. The vaporizer or pot 20 also supports a baffle 32 which, as here shown, extends from the bottom of the vaporizer nearly to the bottom of the housing, so that a narrow restricted opening 33 is provided for all air which is to pass outside the vaporizer and to the perforated sleeve.

With an arrangement such as illustrated in Figures 2 and 3 and the blower operating, but the burner not lighted, the flow of air to the outside sleeve is very substantially reduced with a result that the pressure of the air outside the sleeve may be in the neighborhood of .03 inch of water. At the same time the pressure in the central air distributor is in the neighborhood of .15 inch of water. As a result of this redistribution of the air pressures a much greater portion of the air is forced through the openings 26 in the central air distributor and into the inner part of the pot and less air is available for entering the combustion chamber through the openings in the perforated sleeve 22. This redistribution of the air pressures strengthens the inner jets and results in substantially improved combustion over that obtained by a structure which is identical except for the presence of the diaphragm or baffling means between the vaporizer and the walls of the housing. It can operate much longer pe-

riods at continuous high fire before carbon accumulates to impair combustion.

In the arrangement shown in Figures 4 and 5 the vaporizer 20 carries a ring 50 below the sleeve 22 and extending nearly out to the wall 16 of the housing, leaving a gap 51 whereby a restricted amount of air may pass up to supply the perforated sleeve. The ring is here shown as a flange on the vaporizer but it may be a separate piece.

The present application relates to improvements in liquid fuel burners of the type shown in my application Serial No. 299,943 filed October 18, 1939, now Patent No. 2,290,544 granted July 21, 1942, and shown and claimed in my application for patent Serial No. 377,613 filed February 6, 1941, as a continuation in part of said application Serial No. 299,943.

Since it is obvious that the invention may be embodied in other forms and constructions within the scope of the claims, I wish it to be understood that the particular forms shown are but a few of these forms, and various modifications and changes being possible, I do not otherwise limit myself in any way with respect thereto.

What is claimed is:

1. A pot type burner having an air supplying conduit with a horizontal opening, a source of forced draft for the conduit whereby air is blown up through the opening, an annular vaporizing pot spaced from and above the conduit opening, a perforated sleeve above the outer periphery of the pot, a central air distributor above the inner periphery of the pot, the sleeve and central air distributor forming an annular combustion chamber immediately above the pot, the central air distributor being provided with holes for directing air downwardly into the pot, an enclosure about the sleeve and pot and extending to the conduit opening so that air may be delivered into the enclosure for supplying air to the central air distributor and to the outside of the sleeve, and means to baffle the air flow to the outside of the sleeve so that the air pressure on the outside of the sleeve is substantially less than the air pressure in the central air distributor to thereby reduce the velocity of air flowing through the sleeve and into the combustion chamber.

2. A burner as in claim 1, wherein the bottom of the enclosure has a large opening and the baffle means includes a tubular member extending downwardly from the bottom of the vaporizer towards the opening in the enclosure bottom to provide a restricted passageway.

3. A burner as in claim 1, wherein the bottom of the enclosure has a large opening and the baffle means includes a bell shaped tubular member extending downwardly from the bottom of the vaporizer and having its mouth spaced above the opening in the enclosure bottom to provide a restricted passageway.

4. A burner as in claim 1, wherein the baffle means includes a ring extending out from the top of the pot nearly to the inside wall of the enclosure.

5. A forced draft operated pot type liquid fuel

burner having a cylindrical housing having an opening at the bottom adapted to receive said forced draft, a ring partly closing the top of the housing, an annular vaporizing pot supported below the ring, a perforated sleeve extending between the ring and pot and spaced from the housing wall, a central air distributor above the inner periphery of the pot for forming an annular combustion chamber immediately above the pot, the central air distributor receiving air through the central opening in the pot and having air discharge openings above the inner portion of the pot, and a baffle intermediate the pot and housing for restricting the air flow into the space between the housing and sleeve so that the air pressure maintained therein is substantially lower than the air pressure maintained at the central air distributor openings.

6. An oil burner comprising an annular vaporizer adapted to be heated when the burner is in operation and having an upwardly and outwardly sloping bottom so that the pool depth is greatest near the axis and negligible at its edge, means for directing air jets substantially vertically downwardly against the deepest portion of the pool where combustion is initiated, the air jets being deflected radially outward across the pool surface, so that the mixed air and vapors pass upwardly past the hot surface of the vaporizer beyond the edge of the pool, means for directing air jets inwardly across the top of the vaporizer to intercept and mix with the outwardly moving air and vapors, a common source of air under pressure above atmospheric for all said jets, and static means in the path of the air flowing to the inwardly directed jets for reducing its pressure.

7. A forced draft operated pot type liquid fuel burner having a cylindrical housing having an opening at the bottom adapted to receive said forced draft, a ring partly closing the top of the housing, an annular vaporizing pot supported below the ring, a perforated sleeve extending between the ring and pot and spaced from the housing wall, a central air distributor above the inner periphery of the pot for forming an annular combustion chamber immediately above the pot, the central air distributor receiving air through a central opening in the pot, and being provided with air discharge openings above the inner portion of the pot and having an outer upwardly extending wall and an inner tubular stack above the level of the openings and shorter than its outer wall, and a baffle above the top of the stack whereby the air delivered through said openings is preheated by passing up through the stack and down between the stack and outer wall.

8. A burner as in claim 7, having a flame spreader on top of the central air distributor opposite the ring and wherein the baffle has an opening to allow a predetermined portion of the air entering the stack to pass upwardly to the flame spreader.

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