

March 19, 1946.

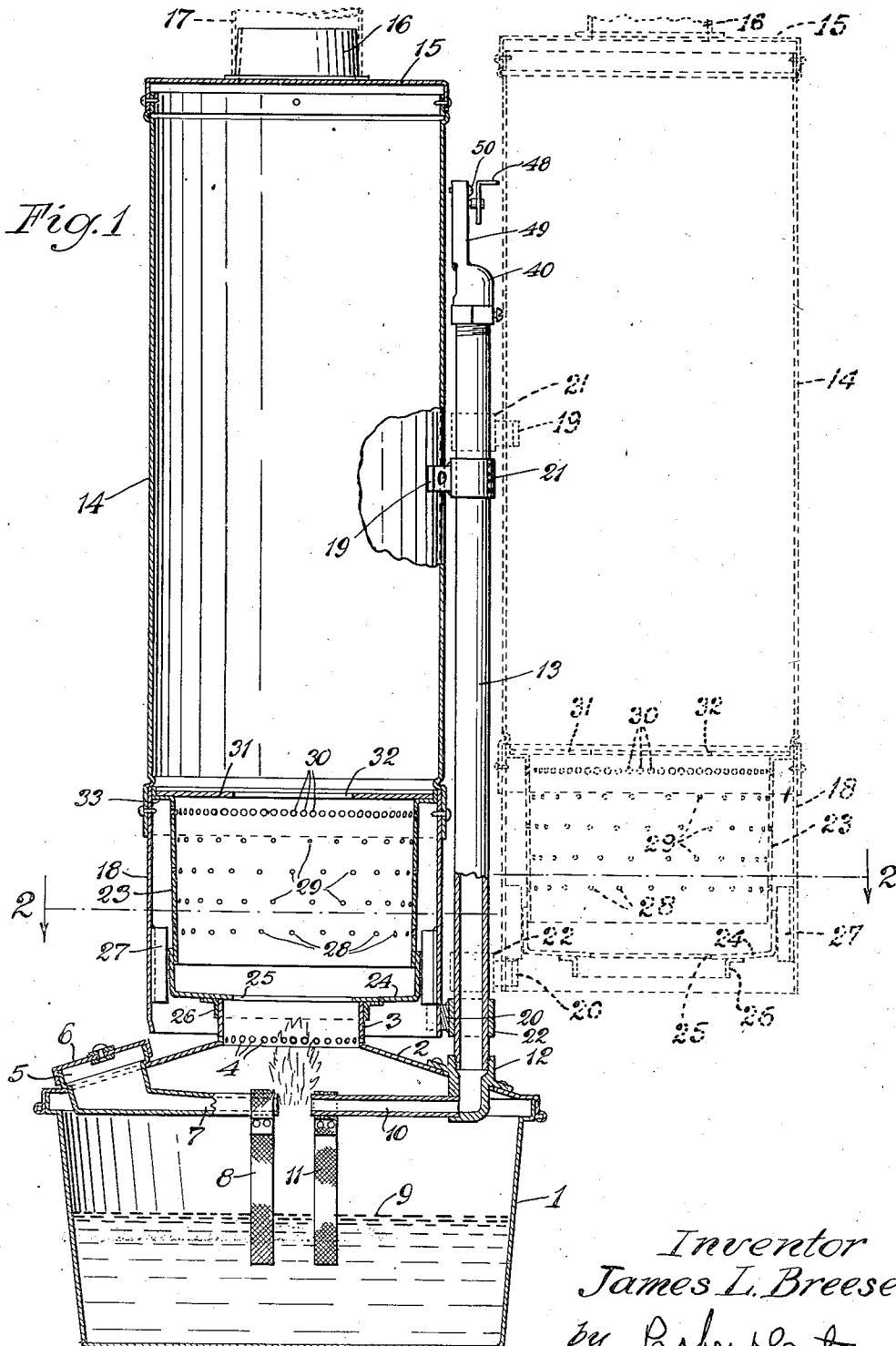
J. L. BREESE

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VAPORIZING BURNER

Filed March 18, 1944

2 Sheets-Sheet 1



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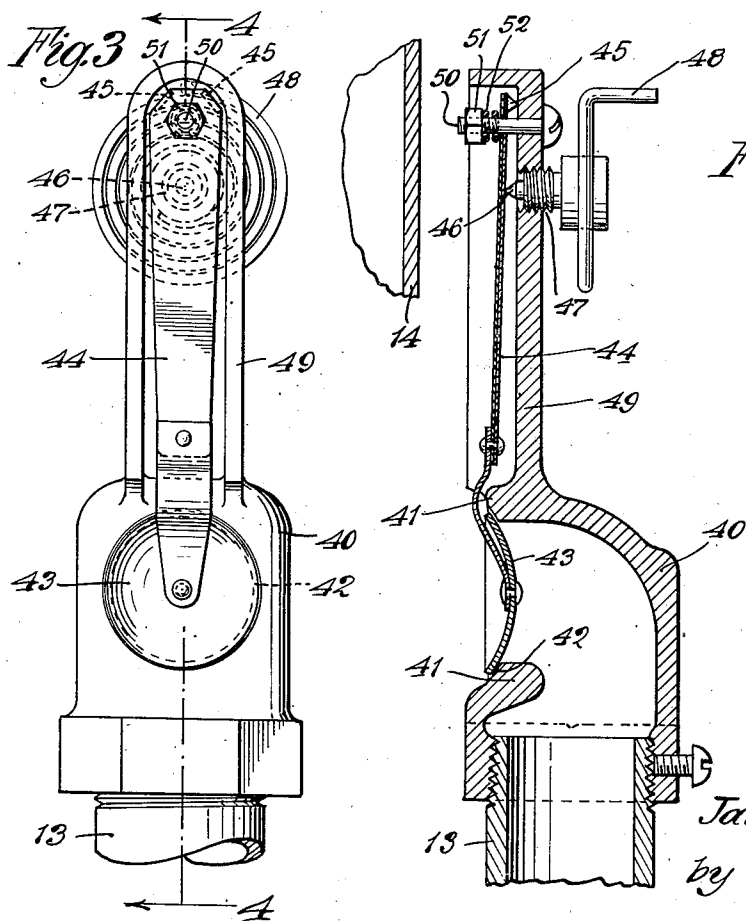
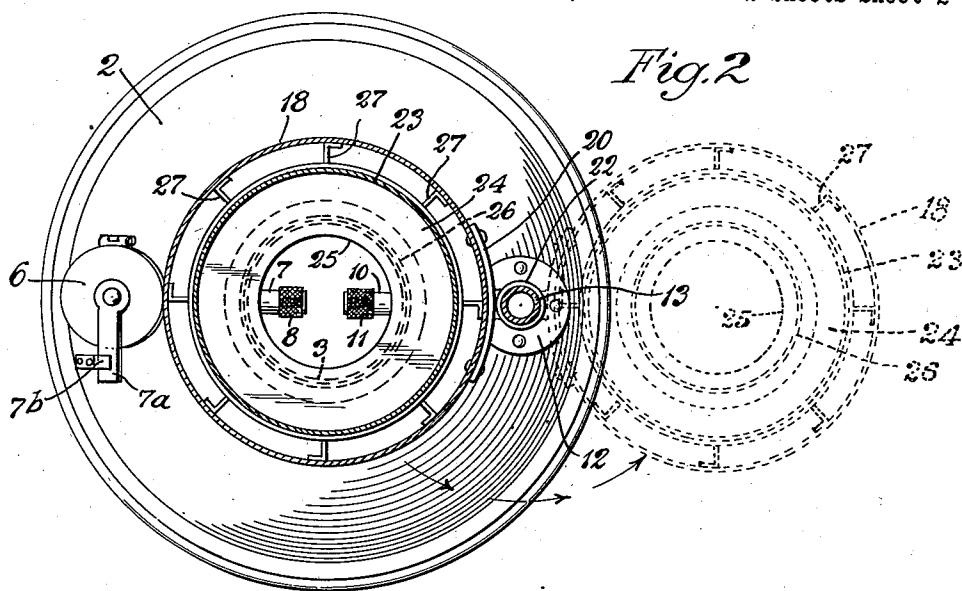
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,396,820

VAPORIZING BURNER

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Application March 18, 1944, Serial No. 527,021

6 Claims. (Cl. 126—93)

My invention relates to an improvement in liquid fuel burners, and has for one purpose to provide improved air control means for a burner of the so-called generator type. Another purpose is to provide improved wick means for maintaining a supply of fuel for the generator flame of such a burner. Another purpose is to provide an improved heater structure in which the heater may be readily moved, to give access to the generator chamber without completely disassembling the device. Another purpose is to provide improved air inlet means for the generator chamber. 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 detail, on an enlarged scale; and

Figure 4 is a section on the line 4—4 of Figure 3.

