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VAPORIZING TYPE LIQUID FUEL BURNER

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7 Claims. (Cl. 158—91)

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This invention relates to improvements in pot-type burners and is concerned primarily with means for simplifying the construction by which to provide a plurality of inclined ports through which air will be delivered in desired quantities to points adjacent the burner base. Such a burner will perform better in consequence, and may be used successfully with space heaters and heating plants for the heating of rooms, buildings, etc.

In the present burner the pot consists of a cylindrical body and a cup-shaped bottom section which is united thereto. In the region of overlap of the circular wall of the bottom section with the cylindrical body I provide a plurality of ports. These ports are disposed in spaced apart relation, and are desirably pitched so that the air passing through the ports will be discharged into the interior of the pot at points adjacent the bottom and in such a direction as to produce a whirling motion of the air therewithin. There is accordingly provided a means for inducing a circulation of air according to a definite plan when and as it is delivered into the burner to support the combustion of the hydrocarbon fuel therewithin.

Certain suggestive embodiments of this invention are shown in the accompanying drawing wherein—

Figure 1 is a vertical section through a space heater wherein is operatively mounted the present burner;

Fig. 2 is a view in perspective showing the cylindrical burner body separated slightly from the bottom section which is designed to be united therewith;

Fig. 3 is a fragmentary view, partly in vertical section, showing the bottom section and the adjacent portion of the burner body;

Fig. 4 which is a view similar to Fig. 2 shows an arrangement of air ports which is somewhat modified; and

Fig. 5 which is a detail in horizontal section taken in a plane where there is overlap of the body walls and bottom section, shows a modified arrangement and disposition of the air ports.

In Fig. 1 there is illustrated a space heater having a drum D which is mounted within a cabinet C in spaced relation thereto. Above a bottom 10 which is provided in the drum there is mounted a burner pot P which may be suspended in its operative position as by means of a baffle plate 11 which is affixed within the drum. A fuel pipe 12 leads from a source of supply of hydrocarbon fuel to the burner pot to connect therewith at a point close to its bottom.

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The present pot-type burner consists of a shell-like body 20 formed at its top with an out-turned flange 21 for resting upon the baffle plate 11 when the burner is suspended therefrom. In its bottom portion the body is provided with a plurality of inward crimps 22 each extending upwardly for a limited distance from its bottom edge. Each crimp constitutes a port, or a one-half part thereof, having a cross sectional area which increases toward the bottom edge of the body. Above these crimps the body is pierced with a large number of openings 23 providing primary air inlets and near the top with other more closely spaced openings 24 to provide secondary air inlets. All these openings are desirably arranged in rows according to a definite plan so as to assure an inflow of air within the burner pot in a predetermined manner.

The pot bottom section 25 comprises a base 26 having an upstanding peripheral wall 27 which is circular. The diameter of this wall 27 may be very slightly larger than that of the body wall so that one may be lapped over the other in a close fitting relationship. In the circular wall 27 I provide a plurality of outward crimps 28 which may correspond in number, spacing, and disposition to the inward crimps 22 in the body 20. The cross sectional area of these ports increases toward the top edge of the circular wall 27. It is contemplated that when the bottom section is assembled with the body the crimps of the one may lie opposite the crimps of the other so that the two together will define a plurality of elongated ports whose upper ends open upon the exterior of the burner while the lower ends of the ports open upon the interior thereof and close to its base 26. These ports, by reason of the inverse relationship of the changing cross sectional areas defined by the complementary crimps 22 and 28, are inclined inwardly (see Fig. 3), and, as shown, are pitched all in the same direction.

To assist in a correct rotative positioning of the bottom section with the body 20, a pin *a* is extended outwardly from the latter at a point near its bottom to enter a notch *b* which opens out upon the top edge of the bottom section 25. When the pin is entered within the notch (see Figs. 1 and 3) the several crimps will be in register to define therebetween the air ports which constitute a feature of this invention. In such a condition of assembly the parts may be united permanently as by welding *w* which is applied along the top edge of the bottom section (see Fig. 3).

The arrangement of ports shown in Fig. 2 may be modified to some extent, one example thereof

being indicated in Fig. 4. Here I have provided a construction exactly the same as the one already described except that certain of the ports, every other one for example, are vertically disposed instead of being pitched. The result is that the air entering through the ports is not all discharged angularly upon the base of the bottom section, but only part of the air so supplied thereto; as a result the swirl or circular motion imparted to the air as delivered to the base is reduced somewhat in velocity. Except for this one change, the construction of Fig. 4 may be the same as that of Fig. 2.

