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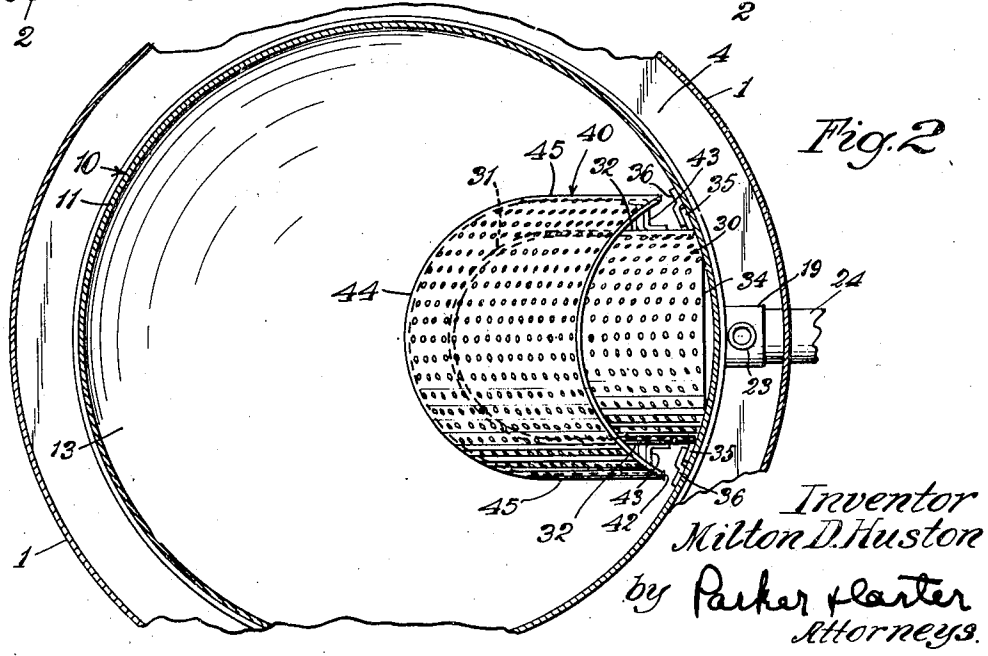
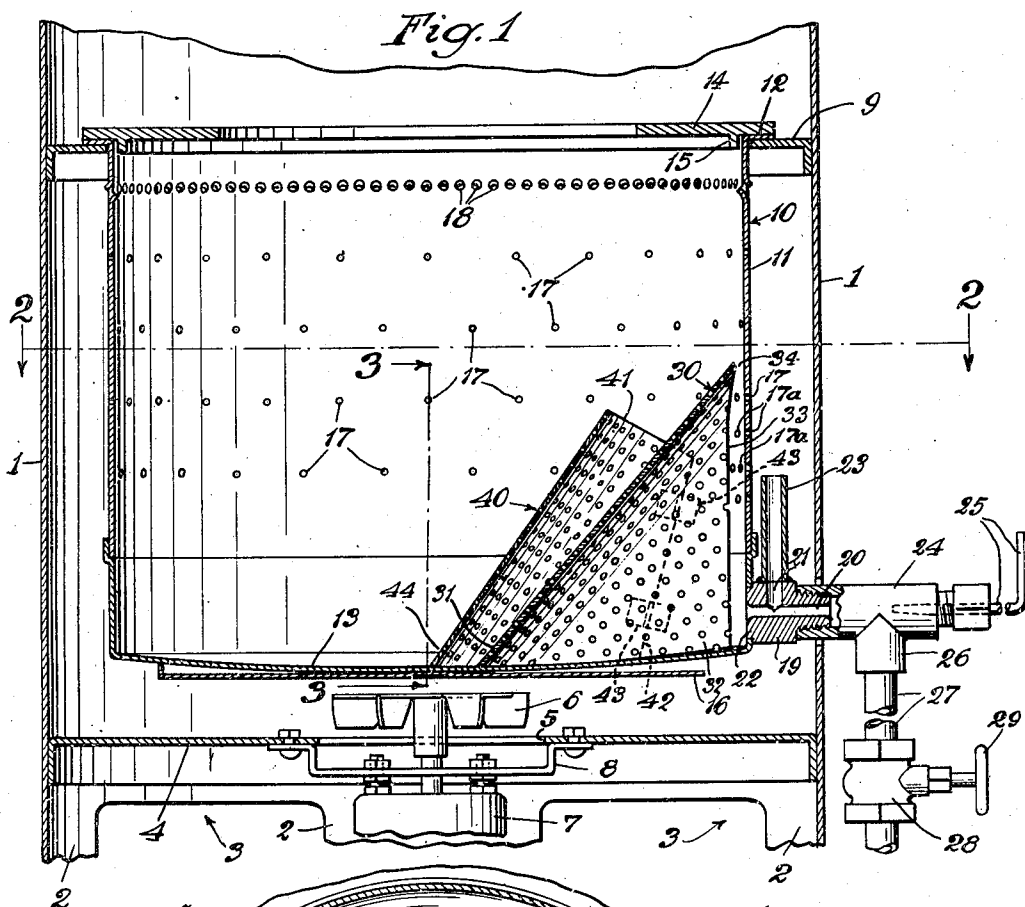
M. D. HUSTON

