

May 17, 1949.

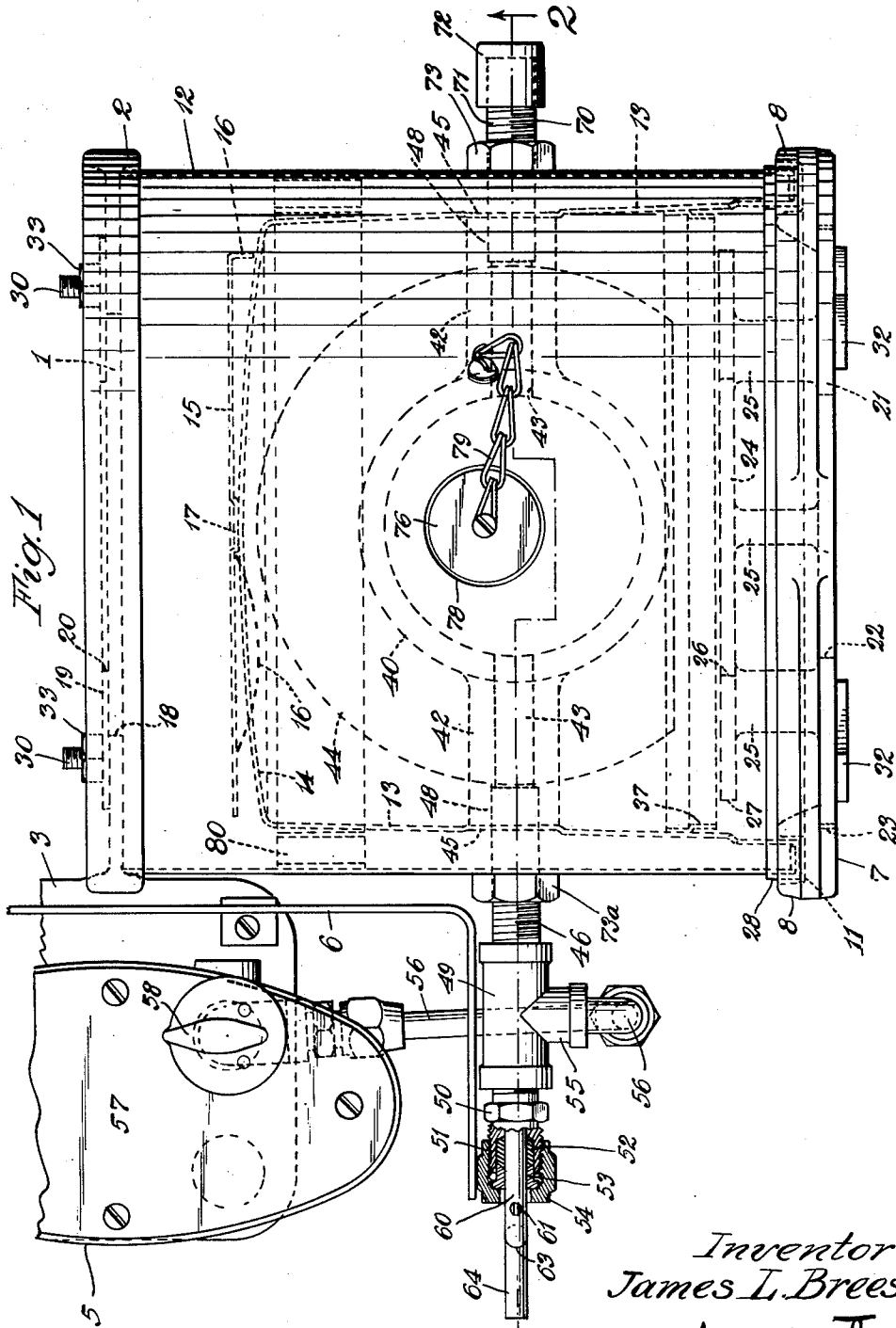
J. L. BREESE

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LIQUID FUEL BURNER WITH VAPORIZING ASSEMBLY

Filed June 14, 1944

