June 20, 1939. K. S. JENSON 2,162,844

OIL PILOT DEVICE

Filed Nov. 19, 1937

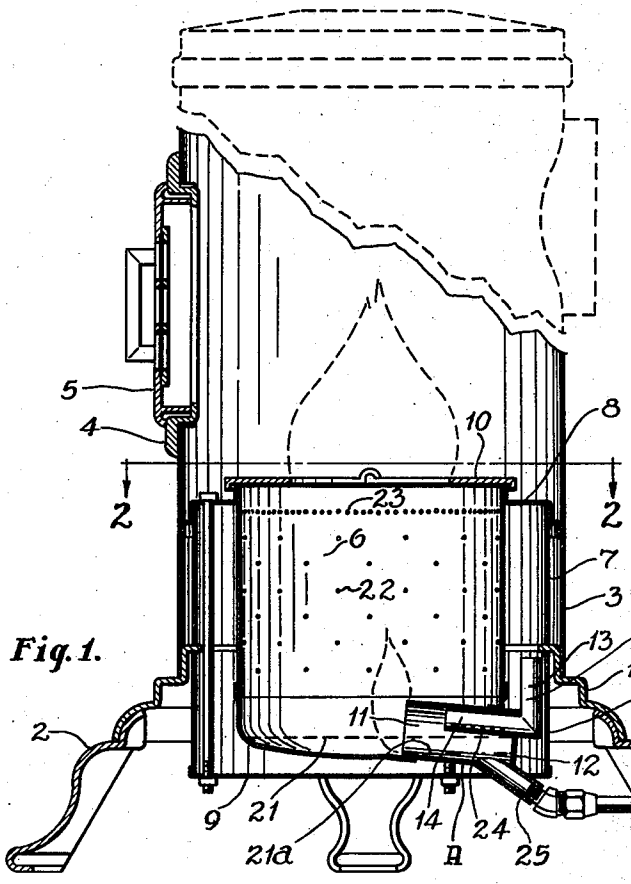

Fig. 1.

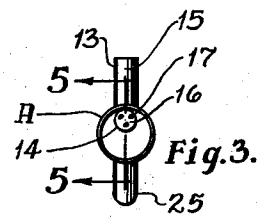

Fig. 3.

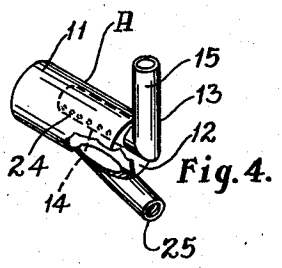

Fig. 4.

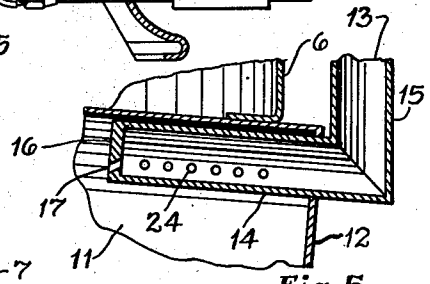

Fig. 5.

