

March 14, 1933.

W. E. TAFT

1,901,271

LIQUID FUEL BURNER

Filed May 31, 1930

2 Sheets-Sheet 1

Fig. 1.

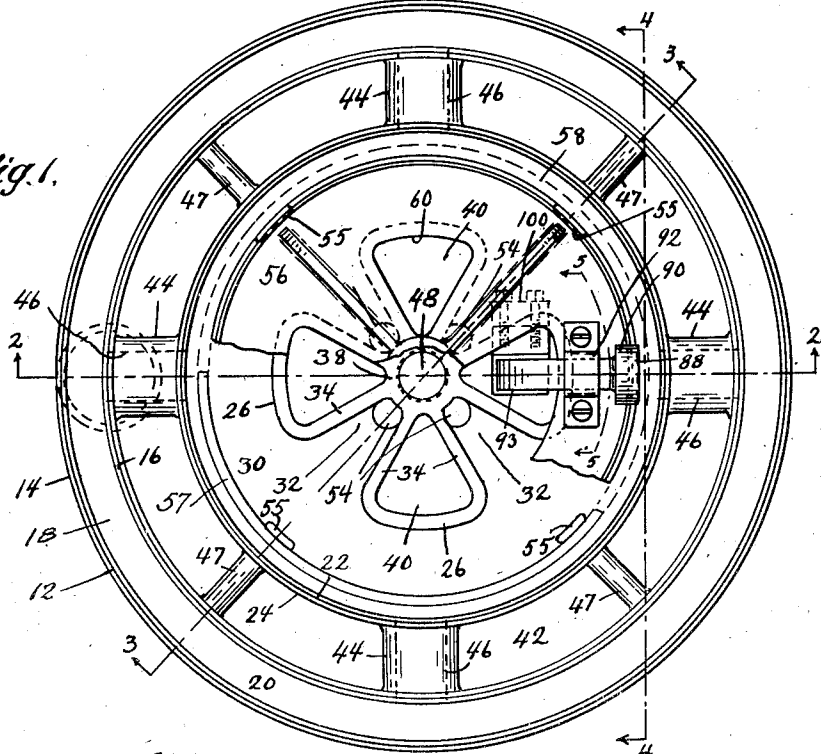
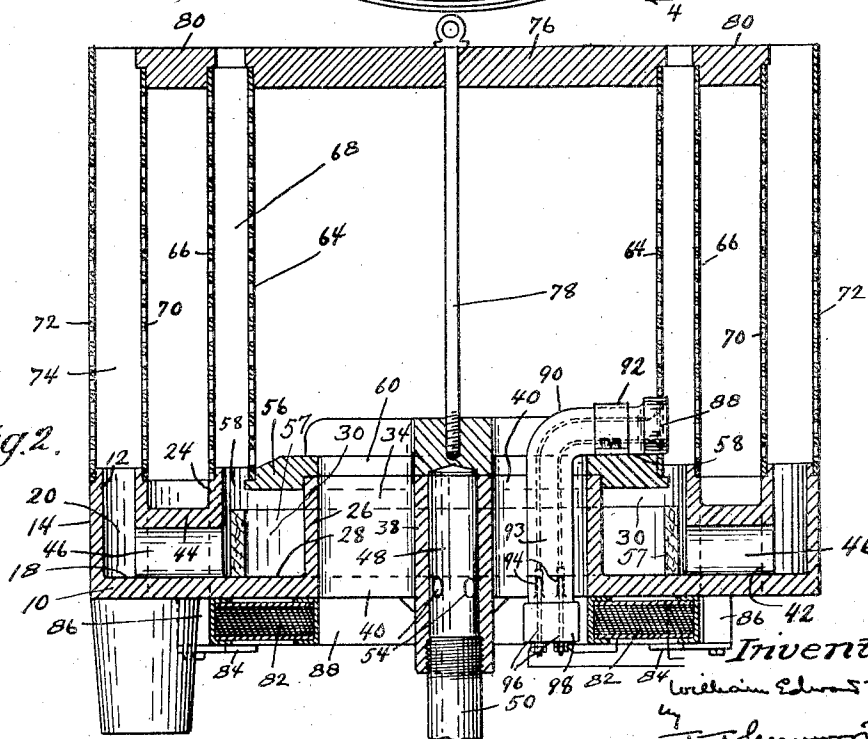


Fig. 2.