Another modification is suggested in Fig. 5. Here the ports are shown to consist in part of oppositely facing crimps 31 and 32, as already described in connection with Figs. 2 and 4, or of crimps 33 which extend inwardly from the wall of the body 20, or of crimps 34 which are extended outwardly from the circular wall of the bottom section 25. Where a single crimp only is used for a port, its cross sectional area will be somewhat reduced, unless the crimp be otherwise enlarged as suggested in Fig. 5. For many reasons it may be preferred to use a series of single crimps, or a mixture of single and double crimps, in providing the ports which lead the air into the burner pot at a point adjacent its bottom.

It will be noted that the bottom section, when lapped over the body in its bottom region, will provide therewith two confronting plies, whereas elsewhere the construction consists of one ply only. I take advantage of the two ply construction in the region of overlap to provide air ports in the simple manner hereinbefore described. As shown clearly in Fig. 3, each crimp 23 increases in depth and cross sectional area as it approaches the top edge of the circular wall 27 of the bottom section. The same is true of the crimps 22 in the body 20 except that the maximum depth and area of each is at the bottom end of the crimp. As a result, the axes of the crimps will be inclined inwardly from the vertical so that air entering through the ports will not be delivered straight downwardly. The angular direction in which the air enters the burner pot is further deflected by its impact with the rounded corner 30 where the base 26 joins with the circular wall 27. For these various reasons the currents of air which enter through the ports are so disposed as to produce a swirling movement of the air therewithin, along the base 26 so as to promote vaporization of the fuel.

I claim:

1. In a device of the class described, a pot-like container for the burning of liquid fuel, the container comprising a continuous side wall and a cup-shaped bottom having its upstanding wall lapping the side wall and joined thereto, and complementary pairs of opposed crimps in the two walls defining between each pair thereof an air port leading downwardly and inwardly from an upper point exteriorly of the container to a lower point therewithin and relatively close to the bottom thereof.

2. A pot-like container according to claim 1 in which each pair of complementary crimps is pitched to deliver air at an angle to the container bottom whereby to produce a circular motion thereof within the container.

3. In a device of the class described, a pot-like container for the burning of liquid fuel, the con-

tainer comprising a continuous side wall and a cup-shaped bottom having its upstanding wall lapping the side wall and joined thereto, and a plurality of crimps in one of the walls and complementary crimps in the other wall, the crimps in each set being extended away from each other to define therebetween an air port leading downwardly from an upper point exteriorly of the container to a lower point therewithin and relatively close to the bottom thereof.

4. In a device of the class described, a pot-like container for the burning of liquid fuel, the container comprising a continuous side wall and a cup-shaped bottom having an upwardly curved peripheral portion to which is integrally joined an upstanding wall lapping for a substantial distance the side wall of the container exteriorly thereof and joined thereto, and a plurality of crimps in one of the lapping walls opposite the other wall and extended away therefrom to provide therebetween an elongated air port leading downwardly from an upper point above the upstanding wall of the bottom and exteriorly of the container to a lower point therebelow and relatively close to the curved peripheral portion of the bottom, but spaced therefrom sufficiently to deliver into the container fresh air in spaced streams for impingement upon the container bottom at substantially its curved peripheral portion from which the upstanding wall is extended.

5. A pot-like container according to claim 4 in which the ports are pitched in the same direction to deliver air at an angle to the container bottom close to its upstanding wall whereby to produce a circular motion thereof about a common axis vertically of the container.

6. In a device of the class described, a pot-like container for the burning of liquid fuel the container comprising a continuous side wall and a cup shaped bottom having its upstanding wall lapping the side wall and joined thereto, a plurality of elongated crimps in one of the walls disposed oppositely of the other wall and extended away therefrom to define therebetween an elongated air port leading downwardly from an upper point exteriorly of the container to a lower point therewithin and having its delivery end substantially at the bottom thereof but spaced therefrom sufficiently to deliver into the container fresh air in spaced streams which impinge upon the container bottom.

7. A pot-like container according to claim 6 in which the container bottom at its periphery is upwardly curved at the point of its connection with the upstanding wall, and the delivery ends of the air ports are so arranged as to deliver into the container air streams which impinge upon the upwardly curved peripheral portion of the container bottom.

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