Feb. 26, 1952 P. WOLLNER 2,587,078

VAPORIZING TYPE OIL BURNER APPARATUS

Filed Jan. 22, 1949 2 SHEETS—SHEET 1

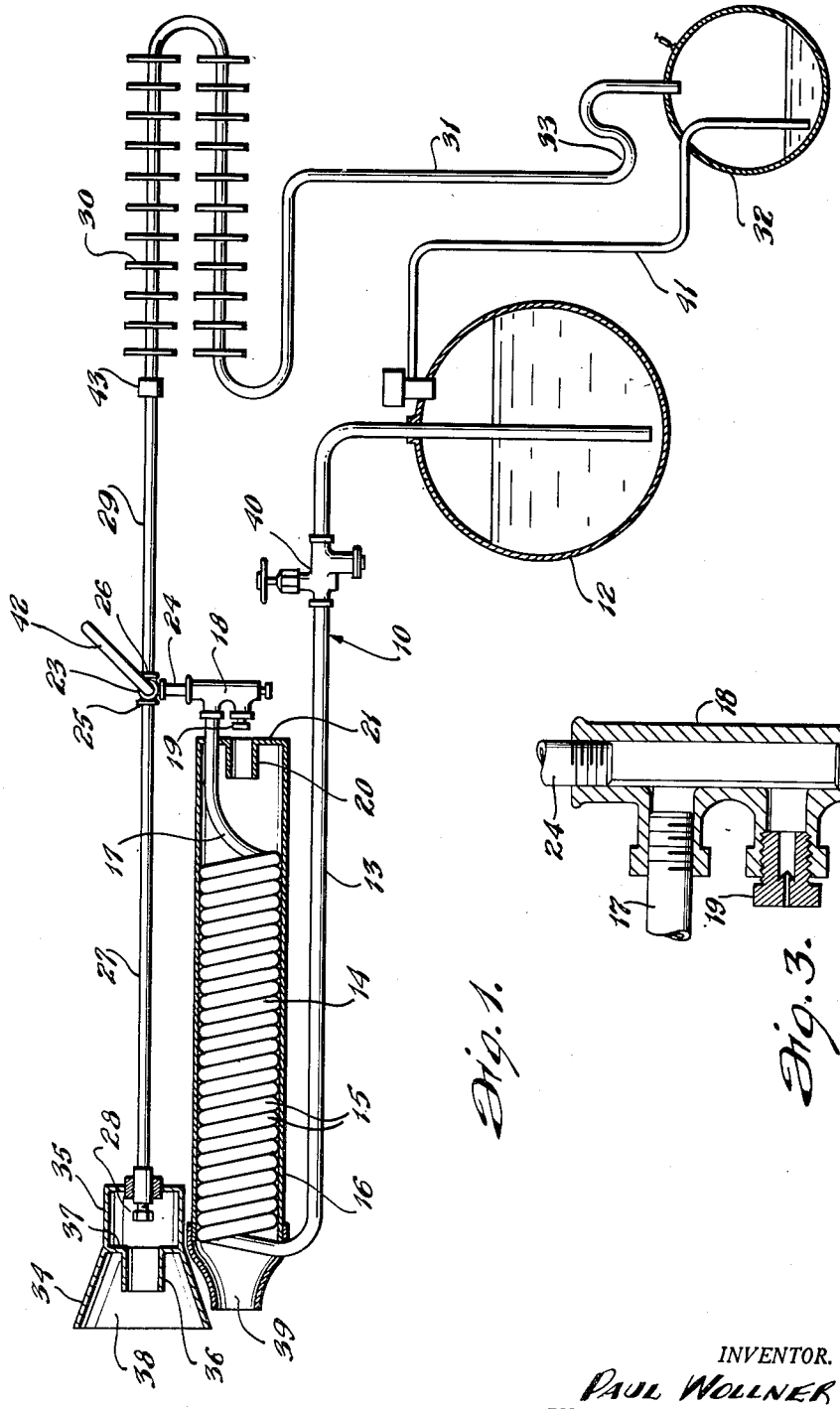


Fig. 1.

Fig. 3.