3 Sheets-Sheet 1



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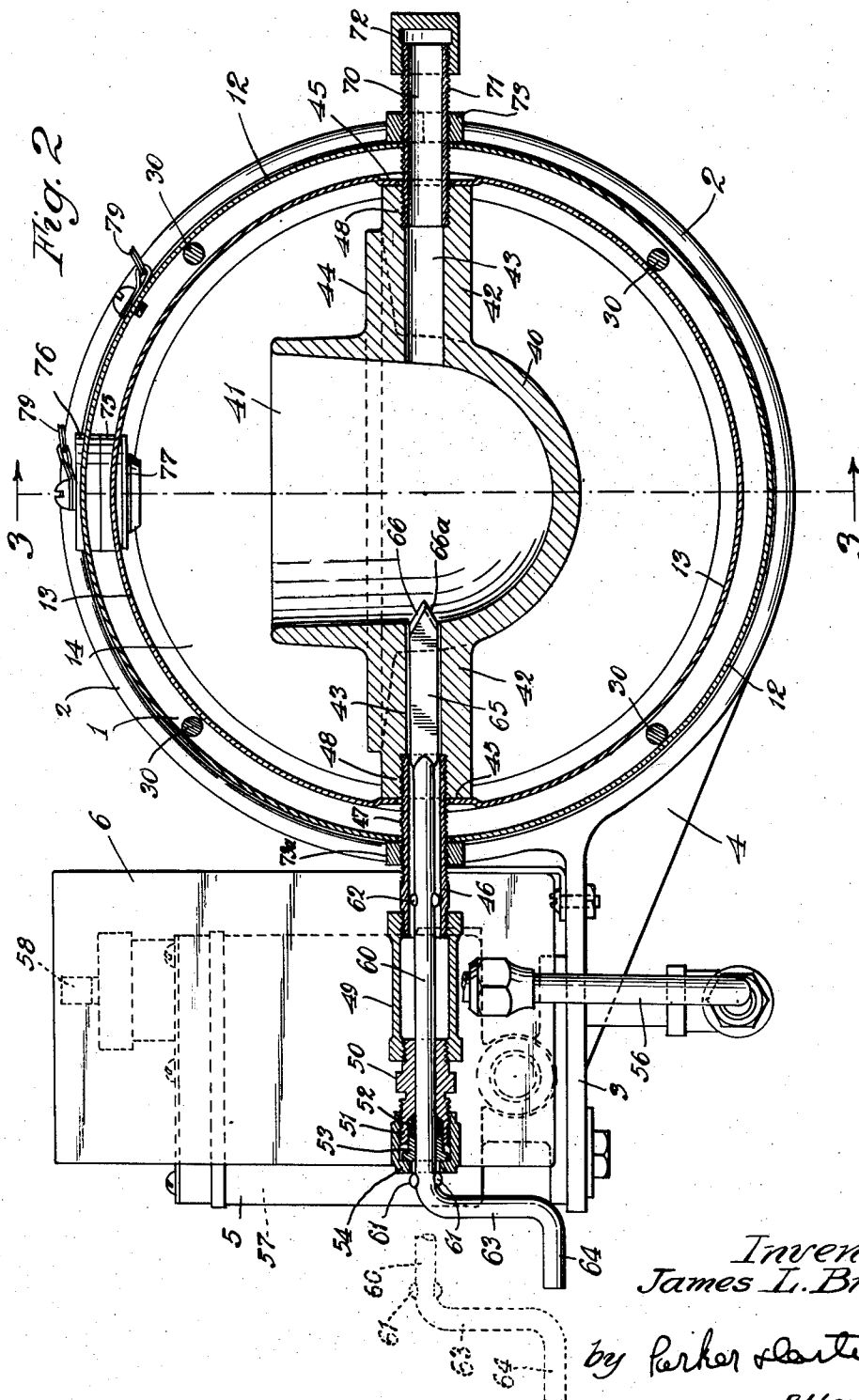
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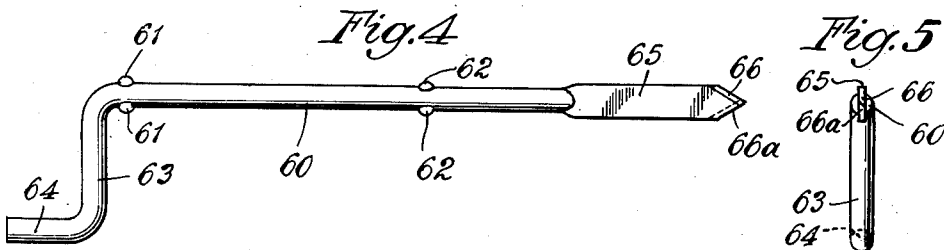