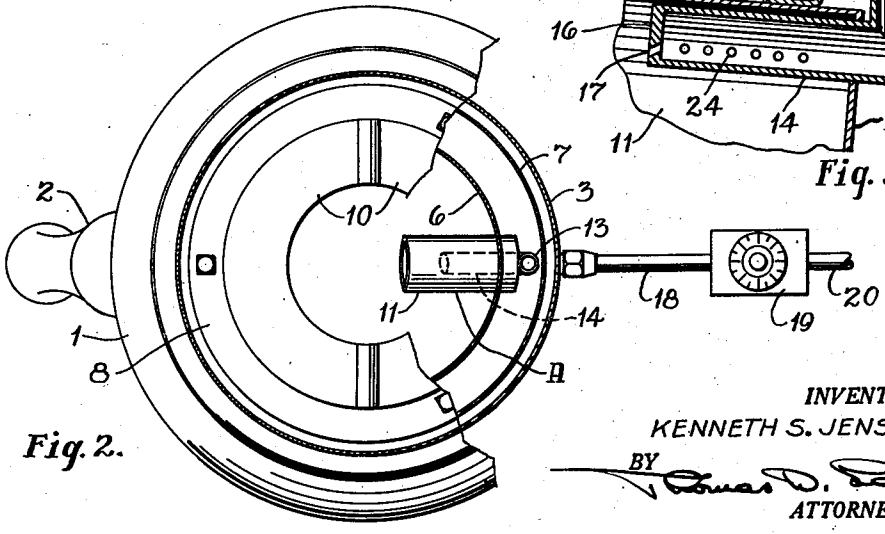

Fig. 2.

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OIL PILOT DEVICE

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6 Claims. (Cl. 158—91)

The present invention relates to a pilot device for oil burners, and more particularly to a pilot device adapted to be used with a gravity feed oil burner.

Various expedients have been tried in an attempt to produce a satisfactory oil pilot flame in natural draft, gravity feed oil burners, but so far as is known, all of such devices produced up to the present time have failed to satisfactorily solve the problem.

An object of the present invention is to make an improved oil pilot device.

Another object is to make an oil pilot device for an oil burner of the gravity feed type.

Another object is to make a pilot device for an oil burner with auxiliary air supply to the pilot flame.

In order to attain these objects, there is provided, in accordance with one feature of the invention, a pilot device mounted in an oil burner to have the mouth of the pilot device positioned in a flame area of the burner to ignite the pilot device before extinguishing of the burner. These and other features of the invention will be more fully set forth in the following descriptions and in the accompanying drawing, wherein:

Figure 1 is a vertical sectional view through a heater having a burner therein, said burner being provided with a pilot device embodying the present invention, the upper part of the heater being broken away and the extreme top portion of the heater being indicated in dotted lines,

Figure 2 is a sectional view on the line 2—2 of Figure 1,

Figure 3 is a view in front elevation of the pilot device,

Figure 4 is a view in perspective of the pilot device, a portion of one side being broken away to show the interior construction, and,

Figure 5 is an enlarged fragmentary sectional view of the pilot burner as on the line 5—5 of Figure 3.

Referring to the drawing in detail, the heater shown in Figure 1 comprises a conventional base ring 1, legs 2, body cylinder 3, door frame 4, and door 5. A "Breese" type burner 6 is here shown as being mounted in the heater in a conventional manner with a conventional type of housing cylinder 7, top baffle 8, apertured bottom plate 9, and burner top ring 10. The particular type of burner is, however, not material to the invention. The construction up to this point is strictly conventional and it is believed unnecessary to enter into further detail with respect to this portion of the structure.

Referring now to the portion embodying the present invention, a pilot device A comprises a cylindrical housing 11 having a closure member 12 secured across the outer end thereof, said closure member having an opening therein, in which is fixedly mounted an L-shaped pipe 13, said L-shaped pipe having one branch 14 thereof mounted substantially parallel to the axis of the housing 11, and the other branch 15 thereof extending substantially vertically outside of the burner 6.

The end of the branch 14 is closed by a plate 16 (see Figure 3) which is provided with a plurality of relatively small perforations 17, which are drilled at an acute angle to the axis of the branch 14 as shown in Figure 5. The lower side of the branch 14 is also provided with a plurality of perforations 24. The housing 11 is mounted in the burner 6 to have a slight downward tilt toward the closed end 12 of the housing 11, and an oil supply tube 25 is mounted to open into the interior of the housing 11. The oil supply tube 25 is connected, by means of conventional fittings, to an oil supply line 18, which is here illustrated as being connected to an automatic constant level valve 19 of a conventional type, from whence a line 20 is connected to an oil supply tank, not shown, of a conventional type.

