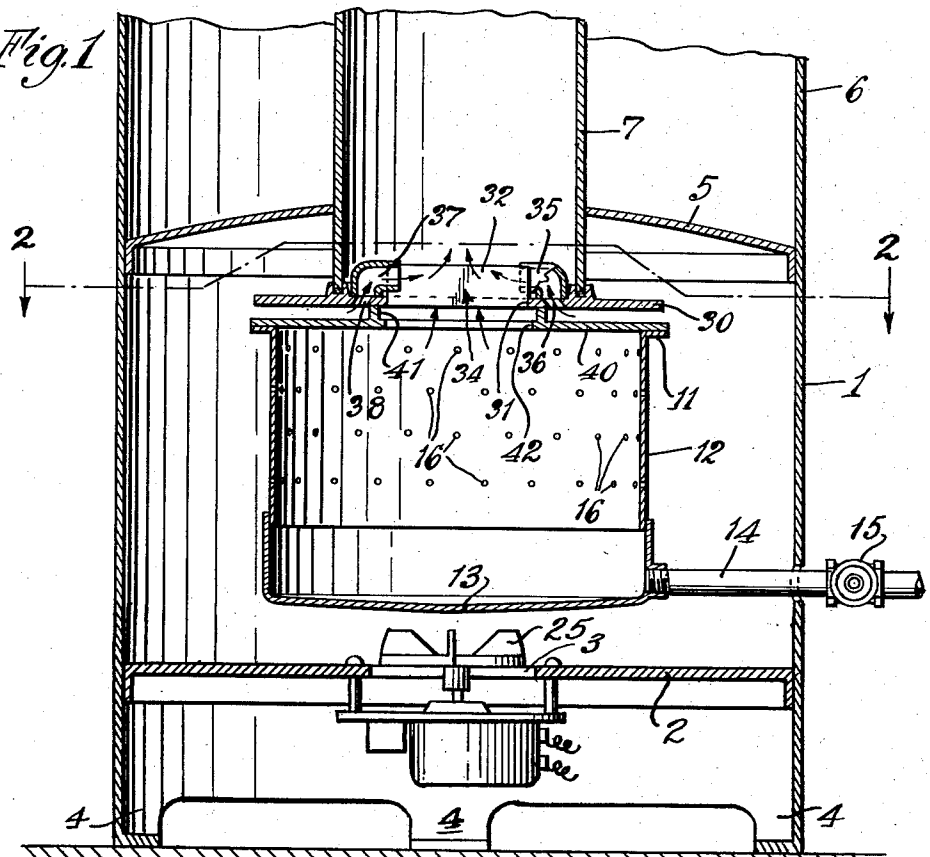
July 11, 1944. J. L. BREESE 2,353,438

POT TYPE BURNER AND MEANS FOR THE DELIVERY OF SECONDARY AIR

Filed June 16, 1941

Fig. 1



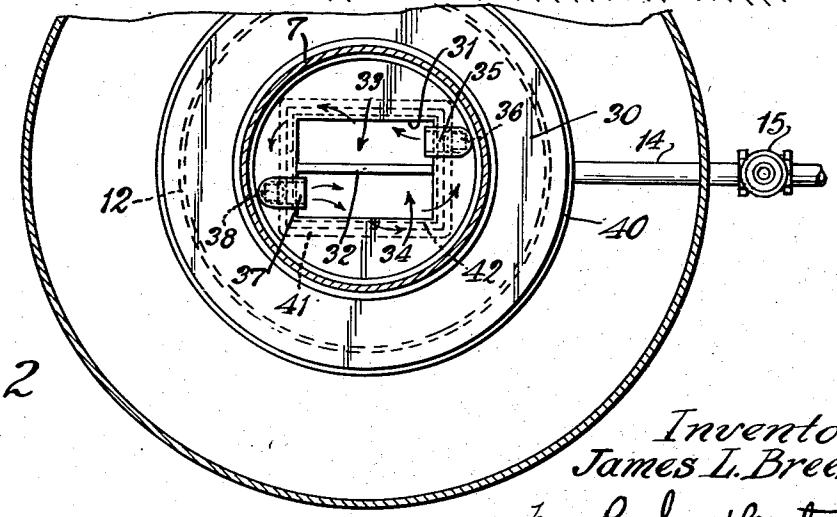


Fig. 2

Inventor
James L. Breese
by Parker & Carter
Attorneys.