Like parts are indicated by like numbers throughout the specification and drawings. Referring to the drawings, 1 indicates any suitable generator chamber of a size sufficient to contain a substantial supply of liquid fuel. 2 indicates a removable cover therefor having a central cylindrical open topped neck 3 with a circumferential row of air inlet apertures 4. 5 is an air admitting neck which may be closed by any suitable cover 6. 7 is an air inlet passage through which air flows when the cover 6 is moved to open position. It may be opened, for example, to obtain an excess supply of air at the starting of the burner. Secured to the inner end of the passage 7 is any suitable depending wick 8 which is of sufficient length to extend downwardly into the liquid fuel 9 throughout a substantial range of level of the fuel. The wick may be of asbestos or of any other suitable material, and is effective to raise liquid fuel to the discharge end of the air inlet passage 7. Another inlet passage 10 with a wick 11 is also provided. This normal air inlet passage 10 is connected to any suitable union 12 which in turn is connected to and receives air from the main air inlet duct 13 which will later be described. It will be seen that the duct 13 is of substantial height. 14 is the heater element or stove drum provided with any suitable top 15 having a centering flange 16 to which any suitable flue element 17 may be applied. The drum 14 is provided with a downward extension 18. This extension may, if desired, be unitary with the drum, but is herein shown as formed of a separate cylinder of sheet metal. 19, 20 are brackets extending outwardly from the drum 14 and its extension 18 respectively,

which carry bearing rings 21, 22 which surround the air inlet pipe 13. It will be understood that the stove element may be raised and lowered on the pipe 13 and may also be rotated thereabout.

23 is any suitable burner pot, herein shown as of the hydroxylating type. It has a bottom element 24 centrally apertured as at 25. 26 is a bottom annular flange adapted to fit snugly about the neck 3, when the parts are in the position in which they are shown in full line in Figure 1. The member 18 serves as an open bottom skirt for admitting air to the space about the pot. This air is more or less constrained to upward movement by flanges 27. The pot is provided with a plurality of air inlet apertures. I show, for example, a bottom row 28 of primary air inlet apertures. I also employ a plurality of rows 29 of primary air inlet apertures, located at various levels in the pot. 30 indicates a top row of secondary air inlet apertures. These are preferably larger and more closely spaced than the primary air inlet apertures, and are upwardly tilted. 31 is a flame ring, centrally apertured as at 32 and located at the top of the pot. The pot is shown as having a top flange 33 extending to the member 18. It may be secured thereto in any suitable manner.

In a generator type of burner a substantial body of liquid fuel is maintained in the generator chamber. A generator flame burns in the generator chamber, and serves to vaporize the volatile liquid fuel in the chamber. This liquid fuel, when vaporized, rises and flows upwardly through the neck 3. It may receive some air through the air inlets 4 in the neck 3, or these air inlets may under some circumstances, be omitted. The vaporized fuel receives primary air, in the pot 23, through the air inlet apertures 28 and 29. The mixture thus formed receives its final or secondary air supply through the air inlet apertures 30, and combustion takes place at or above the top of the pot, when the burner is working under high fire conditions. The rate of combustion is controlled by the rate of inflow of air to the generator chamber. I may provide excess air when the burner is started by opening the cover 6. I may initiate combustion by lifting and rotating the heater to the dotted line position of Figure 1. I can then light the wicks with a match and replace the heater. Air flows inwardly along the passages 7 and 10 to provide the air necessary for combustion of a flame burning at the inlet end of the two passages. The normal air supply flows downwardly through the duct 13. In the normal operation of the burner, the volume of liquid fuel vaporized