The operation of the device is as follows: The valve 19 we will assume is adjustable to two principal positions, namely, an idling position and a full burning position. It will be understood by those conversant with the art that the full burning position is adjustable in a conventional manner to higher or lower flame conditions, but this is not essential to consider for the purpose of the present invention. In the idling or pilot position of the valve 19, a flow of oil is maintained to provide a small pool 21*a* of oil within the housing 11 but preferably not extending beyond the open inner end of the housing 11. In the full burning position a pool 21 of oil will be maintained at a constant level in the bottom of the burner bowl 6 as determined by the setting of the valve 19.

As is known to those who are familiar with the operation of this type of burner, in starting the burner a small pool of oil is first admitted into the bottom of the burner bowl 6, and this oil is ignited as by dropping a lighted match or a small piece of burning paper into the oil pool. When combustion originates in the oil pool, the flame first burns on the surface of the pool of oil and when thus burning, the flame is somewhat smoky. As the burning continues, the burner bowl 6 and

ring 10 are heated, as is also the oil in the pool 21. When the heating of the oil and the burner 6 reaches a certain point, the flame rises, due to the fact that the increase in the rate of vaporization of the oil produces a quantity of vapor without sufficient air to support combustion within the bowl 6. The burner is purposely designed to accomplish this object, and to this end the area of the openings 22 is such that air admitted through the openings 22 in the wall of the burner bowl 6 is not sufficient to support combustion at the normal full burning rate of oil vaporization. Supplementary openings 23 are provided around the upper end of the burner bowl, and these openings slope angularly upward so that the incoming air from these openings feeds into the vapor stream as the vapor stream reaches the ring 10 to provide a combustible mixture so that combustion will begin as the vapor emerges through the central opening in the ring 10.

The above description of burner operation is for the burner proper, without considering the pilot device. The operation of the pilot device is as follows: Assuming that the burner is out and the parts are cold, a small quantity of oil should be admitted through the supply line 20, the constant level valve 19, pipe 18, and the tube 25, into the housing 11, and then permitted to overflow slightly into the base of the burner bowl 6, to provide a small pool of oil therein. The valve 19 may then be adjusted to the high fire position and the pool of oil ignited. The burner would be permitted to burn in the high fire position in the conventional manner until the parts are thoroughly heated, at which time the valve may be adjusted to the idling or pilot position. As the flame recedes to the pilot condition air is drawn in by the natural draft action, which is essential to the successful operation of this type of burner, through the L-shaped pipe 13, passing out through the openings 17 and 24 into the interior of the housing 11. These openings are of a size and number to provide a suitable amount of air to support combustion for the idling flame only, and are not sufficient in total area to noticeably affect the air supply under full flame burning conditions. The total area of these openings is not critical since the amount of air required to support combustion of the idling flame is relatively very small as compared to that required to support combustion of the full flame condition.

The setting of the valve 19 to the idling, or pilot flame position, controls the level of the oil so as to be entirely within the housing 11. Therefore, assuming that the housing 11 and associated parts are heated, as well as the small amount of oil in the pool within the housing 11, this oil will vaporize, and, being supplied with a sufficient amount of air through the openings in the L-shaped tube 13 to provide complete combustion, the idling flame will burn with a clear smokeless flame. It is apparent also that this flame will, by convection, and by conduction through the metal of the bowl with which the housing 11 is in intimate contact, maintain the entire burner bowl 6 in a heated condition so that when the valve 19 is turned to the full burning position to thereby raise the level of the oil to form a pool 21, the time required to heat this oil and the burner to a high fire condition will be greatly shortened, and the burner will reach its clean, full-flame, operating condition much more quickly than when the burner is starting from a cold condition.

The top of the tube arm 13 should be above the maximum oil level within the burner bowl 6 to avoid the possibility of oil overflowing through this tube arm 13 during a flooded condition of the burner.

