Aug. 4, 1942. R. E. MAYO 2,292,339

LIQUID FUEL BURNER

Filed Feb. 14, 1939

Fig. 1.

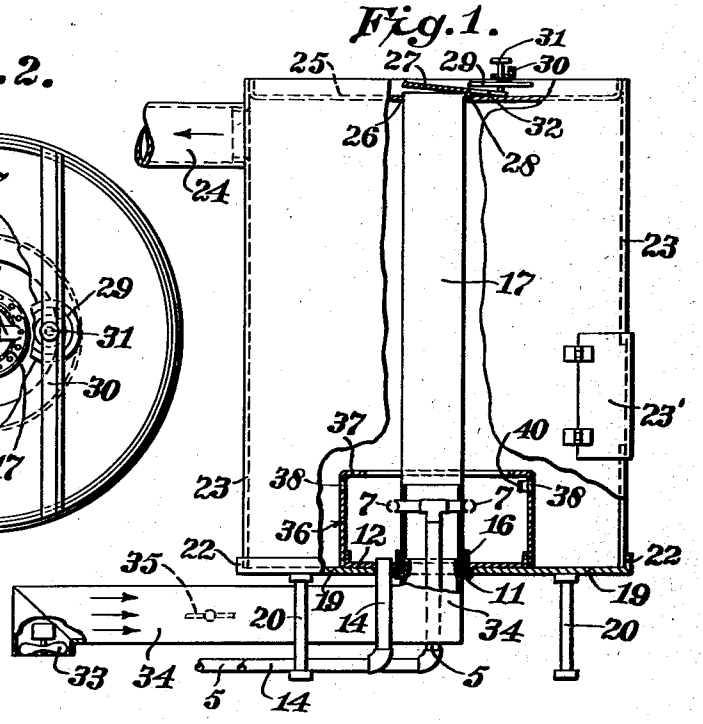


Fig. 2.

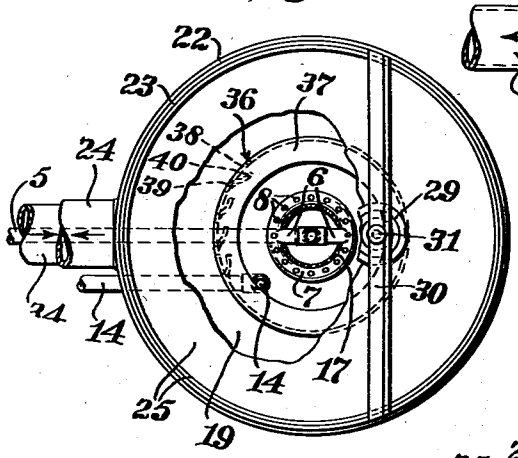


Fig. 3.

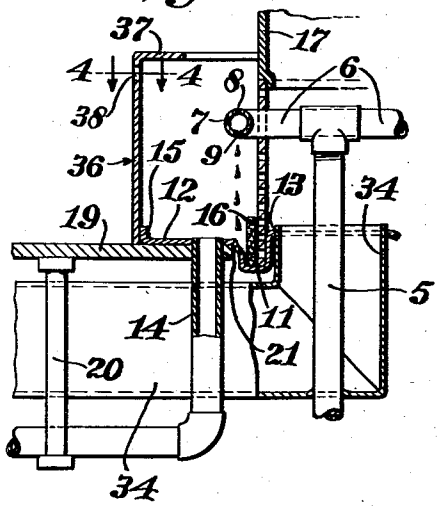


Fig. 5.

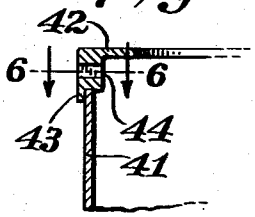


Fig. 6.

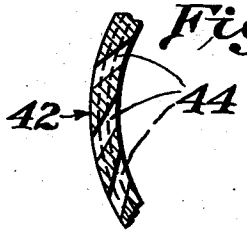
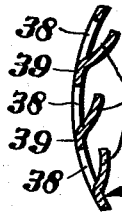


Fig. 4.



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2,292,339

LIQUID FUEL BURNER

Reubin E. Mayo, Snow Hill, N. C.