is controlled by the rate of flow of air downwardly along the duct 13. I find it advantageous to provide a thermostatic control for reducing the air supply in response to a predetermined increase in the temperature of the heater. I may employ a variety of structures, but an effective structure is illustrated in Figures 3 and 4. I illustrate a valve fitting 40 positioned at the top of the air inlet passage 13. It is in the form of an elbow having a lip 41 which defines an air inlet passage. This lip has a generally spherical seating surface 42 which is adapted to receive a spherical closure plate or disc 43. This disc is mounted on a flexing strip 44 or bi-metallic member. The flexing strip 44 is pivoted as at 45 and is adjusted by the employment of the adjustable normally fixed pivot 46 controlled by the screw 47 with the handle 48. The screw 47 is screw-threaded into the upward extension 49 of the valve fitting 40. The strip 44 is normally held in adjusted position by any suitable bolt 50 with its nut 51 and spring 52.

It will be realized that whereas I have described and shown a practical and operative device, nevertheless many changes may be made in size, shape, number and disposition of parts. I, therefore, wish my descriptions and drawings to be taken as in a broad sense illustrative or diagrammatic, rather than as limiting me to my specific showing herein.

The use and operation of the invention are as follows:

I illustrate a generator type burner including the generator and fuel containing chamber 1, which serves as a base for the burner and the heater 14 heated thereby. The burner includes the pot which is secured in relation to the heater 14. The heater and pot may be unitarily raised and lowered on the air duct 13, and may be rotated in order to give access to the interior of the generator chamber 1 through the neck 3. The wicks 8 and 11 will be normally soaked with liquid fuel. Air is supplied to the wick 11 through the air inlet tube 13. Extra air, for the starting period, may pass to the wick 8 when the cover 6 is raised. It may normally be held in closed position by the rotatable arm 7a which engages the safety catch 7b.

When the wicks have been lighted the burner and heater are returned to the full line position of Figure 1. After the device is in operation, the cap 6 is closed and the entire supply of air to the generator chamber 1 passes downwardly along the tube 13. The generator flame, at the end of the air inlet tube 10, is sufficient to vaporize fuel from the surface of the liquid fuel body indicated at 9. This vaporized fuel, whether by draft conditions, or by gas pressure, moves upwardly into the pot 23. I may supply an initial air supply through the air inlets 4, or I may omit these inlets. The vaporized fuel, whether it has additional air from the passages 4 or not, receives its primary air from the air inlet apertures 28 and 29, and its secondary air from the apertures 30.

The rate of combustion is governed by the rate of vaporization. This, in turn, is governed by the rate of flow of air downwardly through the air inlet tube 13. I may govern this rate of flow in response to heat conditions adjacent the heater 14. An increase in the temperature of the heater tends to affect the warping bar 44 and to move the valve 43 toward the closed position in which it is shown in Figure 4. A drop in the temperature of the heating element or drum 14 increases the inflow of air, and thus the evaporation rate of the liquid fuel in the chamber 1.

I claim:

1. In a liquid fuel vaporizing burner, a fuel container and liquid fuel vaporizing chamber adapted to serve as a base for the burner and to contain a substantial supply of liquid fuel, a heater drum located above the fuel container, a hydroxylating burner pot interposed between the heater drum and the fuel container, the interior of the pot being in communication with the interior of the fuel container and with the interior of the heater drum, said pot having a plurality of air inlet apertures therein, a duct supplying air to the vaporizing chamber mounted on said container and extending upwardly along said heater drum and in close proximity thereto, and means for varying the inflow of air through said duct to the interior of the fuel container in response to changes in temperature of said heater drum, the air supplying duct terminating, at its lower end with an air delivering aperture located above the normal level of liquid fuel in the fuel container and a wick, in said container, extending from the lower end of said air supply duct into the liquid fuel within said fuel container.

