April 8, 1947. B. HAYTER 2,418,709

INVERTED POT TYPE BURNER

Filed March 18, 1944

Fig. 1

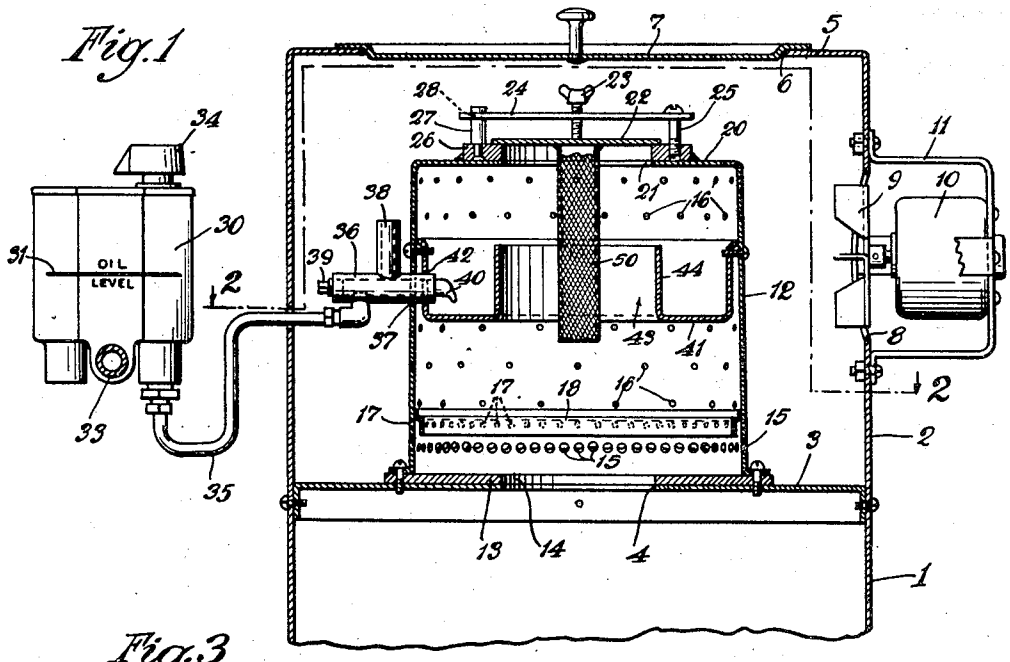


Fig. 3

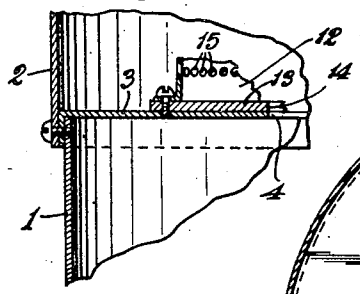
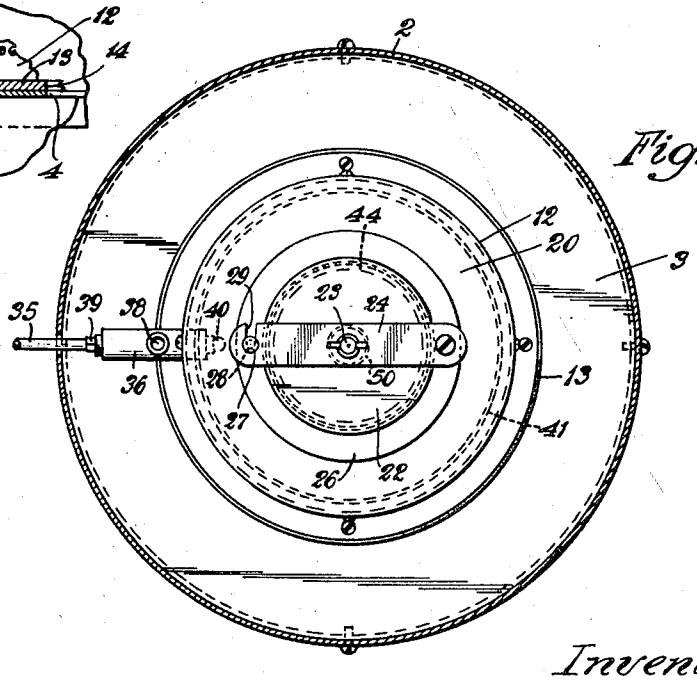