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2 SHEETS—SHEET 2

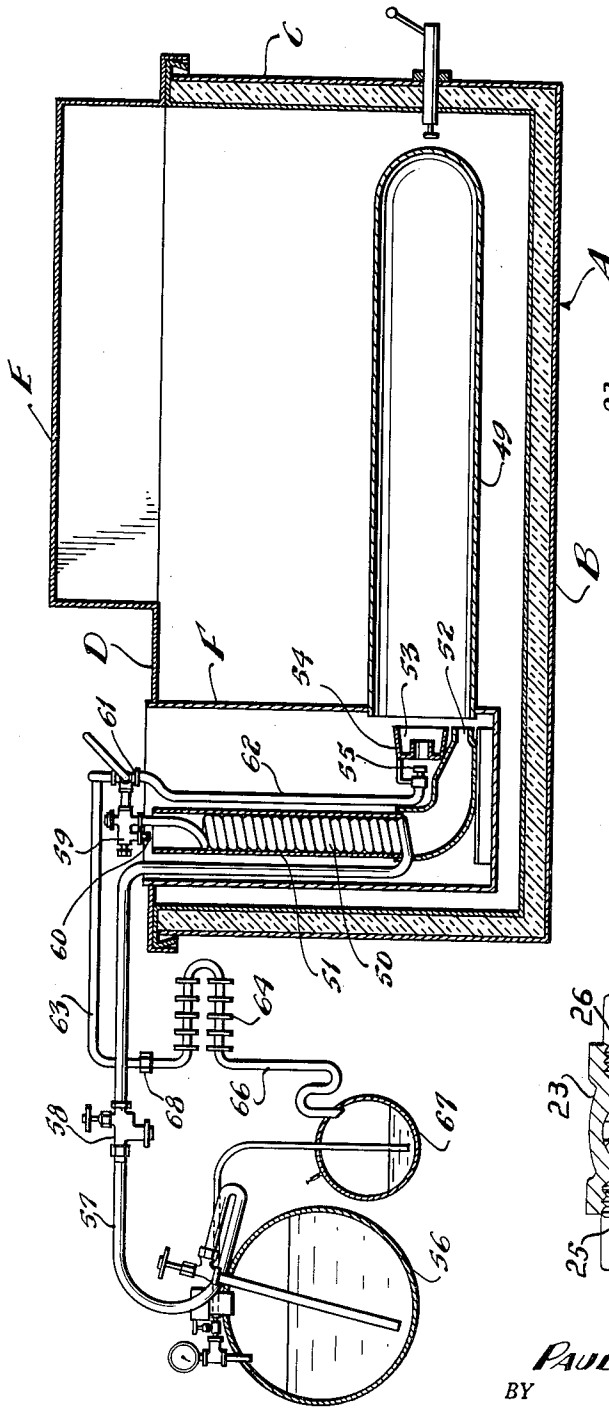


Fig. 2.

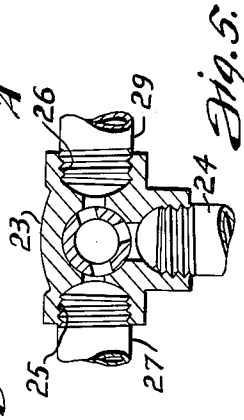


Fig. 3.

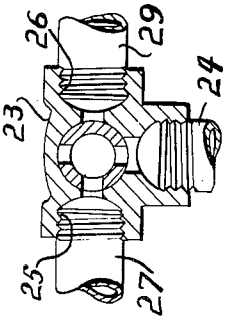


Fig. 4.

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UNITED STATES PATENT OFFICE

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VAPORIZING TYPE OIL BURNER APPARATUS

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Application January 22, 1949, Serial No. 72,179

1 Claim. (Cl. 158—53)

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This invention relates to a vaporizing type oil burner apparatus which is constructed and arranged to generate vaporized fuel to permit the full flow required to the main burner and to discontinue the flow thereof while continuing to generate the full supply of vaporized fuel.

The invention has in view to provide a vaporizing type burner apparatus having a pilot burner arranged to project a flame axially of a vaporizing coil for generating vapor in substantially constant pressure and volume together with means for regulating the flow thereof to the main burner.