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POT TYPE BURNER AND MEANS FOR THE DELIVERY OF SECONDARY AIR

James L. Breese, Santa Fe, N. Mex., assignor to Oil Devices, Santa Fe, N. Mex., a limited partnership of Illinois

Application June 16, 1941, Serial No. 398,293

7 Claims. (Cl. 158—91)

My invention relates to an improvement in liquid hydrocarbon burners and has for one purpose the provision of improved means for supplying secondary air thereto.

Another purpose is to provide improved means for supplying secondary air to a pot type burner employed in connection with a hot water heater.

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 drawing wherein:

Figure 1 is a vertical axial section; and

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

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

Referring to the drawing, 1 generally indicates a suitable base, having a bottom portion or wall 2 and an air inlet aperture 3. 4 indicate any suitable supporting legs, which are spaced apart to permit air to penetrate to the space between the wall 2. 5 is an upper wall, herein indicated as upwardly convex, and 6 indicates an upward extension or drum from the member 1, which may be employed, for example, as a tank for heating the hot water. The tank is completed by a central cylindrical passage 7, which extends downwardly through the wall 5.

At the lower end of the passage 7, I illustrate a wall 30 which has a central rectangular opening 31, which may be centrally divided as by the transversely extending vertical wall 32, which in effect divides the outlet 31 into two separate and parallel elongated outlets, which are indicated as 33 and 34. At one end of the outlet 33, I provide a secondary air injector or nozzle 35 in the form of a pipe angle in communication with an aperture 36 in the wall 30. A similar pipe 37, with its aperture 38, is provided for the opposite end of the outlet 34. Thus, the secondary air is directed toward the left into the outlet 33 and toward the right into the outlet 34, referring to the position of the parts as shown in Figure 2. This also causes a swirling or spiraling of the flame to wipe the sides of the tube 7 and create an improved heating efficiency.

In order to provide air access for the passages 36 and 38, I space the flame ring 40 downwardly below the plate 30, to which it may be connected, for example, by the neck 41, which surrounds a central rectangular opening 42 in the flame ring. Plate 30 and flame ring 40 together constitute a fire ring.

Secured to the flame ring 40, at its outer edge portion, is the flange 11 of a pot 12, having a concave bottom 13, in communication with any suitable liquid fuel inlet passage 14.

The flow of liquid fuel may be controlled by any suitable valve 15, herein shown as manual, but it will be understood that I may employ any suitable means, manual or automatic, for varying or controlling the rate of flow of liquid hydrocarbon fuel along the pipe 14 to the bottom 13 of the pot 12.

The wall of the pot 12 is provided with a plurality of primary air inlet apertures 16, so proportioned as to provide sufficient primary air for combustion at the high stage of the burner. The height of the combustion or flame is determined by the volume of fuel admitted along the pipe 14, but it will be understood that at the high fire stage the necessary supply of primary air is supplied through the apertures 16, but that additional means must be employed for supplying secondary air to complete the mixture.

I employ a pot of the so-called hydroxylating type in which liquid hydrocarbon is vaporized in response to the heat of combustion in or above the pot, and the vaporized hydrocarbon is first combined with the primary air supply, and the consequent mixture is then combined with the secondary air supply for complete combustion. At the pilot stage, the upper rows of apertures 16 may provide the secondary air supply for the combustion taking place within the pot. At the full flame or high fire stage the secondary air is admitted through the apertures 35, 37 as above described.

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 the description and drawing 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:

I illustrate a structure which is ideally adapted for the employment of a pot type burner in hot water heaters, but which is not limited to that use.

In the form herein shown I illustrate a burner pot having primary air apertures adequate to supply the primary air necessary for the full flame or maximum use of the pot. The pot is associated with a combustion passage extending upwardly above the pot and adapted to receive the

mixture formed in the pot. It will be understood, of course, that any suitable flue means are employed for maintaining an upward circulation through the passage 7.

At the high fire stage the inlets 16 of the pot are adequate to supply all the primary air necessary for the liquid hydrocarbon vaporized in the pot. This initial mixture of vaporized liquid hydrocarbon and primary air flows upwardly into the tube 7 and receives its secondary air at a level above the pot. Preferably the secondary air is so supplied as to cause a spiraling or swirling of the flame in the tube in such fashion that the flame and the hot products of combustion wipe across the inner wall of the tube 7 and provide heat exchange of maximum efficiency.