Fig. 2



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INVERTED POT TYPE BURNER

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7 Claims. (Cl. 158—91)

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My invention relates to an improvement in pot type liquid fuel burners. One purpose is to provide such a burner which is particularly adaptable for use with heated elements where the burner is advantageously located above the element to be heated. Another purpose is to provide a burner including an inverted burner pot. Another purpose is to provide improved means for delivering a liquid fuel, for vaporization, to the interior of a burner pot. Other purposes will appear from time to time in the course of the specification and claims.

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, and Figure 3 illustrates a modified form. Like parts are indicated by like symbols throughout the specification and drawings.

Referring to the drawings, 1 generally indicates a heater housing which may, for example, be in the form of a vertically axised cylinder or drum. The details of the heater proper do not of themselves form part of the present invention, but the novel structure herein shown may be advantageously used, for example, with space heaters. 2 indicates an upward extension or continuation of the cylinder 1, and 3 a transverse partition having a central aperture 4, 2 and 3 defining an upper housing above the top of the stove wall within the member 1. Portion 2 has a partial top closure 5 centrally apertured as at 6, the central aperture being closed by any suitable manually removable closure 7. The member 2 may have an air inlet aperture 8 to admit the fan structure 9 actuated by any suitable motor 10 which may be removably secured to the exterior of the member 2 as by the support 11. It will be understood that the fan 9 when rotated by the motor 10 increases the inflow of outside air into the space defined by the members 2, 3, 5 and 7.

Any suitable inverted pot structure may be inserted in the said space in order to direct flame or the products of combustion downwardly through the aperture 4 into the interior of the cylinder 1. I illustrate, for example, an inverted pot 12 having a vertical axis coinciding with the center of the aperture 4. It may for convenience coincide with the axis or center of the drum 1. The pot is shown as resting upon an associated base or flame ring 13 centrally apertured as at 14 in alignment with the aperture 4 of the horizontal partition 3. The pot 12 is shown as provided with a single row of secondary

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air inlet apertures 15 which are downwardly and inwardly tilted, as shown in Figure 1. 16 indicates a plurality of rows of primary inlet apertures located at various levels in the circumferential side wall of the pot 12. 17 indicates a single row of apertures just aove the secondary apertures 15. These apertures 17 are aligned with an air directing flange 18 which directs the air from the apertures 17 downwardly across the air inlets 15 along a path closely adjacent the inner face of the pot 12. The pot 12 is shown as provided with the top closure portion or end 20 which is centrally apertured as at 21, this aperture constituting primarily an access aperture. It is normally closed by a closure plate 22 which may be locked by the thumb screw 23 which passes through the removable locking bar 24 pivoted to a screw 25 extending into the abutment ring 26 secured to the upper surface of the end 20 of the pot. 27 is any suitable headed locking element which has a neck 28 fitting in a slot 29 in the side of the locking bar 24. It will be noted that the pot structure is of such dimensions as to be removable upwardly through the aperture 6 when the cover plate 7 is removed.

In order to provide liquid fuel for vaporization in the pot, I employ any suitable float chamber or metering device generally indicated as 30, the normal oil level being indicated at 31. Oil may be supplied to the chamber 30 along any suitable inlet 33 from a source of liquid fuel not herein shown. 34 indicates any suitable controlling element herein shown as manually controlling the rate of flow of the liquid fuel from the chamber 30. 35 is a liquid fuel pipe extending to a nozzle fitting generally indicated as 36. The nozzle fitting may be inserted through the side of the pot 12, as through the aperture 37. Air may be admitted to the interior of the fitting as by the upstanding air duct 38 which is located outside of the pot 12. 39 is any suitable cleanout plug and 40 is any suitable liquid fuel delivery nozzle. To receive the liquid fuel I indicate a circumferential annular vaporizing channel 41 apertured as at 42 to admit the end of the fitting 36. It has a central aperture 43 defined by a cylindrical wall 44. It will be understood that the fuel level control assembly 30 may be employed to maintain any desired level of oil in the channel 41. The supply may be reduced to a minimum and may be controlled to a drop by drop volume by employment of the manual control element 34.