Inventor.

William Edward Taft
by [Signature]

March 14, 1933.

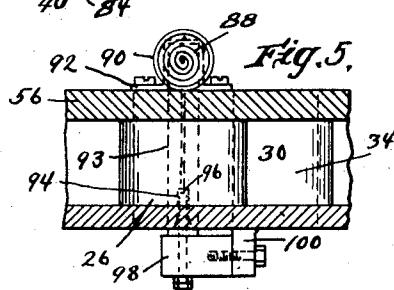
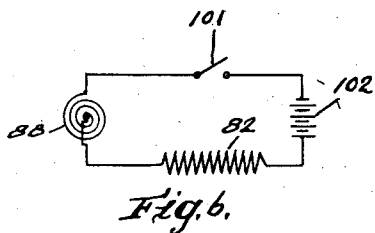
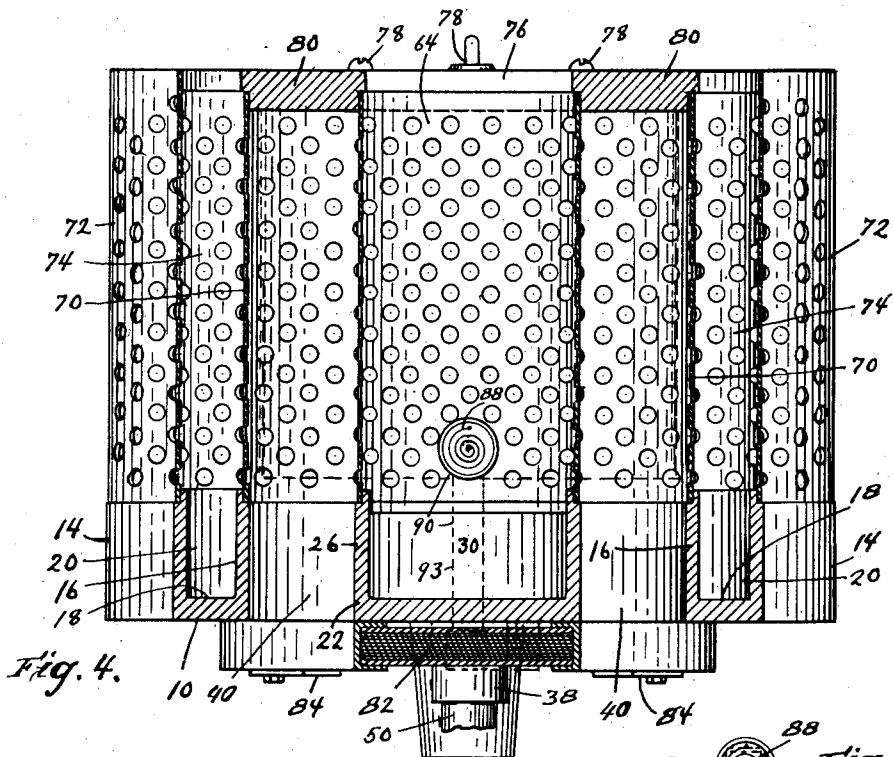
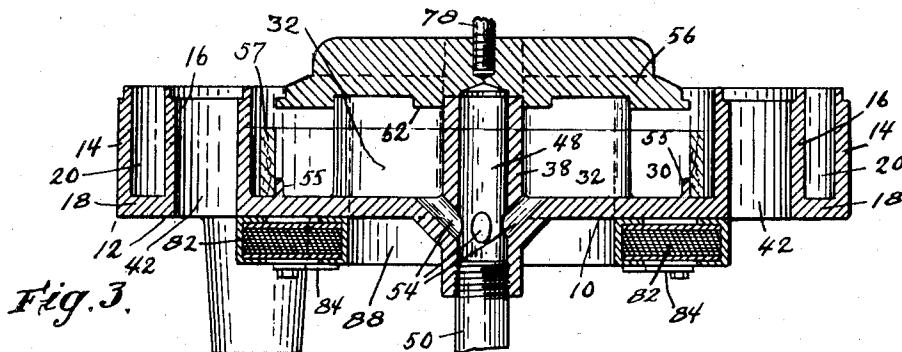
W. E. TAFT