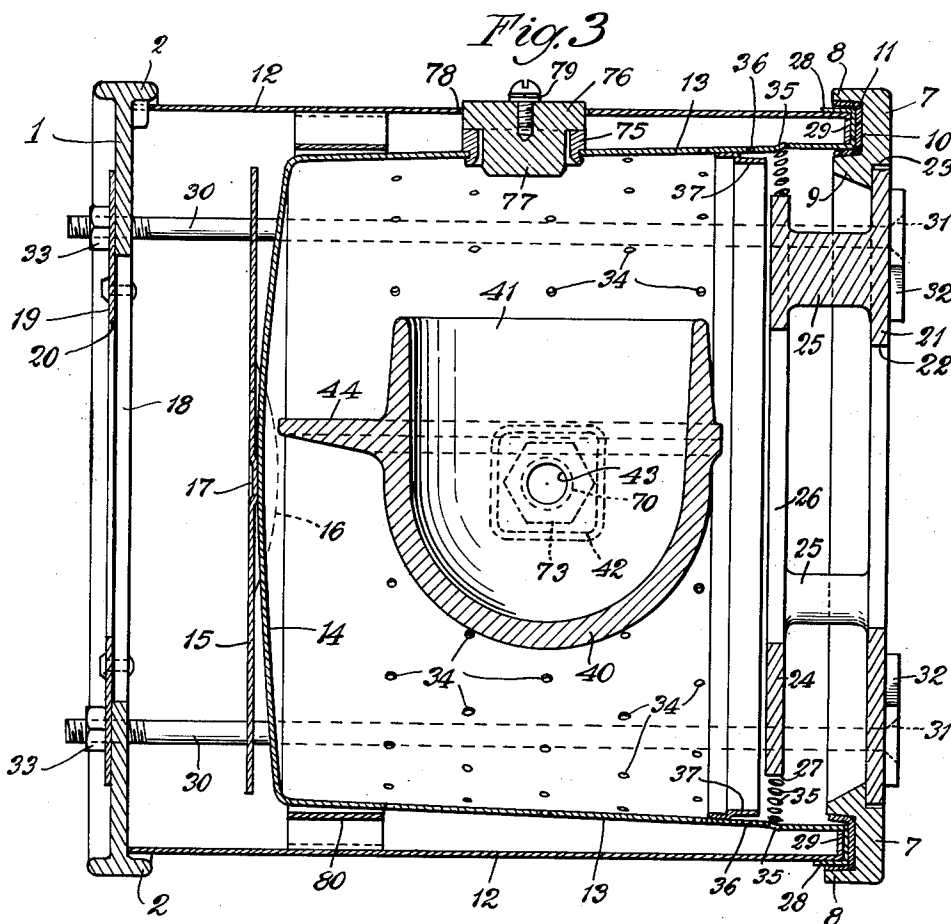
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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LIQUID FUEL BURNER WITH VAPORIZING ASSEMBLY