Thermostatic valve actuating means of a conventional type, not shown, can be associated with the valve 19 so that the valve 19 can be controlled by said thermostatic means, mounted to be actuated by predetermined changes in the temperature, of a medium to be heated by the burner.

I claim:

1. In combination with an oil burner having a perforated oil vaporizing chamber, a substantially horizontally disposed housing having an end thereof opening into the oil pool area of said vaporizing chamber, a depressed portion in the base of said housing to retain a supply of oil, oil supply means feeding through said housing into the interior of said chamber, oil control means mounted to control the oil level substantially within said housing and a tube mounted along the upper side of said housing and extending outwardly beyond said perforated vaporizing chamber and being open to the atmosphere above the maximum oil level in said vaporizing chamber, said tube having a plurality of downwardly directed openings within the housing, said openings being of small total area to support combustion of a pilot flame.

2. In combination with an oil burner having an oil vaporizing chamber with perforated side walls and imperforate bottom portion, a substantially horizontally disposed pilot housing mounted to open into the low point of said bottom portion, the bottom wall of said housing being substantially continuous with the bottom wall of said portion, oil supply means feeding into the interior of said housing, oil control means mounted to control the oil level substantially within said housing on pilot setting and to overflow said housing into said imperforate bottom portion at full burning setting to render said pilot inoperative and an air supply tube mounted along the upper side of said housing, and extending outwardly and upwardly and being open to the atmosphere only above the maximum oil level in said vaporizing chamber.

3. In combination with an oil burner having an oil vaporizing chamber with perforated side walls and imperforate bottom portion, a substantially horizontally disposed pilot housing mounted to open into the low point of said bottom portion, the bottom wall of said housing being substantially continuous with the bottom wall of said portion, oil supply means feeding into the interior of said pilot housing, oil control means mounted to control the oil level substantially within said housing on pilot setting and to overflow said housing into said imperforate bottom portion at full burning setting and an air supply tube mounted along the upper side of said housing and having a plurality of downwardly directed perforations of limited area within said housing, said air supply tube extending outwardly and upwardly and being open to the atmosphere only above the maximum oil level in said vaporizing chamber.

4. A pilot device for an oil burner having a bowl-like base portion adapted to contain a pool of oil, said pilot device comprising a substantially horizontally disposed housing adapted to be mounted to open into a low point of said bowl-like base portion, oil supply means feeding into

the interior of said housing, oil control means mounted to control the oil level substantially within the housing on pilot setting and to overflow said housing into said bowl-like portion at full burning setting, and an air supply tube mounted along the upper side of said housing, said air supply tube extending outwardly and upwardly and being open to the atmosphere only above the maximum oil level in said bowl-like base portion, said pilot device being rendered inoperative by a full burning operation of said oil burner.

5. In combination with an oil burner having a perforated oil vaporizing chamber; a housing having a portion thereof opening into said vaporizing chamber; a depressed portion in the base of said housing to retain a supply of oil; oil supply means; oil control means mounted to selectively control the feed of oil through said housing to said chamber to maintain a predetermined oil level within said housing; and air supply means mounted along the upper side of said housing and extending outwardly of said perforated vaporizing chamber and being open to the atmosphere above the maximum oil level in said vaporizing chamber, said air supply means having a plurality of openings within said housing and said openings being of small total area to support combustion of a pilot frame.

6. The combination with an oil burner having an oil vaporizing chamber with perforated side walls and an imperforate bottom portion defining an oil pool area; a substantially horizontally disposed pilot housing opening into said oil pool area of said chamber; oil supply means feeding into the interior of said housing, oil control means mounted to control the oil level substantially within said housing on pilot setting and to overflow said housing into said imperforate bottom portion at full burning setting to render said pilot inoperative; and air supply means mounted to discharge into said housing at a point above the oil level therein, said air supply means being mounted on said housing and extending outwardly and upwardly therefrom to be open to the atmosphere only above a maximum oil level in said vaporizing chamber.

KENNETH S. JENSON.