1,901,271

LIQUID FUEL BURNER

Filed May 31, 1930

2 Sheets-Sheet 2



Inventor.
William Edwin Taft
J. J. Freeman atty

UNITED STATES PATENT OFFICE

WILLIAM EDWARD TAFT, OF ATHOL, MASSACHUSETTS, ASSIGNOR TO TAFT OIL BURNER COMPANY, OF ATHOL, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

LIQUID FUEL BURNER

Application filed May 31, 1930. Serial No. 457,854.

This invention relates to oil burners of the type wherein liquid fuel is vaporized in an open top channel or trough and burns in the space between perforated combustion tubes or chimneys that surround the channel opening and extend upwardly thereabove.

In large burners of the present type, it is desirable to admit liquid fuel, as oil, into the vaporizing channel at a plurality of spaced locations to insure a uniform distribution of vapor throughout the channel so that combustion will be equally good at all parts of the combustion chamber between the perforated tubes. Such an arrangement in the past has necessitated the use of a plurality of oil pipes and separate connections between them and the source of fuel supply, which thereby increases the cost of installation of the burner and makes the burner troublesome to clean if carbon should form around the openings of the separate pipes.

It is an object of the present invention to provide a burner wherein the oil from but one supply pipe is introduced into the vaporizing chamber at a plurality of spaced locations.

A further object of the invention is the provision of a burner having a vaporizing channel provided with offset pockets into which the fuel is introduced and in which the main portion of the fuel is vaporized.

Another object of the invention is the provision of a burner provided with a plurality of vaporizing pockets and fuel entrances thereto that are so arranged that they can be maintained clean and free from carbon in a convenient manner.

A yet further object of the invention is the provision of a burner having a vapor channel provided with offset fuel vaporizing pockets and air passages located between the pockets, together with a cap which forms a cover for the channel and the pockets and has openings therein which are in register with the air passages between the pockets.

I provide the burner with an electric heating element which is carried on the bottom wall of the vaporizing channel to heat and vaporize the fuel in the burner to facilitate starting.

A yet further object of the invention is the provision of a plurality of heat-transfer ribs connecting the channels, in addition to the gas-conduits therebetween, so that the heat of one channel is transmitted readily to another channel, to assist in the ready vaporization of the oil and the starting of the burner.

It is a further object of the present invention to provide the burner with vapor igniting means which is associated with the circuit of the electric heating elements and which is so arranged that both are operated simultaneously, so that the vapor begins to burn as soon as sufficient amounts thereof are generated.

Another object of the invention is the provision of a burner having a vapor channel provided with vaporizing pockets therein and air passages between the pockets, and an electric ignition device that is located in one of the air pockets and serves to ignite the vapor rising from the opening of the vapor channel.

A further object of the invention is generally to improve the construction and operation of liquid fuel burners.

Fig. 1 is a plan view of the base of a burner embodying the present invention with the combustion tubes removed.

Fig. 2 is a sectional elevation of the burner taken along line 2—2 of Fig. 1.

Fig. 3 is a sectional view taken along line 3—3 of Fig. 1.

Fig. 4 is a sectional elevation of the burner taken along line 4—4 of Fig. 1.

Fig. 5 is a sectional detail taken along line 5—5 of Fig. 1.

Fig. 6 is a diagram of the circuit connections of the electric heating and ignition elements.

As here shown, the burner base 10 is provided with an outer annular ring 12 having radially spaced upstanding outer and inner side walls 14 and 16 and a horizontal bottom wall 18 which provide between them a radial narrow vapor channel or trough 20 which is open at the top. An inner ring 22 is radially spaced from the outer ring and has an upstanding outer wall 24 and concentric

trically spaced therefrom angularly-spaced upstanding inner walls 26 located about a common center and a horizontal bottom wall 28 that provide between them a fuel vaporizing channel 30 which is wide in radial extent and is open at the top. A plurality of, and as here shown, four equi-angularly spaced and inwardly directed vaporizing pockets 32 communicate with said vaporizing channel and are formed by the relatively closely spaced upstanding radial walls 34 which are connected at their outer ends with the arcuate walls 26 and at their inner ends with a vertical boss or hub 38, the pockets being closed at the boss and freely open into the channel. The cooperating walls 34 and 26, and the boss 38, form segment-shaped vertical air passages 40 which are located between the pockets 32 and also between the boss and the channel 30 and are open at the top and also at the bottom of the burner base.