2. In a liquid fuel vaporizing burner, a fuel container and liquid fuel vaporizing chamber adapted to serve as a base for the burner and to contain a substantial supply of liquid fuel, a heater drum located above the fuel container, a hydroxylating burner pot interposed between the heater drum and the fuel container, the interior of the pot being in communication with the interior of the fuel container and with the interior of the heater drum, said pot having a plurality of air inlet apertures therein, a duct supplying air to the vaporizing chamber mounted on said container and extending upwardly along said heater drum and in close proximity thereto, and means for varying the inflow of air through said duct to the interior of the fuel container in response to changes in temperature of said heater drum, the air supplying duct terminating, at its lower end with an air delivering aperture located above the normal level of liquid fuel in the fuel container and an additional air inlet duct adapted to admit air from a point more remote from said heater drum to the interior of the fuel container, said second duct having an air delivery end adjacent the air delivery end of said first duct and located above the level of liquid fuel in the fuel container.

3. In a liquid fuel vaporizing burner, a fuel container and liquid fuel vaporizing chamber adapted to serve as a base for the burner and to contain a substantial supply of liquid fuel, a heater drum located above the fuel container, a hydroxylating burner pot interposed between the heater drum and the fuel container, the interior of the pot being in communication with the interior of the fuel container and with the interior of the heater drum, said pot having a plurality of air inlet apertures therein, a duct supplying air to the vaporizing chamber mounted on said container and extending upwardly along said heater drum and in close proximity thereto, and means for varying the inflow of air through said duct to the interior of the fuel container in response to changes in temperature of said heater drum, the air supplying duct terminating, at its lower end with an air delivering aperture located above the normal level of liquid fuel in the fuel container and an additional air inlet duct adapted to admit air from a point more

remote from said heater drum to the interior of the fuel container, said second duct having an air delivery end adjacent the air delivery end of said first duct and located above the level of liquid fuel to the fuel container and wicks extending downwardly from the air delivery ends of said two ducts into the liquid fuel in said fuel container.

4. In a liquid fuel vaporizing burner, a fuel container and liquid fuel vaporizing chamber adapted to serve as a base for the burner and to contain a substantial supply of liquid fuel, a heater drum located above the fuel container, a hydroxylating burner pot interposed between the heater drum and the fuel container, the interior of the pot being in communication with the interior of the fuel container and with the interior of the heater drum, said pot having a plurality of air inlet apertures therein, a duct supplying air to the vaporizing chamber mounted on said container and extending upwardly along said heater drum and in close proximity thereto, and means for varying the inflow of air through said duct to the interior of the fuel container in response to changes in temperature of said heater drum, said heater drum being rotatably positioned on said air supply duct for rotation into and out of vertical alignment with said fuel container.

5. In a liquid fuel vaporizing burner, a fuel container and liquid fuel vaporizing chamber adapted to serve as a base for the burner and to contain a substantial supply of liquid fuel, a heater drum located above the fuel container, a hydroxylating burner pot interposed between the heater drum and the fuel container, the interior of the pot being in communication with the interior of the fuel container and with the interior of the heater drum, said pot having a plurality of air inlet apertures therein, a duct supplying air to the vaporizing chamber, mounted on said

container and extending upwardly along said heater drum and in close proximity thereto, and means for varying the inflow of air through said duct to the interior of the fuel container in response to changes in temperature of said heater drum, said heater drum being rotatably positioned on said air supply duct for rotation into and out of vertical alignment with said fuel container and being vertically slidable on said air supply duct.

6. In a liquid fuel vaporizing burner, a fuel container and liquid fuel vaporizing chamber adapted to serve as a base for the burner and to contain a substantial supply of liquid fuel, a heater drum located above the fuel container, a hydroxylating burner pot interposed between the heater drum and the fuel container, the interior of the pot being in communication with the interior of the fuel container and with the interior of the heater drum, said pot having a plurality of air inlet apertures therein, a duct supplying air to the vaporizing chamber mounted on said container and extending upwardly along said heater drum and in close proximity thereto, and means for varying the inflow of air through said duct to the interior of the fuel container in response to changes in temperature of said heater drum, said heater drum being rotatably positioned on said air supply duct for rotation into and out of vertical alignment with said fuel container, and being vertically slidable on said air supply duct, the burner pot being bodily movable with said heater drum, said pot and said fuel container having interfitting parts, said parts being adapted to be put in interfitting position in response to a downward sliding movement of the heater drum along said air supply duct when the heater drum and the fuel container are vertically aligned.

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