Application February 14, 1939, Serial No. 256,374

3 Claims. (Cl. 158—91)

This invention relates to liquid fuel burners of the type in which the fuel burns as a vapor from a conduit which is maintained at a liquid vaporizing temperature by the heat of the flame.

Such burners require an initial heating to bring them to the temperature at which the liquid fuel will be vaporized. After the burner has reached a vaporizing temperature, the initial heating means is no longer required and its burning should cease. A feature of the burner of the present invention is the provision of a burner which will positively function in this manner. Furthermore, the invention provides means for delivering air for combustion both to the initial heating means and to the vaporized fuel.

A preferred embodiment of the invention is illustrated in the accompanying drawing in which:

Figure 1 is a side elevation of the burner, parts being broken away to show the interior construction.

Fig. 2 is a plan view of Figure 1, a portion of the top being broken away.

Fig. 3 is an enlarged view of the lower portion of the burner as it appears in Figure 1.

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

Fig. 5 illustrates a modification of the upper portion of the burner chamber.

Fig. 6 is a section on the line 6—6 of Fig. 5.

The liquid fuel to be burned is delivered from any suitable source of supply through a pipe having a riser portion 5. At the upper end of this pipe are branches 6 supporting a ring-shaped conduit 7. In the upper side of conduit 7 are openings 8, and in the under side thereof are openings 9.

Directly beneath the ring-shaped conduit 7 is an annular trough 11 formed in a circular plate 12 having a central opening 13. The trough 11 should have the same radius as the conduit 7, so that the openings 9 of the conduit are directly above the trough. Any liquid fuel admitted to the conduit 7 will consequently drop into the trough.

To carry off excess fuel in the event that it overflows the trough, a return pipe 14 is secured to the plate 12 outside of the trough. To prevent such excess fuel from running off the plate 12, the outer edge of the plate should have an upturned flange 15 and its edge at the opening 13 should be of the same height. Within the trough 11 to absorb the liquid which drops therein is a kindler 16 of ordinary construction.

Also seated within the trough and lying inside of the kindler 16 is the lower portion of a cylindrical air duct 17. This duct is perforated from its base to a point slightly above the ring-shaped fuel conduit 7, and through these perforations air is supplied for combustion. Air may be admitted to the interior of duct 17 either through opening 13 of plate 12 or through the upper open end of the duct, as will later appear. The branch pipes 6 pass through the duct 17, and the ring-shaped conduit may be supported in this manner.

The plate 12 rests upon a circular base plate 19 supported upon standards 20. Centrally of base plate 19 is an opening 21 within which trough 11 lies, and by which plate 12 is centered upon base plate 19. The periphery of base plate 19 is flanged at 22 and within this flange rests the cylindrical wall 23 forming the side of the burner casing. Near the top of the casing is an outlet 24 for connection to a chimney to carry off the products of combustion.

The top of the casing is closed by a plate 25 having a central opening 26 of the same size as the air duct 17. The upper end of the duct should closely fit the opening 26 to form a seal. To close the upper end of duct 17, a valve 27, pivoted at 28, is provided. A thermostat 29, carried by a cross bar 30 of the casing, may be provided to open the valve by pressure upon an operating arm 32 thereof, and an adjustable screw 31 may also be provided to manually control the position of the valve 27.

Air may be forced into the duct 17 by means of a blower 33 located in an air conduit 34 secured in the opening 13. The inlet to conduit 34 may extend to the exterior of the building or space to be heated, so that fresh air will be drawn in. A damper 35 may be located in the air conduit 34.

To form a confined combustion chamber within the casing formed by the outer wall 23, a cylindrical shell 36 may rest upon the base plate 19 and fit the outside of the upturned flange 15 to form a seal. At its upper edge the shell 36 may be inturned to form a flange 37 extending toward the air duct 17 at a point slightly above the perforated portion thereof.

Openings 38 should be formed near the top of shell 36 to admit air and prevent the occurrence of a dead space at this point. These openings preferably should be closely spaced to each other, and may be formed by punching out the material leaving a small connecting portion 39. The portion 40 which is punched out forms vanes, as shown in Fig. 4, which tend to cause a circular flow of the flame within shell 36.

The provision of shell 36 results in a better

mixture of the air and fuel vapor for combustion, and serves to cause the heated air to swirl about within the outer casing and more thoroughly contact the walls thereof. The casing wall will consequently take up a greater part of the heat of the heated air, and improved radiation will result.