Another object of the invention is to provide a burner apparatus of said character in which the pilot burner is arranged to operate at all times at maximum efficiency so as to avoid overheating or underheating of the coil to thereby prevent the deposit of carbon soot on the coil.

A further object of the invention is to provide a vaporizing type burner apparatus in which the main burner may be arranged in either fully on or off condition or the same may be regulated to vary the size of the flame.

A further object of the invention is to provide an apparatus of said character including a condensing coil having an admission orifice equal in area to the orifice of the main burner for receiving and condensing the vapor and returning the same to a return tank when the main burner is turned off.

With the foregoing and other objects in view, reference is now made to the following specification and accompanying drawings in which the preferred embodiments of the invention are illustrated.

In the drawings:

Fig. 1 is a schematic view showing parts in section of a vaporizing type burner apparatus constructed in accordance with the invention.

Fig. 2 is a view in elevation of a burner apparatus constructed in accordance with the invention and shown with the vaporizing coil and the main burner in position in a bituminous material melting apparatus.

Figure 3 is a sectional view of the fitting 18.

Fig. 4 is a sectional view of a three-way valve which is set to direct the flow of the vaporized fuel to the main burner and to shut off the flow to the condenser.

Fig. 5 is a similar view of the three-way valve which is set to direct a portion of the flow to the main burner and the remainder of the flow to the condenser.

Referring to the drawings by characters of reference and more particularly to the form of the invention shown in Fig. 1 of the drawings, the

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burner apparatus is of the type adapted to provide a torch-like flame but it is to be understood that the main burner may be of any desired character to provide the required type of flame.

As illustrated, the apparatus includes a system indicated generally by the reference character 10 for generating hydrocarbon vapor under pressure and at substantially constant volume. The system also includes a fuel supply tank 12 adapted to contain hydrocarbon oil and the like which is under pressure therein to force the oil through the pipe line 13 to a vaporizing coil 14 consisting of a plurality of adjacent convolutions 15 arranged within a cylindrical shell 16.

The pipe line 13 extends through an opening in the shell 16 adjacent the outer end thereof and is connected with the outermost convolution of the coil 14 with the inner end of the coil connected by a pipe line 17 with a fitting 18 having a pilot burner nozzle 19 located at the rear of the shell 16 and in axial alignment with the coil 14. The shell 16 is provided with an open-ended pipe 20 which is affixed to the rear wall 21 thereof in forwardly spaced relation from the pilot nozzle 19.

The system also includes a standard three-way valve 23. The three-way valve 23 is connected with the fitting 18 by a short length of pipe 24 and is formed with oppositely disposed outlets 25 and 26, the former being connected by a pipe line 27 with the main burner nozzle 28 and the outlet 26 being connected by a pipe line 29 with a condenser 30. The condenser 30 is connected by a pipe line 31 with a return tank 32 and with a vapor trap 33 connected in said pipe line adjacent the tank 32.

The main burner nozzle 28 is attached to a conical shaped burner shell 34 by means of arms 35 which mount the burner nozzle 28 in axial alignment and at the rear of an open-ended tube 36 projecting forwardly from the rear wall 37 of said shell and with said shell arranged in parallel relation with the cylindrical shell 16 with the open end 38 of said conical shell 34 located slightly forwardly of the open end 39 of the cylindrical shell 16.

The pipe line 13 is provided with a strainer type fuel control valve 40 for regulating the feeding of the fuel oil from the supply tank 12 to the vaporizing coil 14, while the tank 12 is provided with a fuel supply opening and means (not shown) for creating a pressure within the tank. A pipe line 41 may be arranged between the return tank 32 and the fuel supply tank 12 for emptying the return tank 32 into the supply tank.