I claim:

1. In a pot type heater, a pot with a wall having a plurality of primary air inlet apertures therein, means for supplying a liquid fuel to said pot at a variable and controllable rate, a flame chamber located above and in communication with the interior of said pot, a generally horizontal fire ring partially closing the top of said pot, said fire ring having a plurality of adjacent apertures in communication with the flame chamber, and secondary air inlet passage means adapted to direct secondary air laterally across said apertures.

2. In a pot type heater, a pot with a wall having a plurality of primary air inlet apertures therein, means for supplying a liquid fuel to said pot at a variable and controllable rate, a flame chamber located above and in communication with the interior of the pot, a generally horizontal partition between said pot and the flame chamber, said partition having a pair of adjacent apertures therein to permit communication between the pot and flame chamber, and means for delivering secondary air transversely across said apertures, the secondary air being delivered in one direction across one such aperture and in a different direction across the other aperture.

3. In a pot type heater, a pot with a wall having a plurality of primary air inlet apertures therein, means for supplying a liquid fuel to said pot at a variable and controllable rate, a flame chamber located above and in communication with the interior of the pot, a generally horizontal partition between said pot and the flame chamber, said partition having a pair of adjacent apertures therein to permit communication between the pot and flame chamber, and means for delivering secondary air transversely across said apertures, the secondary air being delivered in one direction across one such aperture and in an opposite direction across the other aperture.

4. In a pot type heater, a pot with a wall having a plurality of primary air inlet apertures therein, means for supplying a liquid fuel to said pot at a variable and controllable rate, a flame chamber located above and in communication with the interior of the pot, and a pair of superposed vertically spaced partitions between said pot and flame chamber, a neck closing the space between said partitions, said partitions being apertured in line to give communication to the interior of the pot and the flame chamber, the space between said partitions and said neck being open to the atmosphere, and the upper partition having therein secondary air inlet apertures adapted to direct secondary air to the interior of said flame chamber.

5. In a pot type heater, a pot with a wall having a plurality of primary air inlet apertures therein, means for supplying a liquid fuel to said pot at a variable and controllable rate, a flame chamber located above and in communication with the interior of the pot, and a pair of superposed vertically spaced partitions between said pot and flame chamber, a neck closing the space between said partitions, said partitions being apertured in line to give communication to the interior of the pot and the flame chamber, the space between said partitions and exterior to said neck being open to the atmosphere, the upper partition having therein secondary air inlet apertures adapted to direct secondary air to the interior of said flame chamber, and air directing nozzles associated with said apertures and adapted to direct air inwardly toward the axis of the burner.

6. In a pot type heater, a pot with a wall having a plurality of primary air inlet apertures therein in its wall, means for supplying a liquid fuel to said pot at a variable and controllable rate, a flame chamber located above and in communication with the interior of the pot, and a pair of superposed vertically spaced partitions between said pot and flame chamber, a neck closing the space between said partitions, said partitions being apertured in line to give communication to the interior of the pot and the flame chamber, the space between said partitions and exterior to said neck being open to the atmosphere, the upper partition having therein a pair of generally diametrically opposed secondary air inlet apertures adapted to direct secondary air to the interior of said flame chamber, and an air inlet nozzle associated with each said aperture and adapted to direct a jet of secondary air generally toward the axis of the burner.

7. In a pot type heater, a pot with a wall having a plurality of primary air inlet apertures therein, means for supplying a liquid fuel to said pot at a variable and controllable rate, a flame chamber located above and in communication with the interior of the pot, and pair of superposed vertically spaced partitions between said pot and flame chamber, a neck closing the space between said partitions, said partitions being apertured in line to give communication to the interior of the pot and the flame chamber, the space between said partitions and exterior to said neck being open to the atmosphere, the upper partition having therein a pair of generally diametrically opposed secondary air inlet apertures adapted to direct secondary air to the interior of said flame chamber, and an air inlet nozzle associated with each said aperture and adapted to direct a jet of secondary air generally toward the axis of the burner, the direction of delivery of said nozzles being generally opposed and along generally parallel paths located respectively at opposite sides of the axis of the burner whereby a spiral of flame is maintained in the flame chamber.

JAMES L. BREESE.