April 17, 1951 H. B. DONLEY 2,549,068

PILOT STRUCTURE

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Fig. 1

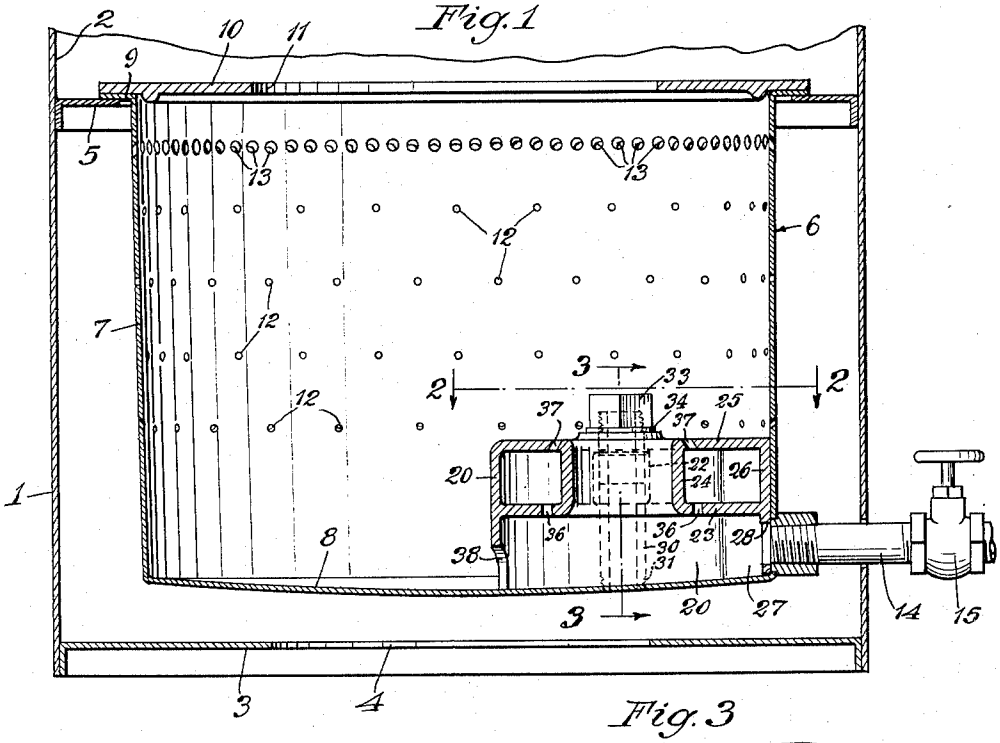


Fig. 2

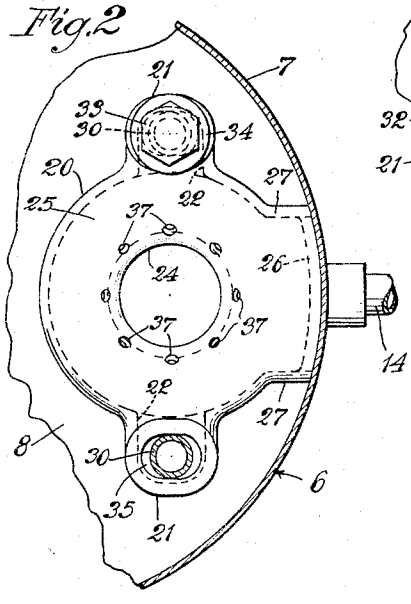
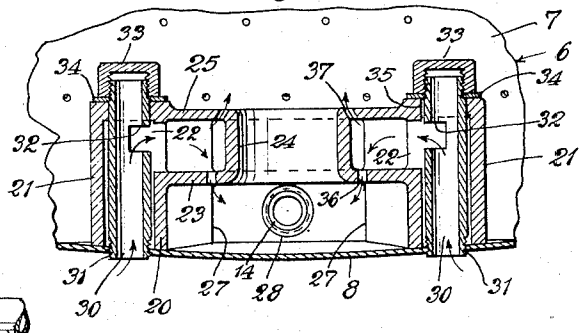


Fig. 3



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PILOT STRUCTURE

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9 Claims. (Cl. 158—91)

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My invention relates to an improvement in pilot structures for vaporizing pot type burners. One purpose is to provide a pilot structure with a minimum turn-down.

Another purpose is to provide a pilot structure which is simple and efficient.

Another purpose is to provide a pilot structure which may be readily applied to a burner pot.

Another purpose is to provide an improved means for holding a pilot structure firmly in position within the pot.

Another purpose is to provide improved air admission means for a pilot structure.

Another purpose is to provide improved combined securing and air admission means for a pilot structure.