In use, the liquid fuel will be admitted to pipe 5 from which it will flow into the ring-shaped conduit 7 and drop through openings 9 into the trough. A lighted piece of paper or other waste, or a lighted kindler at the end of an applicator, may be inserted through a door 23' in casing wall 23, and through the opening between flange 37 and wall 17 to contact the kindler 16 to ignite it. The kindler 16 will continue to burn as long as liquid fuel drops from openings 9, and this will continue until the ring-shaped conduit 7 and branch pipes 6 are heated sufficiently high to cause the entering liquid fuel to become vaporized. The fuel vapor so formed will issue through the upper openings 8, and the flame thereafter will be that due to the combustion of this vapor. This flame will maintain the conduit 7 and pipe 6 at fuel vaporizing temperature.

The blower 33 may be started either when the kindler is first ignited, or not until the flame occurs entirely from the vaporized fuel. Use of the blower will result in high heat from the flame, so that if a high heat is not required, the blower may be turned off. If desired, the blower may be allowed to operate continuously, and the thermostat 29 may be set to open valve 27 when the room temperature becomes high, so that cool air will pass upwardly through duct 17 and enter the room to reduce the temperature of the air. The release of pressure in the air duct 17, due to opening of the valve 27, will decrease the amount flowing to the flame, and this will decrease the heat generated.

If a low heat is required, the blower 33 may be turned off and the damper 35 may be closed, so that no air is admitted through conduit 34. The valve 27 may then be maintained open by adjustment screw 31, so that air may enter air duct 17 through its open top and pass downwardly and out through the perforated lower portion thereof to the flame. If this manner of operation is desired, the thermostat 29 may not only open valve 27 when the temperature of the space being heated becomes high, but the thermostat may turn off the blower as well, the damper being left open at all times. As soon as the space becomes cooled, the thermostat may restart the blower 33 and close the valve 27. It is thus apparent that with the apparatus disclosed, the operation of the burner may be controlled in a variety of different manners as best suits particular conditions.

In the modification of Figs. 5 and 6, the combustion chamber is formed by a cylindrical wall 41 and an upper ring-shaped member 42 which rests thereon. A depending lip 43 may retain the member 42 in place on wall 41. Openings 44 may be formed through the vertical portion of member 42 for the admission of air, and these openings should be inclined as appears in Fig. 6 to cause a rotation of the flaming gases within the combustion chamber. The member 42 may be of cast material.

It is to be understood that variations from the details of the apparatus disclosed may be made while still retaining the features of the invention. The burner is not confined to the proportions disclosed, nor to this exact arrangement of parts. If desired, parts shown may be made integral, or may be subdivided. For example, the trough plate 12 and base plate 19 may be one plate having the trough formed therein. Likewise, the air duct 17 may be made in two pieces, the lower perforated portion being one piece and the upper imperforate portion being another piece, these pieces being connected as by a telescopic joint.

I claim:

1. A burner comprising a trough, a kindler in said trough, a conduit above said trough having means for connection to a source of liquid supply and having openings above the trough for the escape of fuel, a casing surrounding said trough and said conduit and closed at both ends thereof, a duct extending between the closed ends of said casing and open at both ends, said duct lying close to said trough and said conduit, and being perforated between them, and closure means for the opposite ends of said duct to control the inlet of air into said tube from the opposite ends thereof.

2. A burner comprising a trough, a kindler in said trough, a conduit above said trough having means for connection to a source of liquid supply and having openings above the trough for the escape of fuel, a casing surrounding said trough and said conduit and closed at both ends thereof, a duct extending between the closed ends of said casing and open at both ends, said duct being close to said trough and said conduit, and being perforated between them, a blower at one end of said duct to deliver air thereto for combustion, and a valve at the other end of said duct.

3. A burner comprising a trough, a kindler in said trough, a conduit above said trough having means for connection to a source of liquid supply and having openings above the trough for the escape of fuel, a casing surrounding said trough and said conduit and closed at both ends thereof, a duct extending between the closed ends of said casing and open at both ends, said duct being close to said trough and said conduit and being perforated between them, and a thermostatically controlled valve at one end of said duct acting to open upon excessive heat from the burner.

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