I may find it advantageous to employ a radiating element which extends downwardly into the

central aperture or passage 43 of the fuel channel 41. This radiating element may consist of a stainless steel screen or a ceramic tube. Preferably, it extends downwardly well into or through the passage 43. I illustrate for example, the radiating member 50 which is secured at its upper end to the bottom of the removable plate 22 and which extends downwardly through the aperture or passage 43.

It may be advantageous to have the entire upper structure bodily removable from the stove 1, as illustrated in Figure 3, the only difference being that the upper elements 2 and 3 and their associated parts may be bodily lifted from the top of the drum 1.

It will be realized that whereas I have described and shown a practical and operative device, none the less many changes may be made in size, shape, number and disposition of parts without departing from the spirit of my invention. I, therefore, wish my drawings and description to be taken as in a broad sense illustrative and diagrammatic, rather than as limiting me to my specific showing.

The use and operation of my invention are as follows:

I provide a stove or heater element which has a flame admitting aperture in an upper wall, as at 4 in Figure 1. The above described inverted pot burner serves to direct the heat, flame and the products of combustion, downwardly into the space surrounded by the drum 1. I have not illustrated any flue structure, but it will be understood that I may employ any suitable flue means in connection with the housing 1. I may rely on the natural draft to carry the flame and products of combustion into the heated chamber, but under many circumstances, it is advantageous to employ a fan or any other suitable means for increasing the rate of flow of air to the burner pot. I illustrate such a fan at 9, in the side of the upper housing member 2. It will be understood that the fan may be positioned at any suitable point in the upper housing.

The liquid fuel is vaporized by the heat of the combustion already taking place in the pot. Combustion may be initiated, for example, by dropping a piece of waste into the trough 41 and igniting it. The primary air for combustion is supplied through the apertures 16. When the burner is running under pilot conditions, the apertures just above the trough 41 provide the necessary air. When the burner is burning at top capacity, all of the apertures 16 function as primary air inlet apertures, and secondary air is provided by the apertures 15. I find it advantageous to deliver the liquid fuel to the bottom of the trough 41 by the employment of a nozzle which drips the liquid fuel from a slight elevation. This nozzle is preferably sufficiently large in inside diameter to admit a supply of primary air from the air inlet 38. At the lowest stages of combustion this may provide sufficient primary air, the mixture receiving its secondary air when it is discharged to the interior of the trough 41.

The radiating agent may not be necessary, but is advantageous in stabilizing the flame and in cooperating to produce clean combustion. The radiating agent becomes radiant and radiates heat back against the trough 41 and assists in vaporizing the liquid fuel which is delivered to the trough 41. It does this without causing any deposit of carbon and obtains the radiant characteristic while the clean blue flame avoids the deposit of free carbon.

The trough 41, acting as a vaporizing member for the liquid fuel, performs the function of a pilot baffle and divides the interior of the pot into two separate burner spaces connected by the central aperture of the trough. When the device is working at the pilot stage the pilot fire burns in or just below the central aperture 43. When the supply of oil is increased, the level of the fire drops, and combustion of the final mixture takes place at or below the level of the secondary air inlets 15 and the flame and the heated products of combustion flow downwardly a substantial distance into the chamber within and below the aperture 14.

It is also advantageous to direct air downwardly toward the top of the trough 41. Thus in Figure 1, I show the upper two rows of holes 16 as downwardly tilted. Any other suitable means for directing the air downwardly may be employed.

I claim:

1. In a liquid fuel burner, means for defining a combustion chamber, including a top wall and side walls, an inverted burner pot positioned above said top wall said top wall having a flame aperture, the interior of the burner pot being in direct communication with the interior of the combustion chamber through said flame aperture, a vaporizing member in the burner pot, and means for delivering a liquid fuel thereto, said pot including a normally closed top wall, and a circumferential side wall having a plurality of air inlet apertures spaced circumferentially thereabout, and located at various distances from the ends of the pot.