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mesne assignments, to Breese Burners, Inc.,
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1 Claim. (Cl. 158—91)

1

The invention relates to an improvement in liquid fuel burners and has for one purpose to provide improved liquid fuel vaporizing means.

Another purpose is to provide improved means for vaporizing liquid fuel in connection with pot type burners.

Another purpose is to provide an improved vaporizing cup and supporting means therefor, for use in horizontal pot type burners.

Another purpose is to provide improved means effective to clean the fuel admission passage extending to the vaporizing cup or area of a liquid fuel burner.

Other purposes will appear from time to time throughout the specification.

The invention is illustrated more or less diagrammatically in the accompanying drawings, wherein:

Figure 1 is a plan view;

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

Figure 3 is a section on the line 3—3 of Fig. 2; and

Figures 4 and 5 are details.

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

Referring to the drawings 1 generally indicates a supporting ring having a peripheral flange 2 from which extends a bracket 3 provided with a supporting member 4. On the bracket may be positioned any liquid fuel control means 5 such as a float chamber assembly. The details of themselves do not form part of the present invention. 6 is any suitable shield mounted on the bracket 3 and extending between the below described burner and the float chamber assembly, the shield 6 being effective to protect the float chamber from direct heat radiation.

Referring to the burner assembly proper 7 is a ring located at the opposite end of the burner and having a circumferential outer flange 8 and an inner flange 9 defining between them a space or circumferential depression 10. 11 is any suitable packing means in said depression 10. 12 is an outer generally cylindrical housing formed of sheet metal or the like. 13 is the burner pot proper herein shown as including a circumferentially extending wall and unitary closed end 14. 15 is a baffle having spacing edge portions 16. It may be welded or otherwise secured to the end 14 as at 17. The ring 1 has a central aperture 18 and may have secured thereto a ring 19 with a somewhat smaller central aperture 20 aligned generally with the axis of the pot and with the baffle 15. 21 is a flame ring centrally apertured as at 22 and abutting at its edges on a ledge or

2

reduced portion 23 of the ring 7. 24 is a second ring spaced inwardly from the ring 22 by any suitable spacing members 25. It will be observed that the ring 24 is centrally apertured as at 26 and is circumferentially spaced inwardly from the pot as at 27. The pot is provided with an outwardly and rearwardly extending flange 28 which laps about one end of the outer housing 12. The outer housing 12 is also provided with an inwardly extending flange 29. The structure thus formed may be locked together by any suitable tension members or bolts 30 the heads 31 of which may be recessed into securing blocks or plates 32 which abut against the outer face of the ring 21. 33 are any suitable locking nuts. It will be noted that the pot 13 is provided with a plurality of air inlet apertures 34 located at various distances from the end of the pot. They may conveniently be arranged in rows, the apertures of adjacent rows being staggered. I may provide any suitable means for admitting secondary air. I illustrate for example a row of secondary air inlets 35 extending about the pot and tilted toward the open end of the pot. In the form of the device herein shown the secondary air inlets 35 are at the general plane of the ring 24 and project jets of air into the space between the rings 21 and 24. 36 are supplemental air inlets which direct air into a space defined between the pot 13 and the directing flange 37. Thus air is directed substantially parallel with the inner face of the pot 13 toward the bases of the air jets projected by the secondary air inlets 35. In the operation of the burner it will be understood that a liquid fuel is delivered to the space within the pot 13 for vaporization by combustion taking place in the pot or at the open end of the pot. 40 indicates a vaporizing cup having a top open as at 41 and at each side of the cup is a laterally extending boss 42 provided with a bore 43. The cup may also have a circumferentially extending unitary flange 44. The ends of the bosses 42 are shown as engaging flattened portions 45 of the pot wall. A liquid fuel inlet tube 46, externally screw threaded as at 47 fits the internal screw threaded end 48 of one of the bosses 42. At its outer end it receives a T connection 49. To one branch of the T is secured the fitting 50 which has an externally screw threaded enlargement 51 receiving a gland 52 which is held under pressure by the apertured plug 53 held in position by the nut 54. Fuel is admitted through the T connection 55 from the liquid fuel line 56 which extends to the float chamber 57 of the liquid fuel control means 5. The details of the float chamber do not of them-

3

selves form part of the present invention. It is understood that any suitable means may be employed in the float chamber for maintaining a predetermined level of fuel in the cup 40. 58 is any suitable valve controlling means for varying the rate of flow of liquid fuel from the float chamber 57 to the fitting 49 and thus to the interior of the cup 40.

A clean out element is preferably permanently positioned in the liquid fuel inlet system thus provided. It is shown as including a stem 60 having movement limiting enlargements 61, 62. It extends outwardly through the gland 52, which substantially prevents leakage. The enlargement 61 limits the inward movement of the stem 60 toward the cup and the enlargement 62 limits its outward movement. The outward position of its end portion is indicated in dotted line in Fig. 2. It may be laterally offset as at 63 and provided with a crank handle 64, to permit its ready manual rotation. It is flattened and somewhat enlarged at its inner end as at 65 and terminates in converging cutting edges 66, 66a.

The opposite boss 42, inwardly screw threaded as at 48 receives a securing enclosure plug 70 exteriorly screw threaded as at 71 and is provided with any suitable external head 72. It may extend through any suitable screw threaded nut 73 engaging the exterior of the outer housing 12. A similar nut 73a on the exterior of the member 46 engages the opposite side of the outer housing 12. Since both bosses or enlargements 42 are identical it will be understood that the cup can be employed whether the float chamber assembly is on the left hand of the burner as shown in Fig. 2 or on the right hand of the burner. Access to the cup for lighting is provided by a centrally apertured element 75 shown for example in Fig. 3, which seats in an aperture in that part of the wall 13 which overlies the cup 40. It is normally closed by a plug 76 that seats by gravity on the upper face of the ring 75 and includes an inwardly extending portion 77. The member 76 may be inserted through an aperture 78 in the outer housing 12. It may be removed through such aperture but its loss or displacement is prevented by any suitable chain or securing member 79 whereby it is flexibly secured to the exterior of the housing 12.