2,474,530

POT TYPE OIL BURNER AND PILOT MEANS THEREFOR

Filed Aug. 20, 1945

2 Sheets-Sheet 1



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Fig. 3

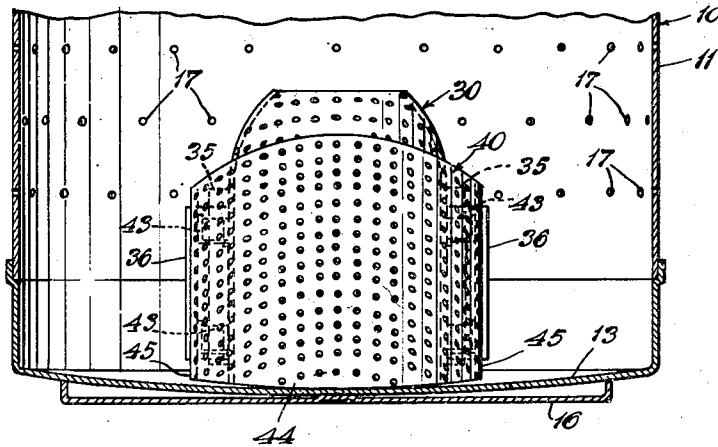


Fig. 4

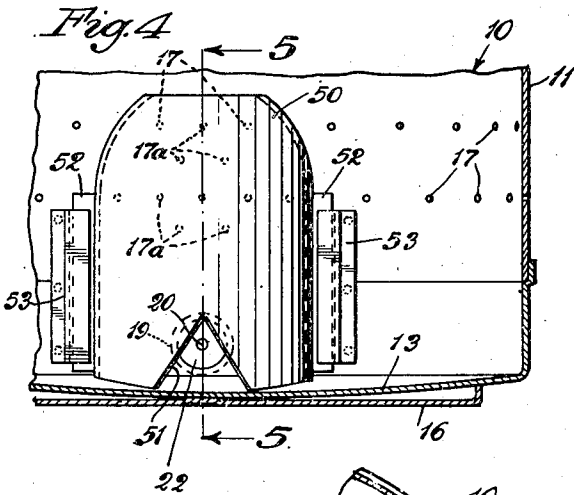


Fig. 5

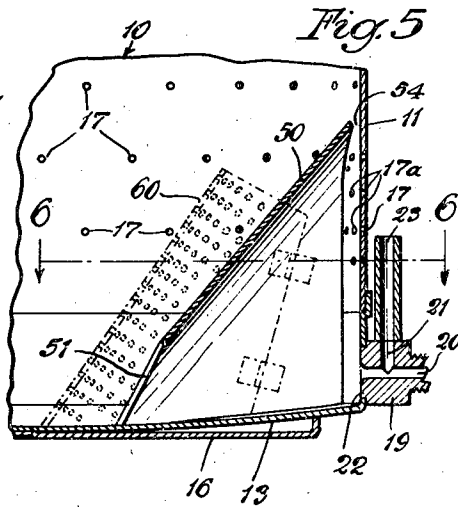
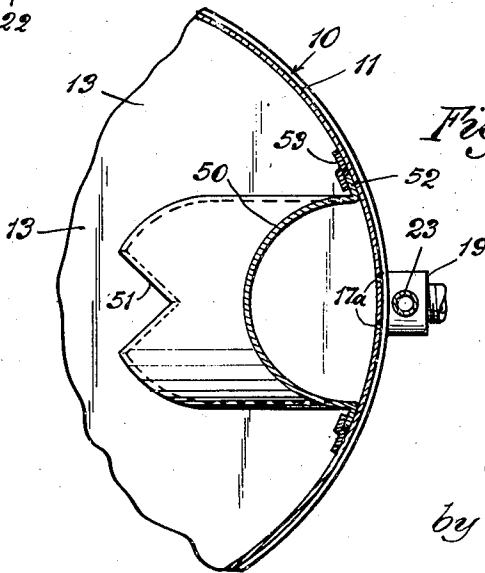


Fig. 6



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UNITED STATES PATENT OFFICE

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POT TYPE OIL BURNER AND PILOT MEANS THEREFOR

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by means assignments, to Breese Burners, Inc.,
Santa Fe, N. Mex., a corporation of Delaware

Application August 20, 1945, Serial No. 611,563

1 Claim. (Cl. 158—91)

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My invention relates to an improvement in liquid fuel oil burners of the hydroxylating type and has for one purpose to provide improved pilot means therefor.

Another purpose is to provide an improved pilot housing.

Another purpose is to provide a pilot housing which can be readily removed for cleaning when necessary.

Another purpose is to provide a pilot housing adapted to maintain the pot bottom highly heated.

Another purpose is to provide pilot means adapted for a rapid and efficient shift of combustion from pilot stage to the high fire stage.

Another purpose is to provide an improved liquid fuel delivering fitting.

Another purpose is to provide a pilot structure which causes a minimum of interference with the normal operation of a hydroxylating burner pot at high fire.

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

I illustrate the 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;

Figure 3 is a partial section on the line 3—3 of Figure 1;

Figure 4 is a view similar to Figure 3 of a variant form of the device;

Figure 5 is a section on the line 5—5 of Figure 4; and

Figure 6 is a section on the line 6—6 of Figure 5.

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

Referring to the drawings 1 generally indicates an outer housing shown in the form of a drum. The outer housing is shown as provided with a plurality of supporting legs 2 which have air admission spaces 3 therebetween. 4 is a centrally apertured bottom wall, its aperture 5 being generally on the axis of the drum 1. 6 is a booster fan driven by a motor 7, the motor and booster fan being mounted on any suitable bracket or support 8 which aligns the motor and fan substantially on the axis of the drum. 9 is a supporting ring shown as angular in radial cross section. It supports any suitable pot structure generally indicated as 10 and including a circumferential side wall 11 with an upper outwardly extending flange 12 seated on the ring 9. The pot is provided with an upwardly concave