2. In a pot type liquid fuel burner, a pot having a generally cylindrical circumferential side wall, a normally closed top wall, and an open bottom, said circumferential side wall having a plurality of primary air inlets spaced circumferentially thereabout, and located at various distances from the ends of the pot, an upwardly concave vaporizing element located in said pot, intermediate the highest and lowest primary air inlets in said side wall, means for controllably delivering to said vaporizing element a supply of liquid fuel for vaporization therein, and means for delivering secondary air to the mixture of primary air and vaporized fuel flowing downwardly through the open bottom of the pot.

3. In a pot type liquid fuel burner, a pot having a generally cylindrical circumferential side wall, a normally closed top wall, and an open bottom, said circumferential side wall having a plurality of primary air inlets spaced circumferentially thereabout, and located at various distances from the ends of the pot, an upwardly concave vaporizing element located in said pot, intermediate the highest and lowest primary air inlets in said side wall, means for controllably delivering to said vaporizing element a supply of liquid fuel for vaporization therein, and means for delivering secondary air to the mixture of primary air and vaporized fuel flowing downwardly through the open bottom of the pot, said vaporizing element being in the form of a concave ring having a central aperture generally concentric with said side wall.

4. In a pot type liquid fuel burner, a pot having a generally cylindrical circumferential side wall, a normally closed top wall, and an open bottom, said circumferential side wall having a plurality of primary air inlets spaced circumferentially thereabout, and located at various distances from the ends of the pot, an upwardly concave vaporizing element located in said pot, intermediate

the highest and lowest primary air inlets in said side wall, means for controllably delivering to said vaporizing element a supply of liquid fuel for vaporization therein, means for delivering secondary air to the mixture of primary air and vaporized fuel flowing downwardly through the open bottom of the pot, said vaporizing element being in the form of a concave ring having a central aperture generally concentric with said side wall, and a radiating member arranged generally concentrically with said side wall, extending through the central aperture of said concave ring.

5. In a pot type liquid fuel burner, a pot having a generally cylindrical circumferential side wall, a normally closed top wall, and an open bottom, said circumferential side wall having a plurality of primary air inlets spaced circumferentially thereabout, and located at various distances from the ends of the pot, an upwardly concave vaporizing element located in said pot, intermediate the highest and lowest primary air inlets in said side wall, means for controllably delivering to said vaporizing element a supply of liquid fuel for vaporization therein, means for delivering secondary air to the mixture of primary air and vaporized fuel flowing downwardly through the open bottom of the pot, said normally closed top wall having an axial aperture, and a removable closure for said aperture.

6. In a pot type liquid fuel burner, a pot having a generally cylindrical circumferential side wall, a normally closed top wall, and an open bottom said top wall having a central opening, a removable closure for said opening, said circumferential side wall having a plurality of primary air inlets spaced circumferentially thereabout, and located at various distances from the ends of the pot, an upwardly concave vaporizing element located in said pot, intermediate the highest and lowest primary air inlets in said side wall, means for controllably delivering to said vaporizing element a supply of liquid fuel for vaporization therein, means for delivering secondary air to the mixture of primary air and vaporized fuel flowing downwardly through the open bottom of the pot, said vaporizing element being in the form of a concave ring having a central aperture generally concentric with said side wall, and a radiating member arranged generally concentrically with said side wall, and extending through the central aperture of said concave ring, said radiating member being mounted on and removable with said removable closure for the central opening of said top wall.

7. In a pot type liquid fuel burner, a pot having a generally cylindrical circumferential side wall, a normally closed top wall, and an open bottom, said circumferential side wall having a plurality of primary air inlets spaced circumferentially thereabout, and located at various distances from the ends of the pot, an upwardly concave vaporizing element located in said pot, intermediate the highest and lowest primary air inlets in said side wall, means for controllably delivering to said vaporizing element a supply of liquid fuel for vaporization therein, means for delivering secondary air to the mixture of primary air and vaporized fuel flowing downwardly through the open bottom of the pot, and an outer housing surrounding said pot and defining, with said pot, a pressure chamber in communication, through the air inlets of said circumferential side wall, with the interior of said pot, and means for delivering air, under pressure, to said pressure chamber, and for thereby maintaining a forced movement of air jets into the interior of said pot.

BRUCE HAYTER.

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