In use and operation hydrocarbon fuel oil is

forced by the pressure within the tank 12 through the pipe line 13 to the forward end of the coil 14, the quantity of flow being regulated by the valve 40. The fuel is converted into vapor within the coil 14 by the heat of the flame jet issuing from the pilot nozzle 19. The vaporized fuel issues from the coil 14 at substantially constant pressure and volume which flows into the fitting 18 to supply the pilot nozzle 19 and from the fitting 18 the vaporized fuel flows through the three-way valve 23 to supply the main burner nozzle 28 with the required flow thereof for the maximum length of the flame jet. The three-way valve 23 is adapted to be regulated to direct the flow of the vaporized fuel to the main burner and to shut off the flow to the condenser 30 as shown in Fig. 4. The valve 23 may be arranged to direct a portion of the flow through the pipe line 27 to vary the length of flame issuing from the main jet 28 and to direct the remainder of the flow through the pipe line 29 to the condenser 30 as shown in Fig. 5. The cross-sectional area of the inlet 43 of the condenser 30 is equal to the cross-sectional area of the main burner nozzle 28 whereby either the main burner 28 or the condenser 30 will take the full flow of the vaporized fuel issuing from the fitting 18 and the cross-sectional area of the pilot nozzle 19 being constant the pilot burner operates at its maximum efficiency and will not deposit carbon soot on the coils nor overheat nor underheat the same.

In Fig. 2 of the drawings the burner apparatus is illustrated in position in a bituminous material melting apparatus. The melting apparatus includes a container A comprising an insulated bottom wall B, side walls C, and a top wall D having a hinged cover E. Supported by the top wall D is a rectangular shaped receptacle or well F with a flue 49 extending forwardly therefrom adjacent the bottom of the container. The burner apparatus is arranged with a vaporizing coil 50 disposed within a cylindrical shell 51 and which coil and shell are arranged in vertical relation within the receptacle F. The outlet 52 of the shell 51 and the qutlet 53 of the shell 54 of the main burner nozzle 55 are positioned at the inner end of the flue 49 with the main burner nozzle 55 disposed for projecting a flame longitudinally of said flue.

The forward end of the coil 50 is connected with a fuel supply tank 56 by means of a pipe line 57 having a strainer type supply valve 58 interposed in said pipe line. The vaporizing coil 50 is also connected with a fitting 59 having a pilot nozzle 60 disposed to project a flame axially of the coil 50 and which fitting is connected with a standard three-way valve 61 connected by a pipe line 62 with the main burner nozzle 55. The three-way valve 61 is also connected by a pipe line 63 with a condenser 64 and by a pipe line 66 with a return tank 67, the construction of the burner apparatus being substantially similar to that shown in the previous form of the invention.

There is thus provided a vaporizing burner apparatus of the torch type in which the generation of vaporized fuel is substantially constant in volume and pressure when the main burner is in off or on condition and the quantity of vaporized fuel generated is adequate to supply the maximum length of flame of the main burner and in which the setting of the regulating valve and the area of the orifice of the main burner and the inlet orifice to the condenser determines the flow of vaporized fuel to the main burner and to the condenser.

In this form of the invention also the cross-sectional area of the inlet 68 of the condenser 64 is equal to the cross-sectional area of the main burner 55 whereby either the main burner 55 or the condenser 64 will take the full flow of the vaporized fuel issuing from the fitting 59 through the valve 61 so that the cross-sectional area of the pilot nozzle 60 remains constant. The flow of the vaporized fuel through the pilot burner 60 being constant the same operates at its maximum efficiency and will not deposit carbon soot on the coils 50, nor overheat nor underheat the same.

What is claimed is:

In a vaporizing type oil burner apparatus, a hydrocarbon vapor fuel generator including a coil for conducting liquid fuel and a burner having an orifice of constant area for projecting a flame axially of said coil for vaporizing the fuel therein, means to conduct fuel vapor from said coil to said burner orifice, a tank for containing fuel under pressure, means for conducting the fuel from the tank to the coil and for regulating the quantity of flow thereof whereby vaporized fuel issuing from the orifice of said burner is of substantially constant pressure to thereby produce a flame of constant size for obtaining vaporized fuel of constant volume and pressure, a main burner having an orifice of constant area, a condenser having an inlet of constant area, a vapor fuel supply line leading from said vapor conducting means with branches to said main burner and condenser, and a valve interposed in said fuel supply line at the juncture of the branches therewith for proportioning the flow of the vaporized fuel from said vapor conducting means to said main burner and condenser.

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