Any suitable booster fan mechanism, not herein shown, may be seated in the aperture 20, whereby air under pressure may be delivered into the space between the outer housing 12 and the pot 13. Any suitable baffle means 80 may be provided in the space between the side wall of the pot 13 and the opposed portion of the outer housing 12. This baffle prevents spiralling of the air in the space between the pot wall and housing.

It will be realized that, whereas I have described and shown a practical and operative embodiment of my invention and the method for carrying it out, nevertheless many changes may be made in the size, shape, number and disposition of parts and in the details and steps of such method 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 my invention are as follows:

In starting the device liquid fuel is supplied to the interior of the cup from the float valve assembly 5, or from any other suitable source of liquid fuel. The fuel may be initially ignited

4

through the ring 75 and the aperture 78. When ignition has taken place the plug 76, 77 is put back in place, and is effective to prevent any substantial air leakage. Assume that ignition has begun and that the liquid fuel in the pot is undergoing vaporization. The vaporized fuel rises from the pot and mixes with the primary air flowing through the primary air inlets 34. The result is the formation of a mixture of vaporized fuel and air which, when the device is burning at a high rate of combustion, is mixed with secondary air delivered through the apertures 35 and is fully burned at or beyond the open end of the pot. Air pressure may be delivered through the aperture 20 for example by employment of any suitable booster fan unit. The result is a flame which flows through the aperture 22 of the flame ring 21 and may extend for a substantial distance outside of the pot. Where sufficient air pressure is employed the burner lends itself to uses where a horizontally projected frame of substantial length is desirable. It may be employed for example in small heating plants, cook stoves, hot water heaters and the like.

The ring 24 serves as a recirculating ring as the secondary air is directed into the space between the rings 24 and 21. The vaporized fuel is thus completely mixed with the inflowing secondary air and some of the contents of the pot are drawn outwardly about the outer edge 27 of the ring 24. The baffle 15 prevents undue cooling of the pot end 14 by the inflowing air. The baffles 80 prevent spiralling of the air in the space between the pot 13 and the outer housing 12. The air delivered through the apertures 36 and directed by the flange 37 tends to hold the secondary air jets to the pot wall, and reduces or eliminates combustion noise.

The fuel within the cup 40 is subjected to the direct heat of combustion taking place within the pot, since the top of the cup is open. The fuel is also subjected to conducted heat, to heat conducted by the cup itself and by the circumferential flange 44.

A problem in connection with burners of this type is to prevent the formation of carbon within the fuel inlet passage. Some carbon will form and it is therefore desirable to provide means for cleaning out the fuel inlet passage. The rod 60 with its terminal portion 65 and its cutting edges 66, 66a constitute an efficient and easily employed means for cleaning out the fuel inlet passage, or that part of the passage which is subjected to sufficient heat to cause the deposit of carbon or of other contents of the fuel. The clean out member may formally be left in the dotted line position of Fig. 2. When in that position the blade 65 is withdrawn into the tube or duct 46. Since the blade 65 is flattened, as shown in Fig. 5, it does not interrupt the free flow of fuel. Its outward withdrawal is limited by the expanded portions 62 which may for example abut against the inner end of the fitting 50. The user from time to time, or when he is satisfied that carbon or solids have formed in the boss 42, can rotate the blade 65 by rotating the handle 64. At the same time he can advance the rod 60 toward the cup 40. The edges 66 and 66a are effective to cut through any accumulated solids. The solids will be carried into the interior of the cup by the flowing fuel, and the rod 60 can again be withdrawn to dotted line position. In use it is advantageous to make a routine occasionally employing the clean out members thus provided.

The unit is conveniently compact and may be readily assembled or disassembled.

I claim:

In a liquid fuel burner, a pot having an open end, a circumferential side wall and an end wall, said side wall having a plurality of air inlet apertures located at various distances from the ends of the pot, a vaporizing cup in said pot having lateral extensions engaging opposite parts of said circumferential side wall, each said extension having a passage extending therethrough into communication with the interior of the cup, and means for securing the cup in relation to the pot including a liquid fuel inlet duct extending through the pot wall and entering one of said lateral extensions and a securing element extending through the pot wall and entering the other of said lateral extensions.

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