The channels 20 and 30 are spaced apart by an air passage 42 which is concentric with said channels and is open at the top and the bottom of the burner base. A plurality of, and as here shown, four equi-angularly spaced webs 44, extend across the air passage and have ducts 46 therein which open into both channels so that the vapor generated in the vaporizing channel 30 can flow into the vapor channel 20 and fill it uniformly. Other ribs 47 extend across the annular air passage and connect the rings containing the channels and are solid. Said ribs 47, together with the ribs 44, serve to conduct heat from the vaporizing channel to the vapor channel, especially when the walls of the vaporizing channel are heated electrically, as will be explained hereinafter to facilitate vaporization of fuel when starting the burner in operation, liquid fuel at this time being in both channels. The central boss 38 is provided with a vertical passage 48 which extends completely therethrough and so is open at the top. An oil pipe 50 is threaded in the lower end of said passage and extends to a suitable source of liquid oil supply, not shown. Small oil passages or branches 54 pass diagonally outwardly through the boss from the passage therein into the inner ends of the vaporizing pockets 32 so that oil is introduced from said pipe 50 into the end of each pocket. This arrangement provides a very simple and reliable means for distributing the oil in a plurality of spaced locations into the vaporizing channel 30. When the burner is in steady operation, the oil that passes through said branches 54 is vaporized mainly in the vaporizing pockets 32 so that the body of the channel 30 is filled mainly with oil vapor. At this time there will be no liquid oil in the channels 20 and 30. Projections 55 upstand from the bottom wall 28 in the vapor-

izing channel and serve to retain an igniting wick 57 in position therein when the use of such wick is considered desirable to facilitate ignition of the oil.

A cap 56 is seated upon the top of the wall 26 and extends radially over the open top of the vaporizing channel 30 and terminates in confronting and spaced relation with the outer wall 24 whereby to provide the channel with an annular opening 58 of reduced radial extent. The cap is provided with a plurality of segment shaped openings or apertures 60 therethrough which correspond and are in register with the air passages 40 so that the air passing upwardly through said passages can enter the burner above the top of the cap. Preferably the cap is provided with depending projections 62 which fit between the walls 34 of the vaporizing pockets adjacent the boss 38 for the purpose of holding the cap with the openings 60 therein in register with the passages 40 of the burner base. The cap is also seated on the walls 34 and the top of the boss 38 and forms a closure for the oil passage 48 in the boss, the level of oil in the passage always standing below the cap. The cap supports a perforated cylindrical combustion tube 64 which upstands thereabove at the inner side of the annular passage 58. A similar outer combustion tube 66 is supported on the wall 24 and is spaced radially from the tube 64 and provides an annular combustion chamber 68 in which the fuel vapors rising from the opening 58 of the vaporizing chamber are burned. Similar tubes 70 and 72 surround and upstand above the open top of the vapor channel 20 and provide a combustion chamber 74 therebetween. The top of the tube 64 is closed by a cover 76 which is secured to the cap 56 by a screw 78 so that the cover, the cap and the tube 64 are united and can be removed as a unit for inspection or cleaning. The annular opening between the tubes 66 and 70 is closed by an annular ring 80. This arrangement closes the tops of the air passages between the tubes and so constrains the air to flow through the perforated tubes and into the combustion chambers and thereby to burn with the fuel vapors.

Vaporization of the liquid fuel in the vaporizing chamber 30 is initiated by an electric heating element 82 which is in the form of a centrally-apertured disc containing an internal resistance element and is secured against the bottom wall 28 of the vaporizing chamber by plates 84 which underlie the disc and are secured removably to depending lugs 86 of the burner base. The heater disc has a circular passage 88 in the middle thereof which is disposed beneath and is in register with the passages 40 so that air can flow freely through the disc into the interior of the combustion tube 64. The electric heat-

ing element is adapted to be energized from a suitable source of electric power as the lighting or power mains of a house only until sufficient vapor is given off to permit the starting of combustion. The heat of combustion is then sufficient to continue the vaporization.