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

I illustrate my invention more or less diagrammatically in the accompanying drawings wherein:

Figure 1 is a vertical axial section;

Figure 2 is a section on the line 2—2 of Figure 1; and

Figure 3 is a section on the line 3—3 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 or drum. It may be of any suitable form, but for convenience I prefer to make it cylindrical, and to have associated with it an upward continuation 2 which may serve as a combustion chamber or radiating member. It will be understood that any suitable flue connection, not herein shown, may be provided for it. The bottom of the housing 1 is shown as closed by a bottom wall 3 which has a central aperture 4. Any suitable supporting means may be employed for spacing the housing upwardly from the ground, or from the supporting surface, to permit air to flow inwardly below the partition 3 and upwardly through the aperture 4. 5 generally indicates an angle ring, welded or otherwise secured to the housing 2. 6 generally indicates a vaporizing burner pot, shown as including a circumferential side wall 7, an upwardly concave bottom or end wall 8, and an outwardly extending top flange 9 which rests upon the angle ring 5.

10 is any suitable flame ring, centrally apertured as at 11, which partially closes the top of the pot 6. The pot is provided with a plurality of primary air inlets 12 shown as arranged in

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a plurality of rows which extend circumferentially around the side wall of the pot. 13 indicates any suitable secondary air inlet means. I illustrate, for example, a single row of upwardly tilted secondary inlets which are both larger and more closely spaced than the primary inlets 12. 14 is a liquid fuel supply pipe or duct adapted to admit liquid fuel to the bottom 8 of the pot 6, for vaporization.

Any suitable means, not herein shown, may be employed for varying the rate of flow of liquid fuel along the pipe 14 to the pot. I may, for example, employ a conventional and well known float valve assembly, the details of which do not, of themselves, form part of the present invention, or I may employ any suitable manual control, diagrammatically illustrated as at 15 in Figure 1. It will be understood that when the burner is burning at high fire, liquid fuel is vaporized on the pot bottom and rises upwardly through the pot. It receives and is mixed with the primary air entering through the inlets 12. This air is insufficient in volume, in relation to the volume of vaporized fuel, to form a final and completely combustible mixture. However, the primary mixture, when it continues rising toward the top of the pot, receives from the secondary air inlets 13 sufficient secondary air to complete a fully combustible mixture which burns at or above the level of the inlets 13. In normal use of the device a substantial flame will extend from and above the top of the pot.

In this type of burner the provision of pilot or low float turn-down means is important. For example, it may be desirable to maintain a minimum fire without any substantial or perceptible heating effect. I illustrate a pilot structure which has substantial advantages. It includes unitary securing and air supply means which may be used in connection with a wide variety of pilot piece design. It will be understood, therefore, that the particular pilot structure herein shown may be widely varied.

Referring, however, to the pilot piece as shown, I illustrate a generally circumferential side wall 20 which has outwardly extending ears 21 which, with the inward continuations 22 of the side wall 20, define separate spaces. The space within or surrounded by the pilot wall 20 is partially closed by an inwardly extending intermediate wall 23 which terminates in an upwardly extending inner and, preferably, cylindrical wall 24. The space between the top of the wall 24 and the top of the wall 20 is closed by a top

wall 25, all as shown in Figures 2 and 3. It will be noted that the top wall 25 lies at a level below the lowest of the primary air inlets 12, and that, therefore, no air is admitted to the interior of the pilot structure from or through the pot side wall. I may, in fact, find it advantageous to provide an offset portion of the wall 20, as at 26, which actually abuts against the inner surface of the pot side wall 7, and which is connected to the side wall 20 by connecting portions 27. The wall 26 is apertured or cut away, as at 28, in line with the liquid fuel inlet duct 14, to the end that liquid fuel will flow upon the bottom of the pot for vaporization.

In order to hold the pilot structure in position, and, at the same time, to supply air for pilot combustion, I provide upwardly extending tubular connectors 30 which are shown as extending upwardly within the outwardly offset wall portions 21. They may be secured at their lower ends to the pot bottom 8. I illustrate them as screw-threaded as at 31, but it will be realized that any other suitable connecting means may be employed. Each such tube 30 has an air outlet aperture 32 through which air from beneath the bottom of the pot may flow into the circumferential space between the walls 23, 24 and 25. In order to prevent unintended upward escape of air through the tubes 30, and, at the same time, to hold the pilot piece in position, I illustrate inwardly screw-threaded caps 33 which are screw-threaded at the tops of the tubes. 34 indicates any suitable washers or packings. It will be understood, of course, that any other suitable top securing means may be employed, but the structure as illustrated in Figure 3 does provide unitary means for at the same time holding the pilot structure firmly in position, and for supplying air to its interior. It will be understood that the top wall 25, where it overlies the space surrounded by the side wall offsets 21, may have a suitably formed or enlarged aperture 35 through which the upper end of the tube 30 passes.

It will be noted that the wall 23 may be provided with a plurality of downwardly directing air openings 36, while the wall 25 may be provided with a plurality of upwardly and inwardly directing air openings 37. It will be understood that the arrangement of air outlets may be widely varied, to suit particular conditions. The pilot piece may, if desired, have one or more side openings 38. In Figure 1, I illustrate a single such opening through which unvaporized liquid fuel may flow outwardly upon the bottom of the pot, when the burner is at high fire.

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 description and drawings to be taken as in a broad sense illustrative or diagrammatic, rather than as limiting me to my precise showing.