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bottom 13. The otherwise open top of the pot is partly closed by the centrally apertured flame ring 14 shown as centered by the downwardly extending flange 15. 16 is any suitable air protector for the bottom of the pot, aligned with the fan 6. The side wall 11 of the pot is provided with a plurality of rows of primary air inlet apertures 17 located at various distances from the ends of the pot. Any suitable means for admitting secondary air may be employed but for convenience I illustrate a single row of upwardly tilted secondary air inlets 18 which are both larger and more closely spaced than the primary air inlets 17. 19 is a liquid fuel inlet fitting having a longitudinal bore 20 and an intersecting and somewhat larger gauge air inlet vertical bore 21. The fitting is provided with a reduced portion 22 extending through an appropriately formed hole in the lower portion of the pot side wall, and preferably flush with the inner face of said side wall. 23 is an air inlet duct in communication with the bore 21 and positioned in the space between the drum 1 and the pot side wall 11. 24 is a T, screw threaded or otherwise secured to the fitting 19 and provided with any suitable clean-out member or reamer 25. The lower arm 26 of the T receives any suitable liquid fuel delivery pipe 27. Any suitable means may be employed for varying the rate of liquid fuel along the pipe 27 and thus through the bore 20 to the interior of the pot. I may employ for example a conventional float valve assembly, but I illustrate diagrammatically any suitable valve structure 28 with a manual control member 29. It will be understood however that any suitable means, whether automatically or thermostatically or manually controlled, may be employed.

The pilot structure proper includes or consists of a pilot housing generally indicated at 30. The housing in Figures 1 to 3 is shown as foraminous. It consists of a curved member, the lower edge of which, as at 31, surrounds a portion of the pot bottom preferably extending fairly close to the central axis of the pot. The curved edge portion 31 may be connected by straight edge portions 32 with the side wall of the pot. The rear or outer edges 33 of the housing 30 abut against or conform fairly closely to the side wall of the pot. Preferably a gap 34 is left between an upper edge portion of the housing 30 and the opposed wall of the pot, the gap being at the top of the pilot structure. The pilot housing 30 is also shown as provided with a laterally extending outwardly turned edge portion 35 along each vertical edge thereof, the edge portion 35 being received

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slidably in any suitable clips 36 welded or otherwise secured to the inner wall of the pot with clearances permitting ready and generally vertical movement of the pilot housing. Thus the pilot housing can easily be inserted and removed, and can also raise and lower somewhat in response to warping or expansion and contraction of the bottom 13 of the pot.

The pilot housing 30 may be employed by itself. I illustrate however a supplemental baffle or housing member which may optionally be applied thereto. The outer member, generally indicated as 40, is shown as somewhat similar in form to the housing 30 except that its upper edge terminates at a point inwardly spaced from the pot, as at 41. Also I find it desirable to have its side edges 42 terminate inwardly from the pot wall, the housing 40 being spaced away from the housing 30. It may for example be mounted on any suitable supporting clips or legs 43. The lower edge of the housing 40 includes the arcuate inner portion 44 and straight edge portions 45. Preferably, as shown in Figure 1, the separation between the members 30 and 40 increases progressively upwardly, the widest gap therebetween being at the top as shown in Figure 1.

Whereas I find it desirable to employ a foraminous pilot housing associated with a foraminous inner baffle I may also employ a solid pilot housing. Thus in Figures 4 to 6, I illustrate a solid pilot housing 50, of sheet metal, which may be formed identically with the housing 30 except for the employment of a bottom flame outlet or notch 51 which may be unnecessary or may be omitted when a foraminous member is used. The solid housing is provided with side lugs 52 which slide in clips 53 corresponding to the clips 36 of Figure 2. I may also employ an outer baffle in connection with the solid housing, as shown in dotted lines at 60 in Figure 5.

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 herein an improved pilot device for liquid fuel burners which permits the operation of the burner at a very low turndown while having little or no effect on the top capacity of the burner. It has the further advantage of permitting a rapid increase in the rate of flow of the fuel without smoking or carbon deposit. In the use of the burner the pilot housing is maintained at red heat and the heat is radiated upon that part of the bottom of the pot which is surrounded by the housing. As liquid fuel flows across the pot bottom it crosses a highly heated area of metal and is also subjected to the radiant heat of the overlying pilot housing. The result is a very rapid vaporization of the liquid fuel and an efficient combustion.