In accordance with this invention, means is provided to ignite the vapor electrically coincidentally with the electric vaporization thereof. Said means includes a high resistance electric conductor 88 which is arranged in spiral form in the end of an insulated support or plug 90 that is secured removably by a strap 92 to the generator cap 56. The intermediate combustion tube 64 is provided with an aperture through which the end of said plug is extended so that the spiral igniting conductor is freely exposed to the combustible mixture in the combustion space 68. The plug is provided with a depending insulating extension 93 that is located in one of the apertures 60 of the generator cap 56 and in one of the passages 40 that is in register with said aperture. The bottom end of the plug is provided with terminals 94 that are in removable engagement with terminals 96 of a contact base 98 which base is secured, see Fig. 5, to a depending leg 100 of the burner base and is located under the plug. The connection between the plug and the base is detachable so that the plug 90 is removed from its connection with the contact base when the cover 76 and the associated cap 56 are withdrawn from the burner. The igniting conductor 88 is adapted to be associated with the circuit of the heating element 82 so as to be energized concurrently therewith. In Fig. 6, it is shown as being in series with the heating element so that when the switch 101 is closed, the circuit from the source of power 102 through the heating element and igniting conductor is completed. Obviously, the igniting conductor can be connected in multiple with the heating element, if desired. The igniting conductor is adapted to operate at a temperature sufficiently high to ignite the combustible mixture in the chamber 68 as soon as the heating element 82 has generated sufficient vapors to form a combustible mixture. After the combustion has progressed for a sufficient period of time for the heat thereof to maintain the work of vaporization, the heating element and igniting conductor can be de-energized. With this arrangement, the ignition of the combustible mixture is performed automatically and without any separate operation and also without the necessity for special circuits and apparatus and thereby greatly facilitates the use of the burner.

Certain features of construction herein shown are described and claimed in my co-

pending application Serial No. 457,855, filed May 31, 1930.

I claim:

1. A liquid fuel burner having a vaporizing channel that has an opening at the top, spaced combustion tubes surrounding and upstanding above said opening, an electric heating element located in a position to heat and vaporize the liquid fuel in said channel, and a resistance conductor disposed within the bottom of the space between said tubes and immediately above the open top of said channel in position to ignite the fuel vapors at the time they issue from said open top, said heating element and resistance conductor being connected together for concurrent energization.

2. A liquid fuel burner comprising a base having a vaporizing channel that has an opening at the top, combustion tubes surrounding and upstanding above said opening a cap which rests removably on said base and constitutes a support for one of said tubes, an electric heating element located in position to heat and vaporize the liquid fuel in said channel, and an electric resistance conductor in the circuit of said heating element and adapted to be heated by the current passing therethrough and disposed in position to ignite the fuel vapor, said resistance conductor being carried by and being removable with said cap and having terminals, and a terminal connector carried by said base and with which said terminals removably engage.

3. A liquid fuel burner having a vaporizing channel that has an opening at the top, combustion tubes surrounding and upstanding above said opening, an electric heating element disposed in position to heat and vaporize the fuel in said channel, and an electric resistance conductor in series with said resistance element and adapted to be highly heated by the current passing through said element and located immediately above said channel in the space between said combustion tubes and in position to ignite the vapor as they issue from said top opening, said resistance conductor having a concentrated winding which provides a spot source of heat.

4. A liquid fuel burner having a base provided with an air passage and an annular open-top vaporizing channel therein which encloses said air passage, spaced combustion tubes surrounding the open top of said channel and providing a combustion chamber between them, a removable cap overlying said base and a portion of said channel and constituting a carrier for one of said tubes, an electric resistance conductor carried by said removable cap and extended through one of said tubes into said combustion chamber and also being downwardly extended into said air passage, and

provided with terminals which are carried by said cap, and an electric heating element carried by said base in position to heat and vaporize the fuel in said channel and having fixed terminals which are carried by said base and are detachably engaged by said resistance conductor terminals.

In testimony whereof, I have signed my name to this specification.

WILLIAM EDWARD TAFT.