The use and operation of the invention are as follows:

I illustrate a pilot assembly or pilot piece which receives its air through the bottom of the pot, through the tubes 30, and which is, at the same time, firmly secured to and by the tubes 30, in proper position, and with a firm contact between the lower edges of the walls of the pilot structure and the bottom of the pot. It is unnecessary, in the form herein shown, to urge the pilot piece firmly against the pot side wall, since there is no possibility of substantial leakage. Preferably, the end of the duct 14 extends through an appropriately formed aperture 27, or is properly aligned with the aperture 27, so that liquid fuel flows freely into the interior of the pilot piece. It will be understood, however, that, if desired, the wall 26 may be omitted. The relatively large size of the apertures 35 permits the pilot structure to be adjusted against a side wall 7 of the pot, and to be firmly locked, by the screw-threaded caps 33, in the adjusted position. As is clear from Figures 2 and 3, I illustrate the large aperture 35 in connection with only one of the tubes 30. If necessary, both apertures may be enlarged.

It will be understood that whereas I have shown a structure in which two hollow connectors are employed, it is, under some circumstances, practical to use but a single connector. It will be understood, also, that the size, shape and proportion of the pilot piece itself may be widely varied. For example, I do not wish my invention to be limited to use with a pilot piece in which an upward opening is employed.

I claim:

1. For use as a pilot structure for pot type burners a pilot piece having a side wall and a top wall defining an interior space, means for holding the pilot piece firmly in predetermined position within and downwardly against the bottom of a pot burner, said means including a hollow connector member, and means for securing the hollow connector member to the bottom of a pot burner with the interior of said hollow connector member in communication with air below the pot burner, and means mountable on said hollow connector member and engageable with said pilot piece and adapted, when so engaged, to direct a substantial downward thrust upon said pilot piece towards the bottom of a pot burner, when mounted therein, said hollow connector member having a laterally directed air passage adapted for communication with the interior of the pilot piece, when the pilot piece and hollow connector member are operatively assembled.

2. The structure of claim 1, characterized by and including two hollow connector members located one at each side of the pilot piece.

3. The structure of claim 1, characterized by said unitary pilot piece having walls defining a plenum chamber and a mixing chamber, said laterally directed air passage of the hollow connector being in communication with the interior of said plenum chamber when the pilot piece and hollow connector are operatively assembled.

4. The structure of claim 1, characterized by and including a hollow connector extending upwardly above the top of the pilot piece, and a connector member on said connector formed and adapted to engage the top of the pilot piece and to urge the pilot piece downwardly toward the bottom of the burner.

5. The structure of claim 1, characterized by and including a pair of hollow connectors extending upwardly above the top of the pilot piece, and connector members on said connectors formed and adapted to engage the top of the pilot piece and to urge the pilot piece downwardly toward the burner, said pilot piece being apertured and said hollow connectors passing through said apertures, the hollow connectors and said apertures being dimensioned to permit a range of lateral play between the connectors and the pilot piece, whereby the pilot piece can be adjusted in relation to the connectors prior to tightening the securing members.

6. In combination with a burner pot having a bottom wall provided with an aperture, and a side wall having a liquid fuel supply duct extending therethrough, a pilot piece having walls defining an interior space, and means for holding the pilot piece firmly downwardly against the bottom of the pot, said means including an open ended hollow connector member provided with a laterally directed aperture, the lower end of said hollow connector member being secured to the bottom of the pot, said hollow connector member extending upwardly therefrom with its interior in communication with the air outside of the pot through said aperture in the bottom of the pot and in communication with the interior of the pilot piece through said laterally directed aperture in the connector member, and means on the upper end of the hollow connector member closing said end and engaging the pilot piece for directing a substantial downward thrust thereon against the bottom of the pot, the pilot piece having an otherwise open bottom adapted to be closed by the bottom of the pot, said pilot piece being positioned within the pot interiorly to receive liquid fuel delivered to the interior of the pot by said liquid fuel duct.

7. The structure of claim 6, characterized by said pilot piece having a mixing chamber in its bottom portion and a plenum chamber in its upper portion, said plenum chamber having an inner wall portion defining and surrounding a flame outlet extending upwardly from the mixing chamber.

8. The structure of claim 6, characterized by said pilot piece having a mixing chamber in its bottom portion and a plenum chamber in its upper portion, said plenum chamber having an inner wall portion defining and surrounding a flame outlet extending upwardly from the mixing chamber, said connector member having the laterally directed outlet positioned intermediate its ends and in communication with said plenum chamber.

9. The structure of claim 6, characterized by said pilot piece having a mixing chamber in its bottom portion and a plenum chamber in its upper portion, said plenum chamber having an inner wall portion defining and surrounding a flame outlet extending upwardly from the mixing chamber, said connector member having the laterally directed outlet positioned intermediate its ends and in communication with said plenum chamber, and having an upper end portion extending upwardly above the pilot piece and a locking member thereon adapted to engage an upper surface of said pilot piece.

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