The structure is advantageous since tightness against the pot is not critical and since the pilot structure may raise or lower along the clips 36 or 53 as the bottom of the pot warps or changes in contour due to changes in temperature. In other words the pilot housing is floatingly supported and can be slightly raised by an upwarping of the bottom, and will gravitationally follow the

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bottom down when it warps down slightly. In a sense the housing has a chimney action, but only a restricted chimney action. I preferably employ a top gap 34 or 54 which permits a certain upward circulation of air and vaporized fuel. However, this circulation is very slight and does not cause an indraft of air from the rest of the interior of the pot. The apertures in the pilot housing, and the air inlet apertures of the pot which communicate with the interior of the pilot housing, are so related as to maintain the pressure within the pilot housing somewhat above that of the rest of the pot interior.

There is a definite relation between the top opening or gap 34 or 54 and the draft at which the burner operates. The smaller the opening is made, the lower the burner can be turned down and still burn clean. If the top opening is too small, the burner tends to snuff out. The top opening also controls the capacity. In order to burn less oil, the top opening is reduced.

It should be kept in mind that whereas the top opening is desirable and advantageous, it can, particularly where a perforated pilot housing is employed, be eliminated entirely. This is possible if the apertures of the pilot housing are large enough and numerous enough.

The pilot housing may be made of perforated material, as in Figures 1 and following, or it may be made of solid metal as in Figures 4, 5 and 6. If it is made solid, a bottom opening, such as the notch 51, is necessary.

In designing the pilot housing it is important that the housing cover and surround a substantial area if the pot bottom and also that the pilot housing be so shaped and positioned as to cause a minimum interference with the normal air supply to that part of the interior of the pot which is outside of the pilot housing. With reference for example to Figure 5 it will be noted that, in addition to the normal primary air inlets 17, seven supplemental air inlets 17a are provided in order to increase the supply of air delivered to the interior of the pilot housing. Only five of the normal primary air inlets communicate with the interior of the housing. Thus, while an ample air supply is provided for the pilot housing, substantially all of the normal primary air inlets are free to direct jets of air, at the high fire, into vaporized fuel present in the interior of the pot outside of the pilot housing. Not merely is an exceedingly small number of jets intercepted but the shape of the housing is such as to furnish no interference with any of the outside jets which are directed radially into the interior of the pot.

The high temperature maintained by the herein described pilot housing not merely causes a rapid vaporization of the fuel but prevents tar from forming, and keeps the surrounded pot bottom area clear of carbon.

The expansion chamber formed between the members 30 and 40, with its upward increase in width, insures that combustion will take place in the space between the members 30 and 40, instead of at the top. Thus the lower portion of the pilot housing is kept highly heated.

As above mentioned, supplemental air inlet apertures are provided, as at 17a, in order to admit through that part of the side wall enclosed within the pilot housing a greater volume of air than is normally admitted through corresponding areas of the pot wall outside of the pilot housing.

Whereas I have described and shown several

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different shapes of pilot housing, it will be understood that a wide variation in shape may be made without departing from the spirit of my invention.

One advantage of the pilot housing herein shown is that the size of the pilot has no relation to the size of the burner. The same size and shape of pilot element may be employed with burners of different diameter or cubic content.

I claim:

In a liquid fuel burner and pilot means therefor, a burner pot having a circumferential side wall, a closed end wall and an open end, said side wall having therein a plurality of air inlets spaced circumferentially thereabout and located at various distances from the ends of the pot, means for delivering a liquid fuel to the interior of the pot upon the end wall thereof at a controlled rate of flow, for vaporization upon the end wall of the pot, and a pilot housing located within the pot surrounding and above that part of the end wall of the pot upon which liquid fuel is discharged, the housing including a body portion the lower edge of which conforms to the end wall of the pot, the housing wall of which slants upwardly toward and engages and conforms to

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the inner face of the side wall of the pot, and an inclined additional baffle body partly surrounding and spaced from the lower portion of the pilot housing and defining, with the pilot housing, an upwardly expanding chamber extending upwardly from the end wall of the pot, such chamber being open upwardly toward the open end of the pot.

MILTON D. HUSTON.

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