Apr. 17, 1923. 1,451,798

W. W. WILLIAMS

LIQUID FUEL ATOMIZING DEVICE

Filed Oct. 8, 1920 6 Sheets-Sheet 1

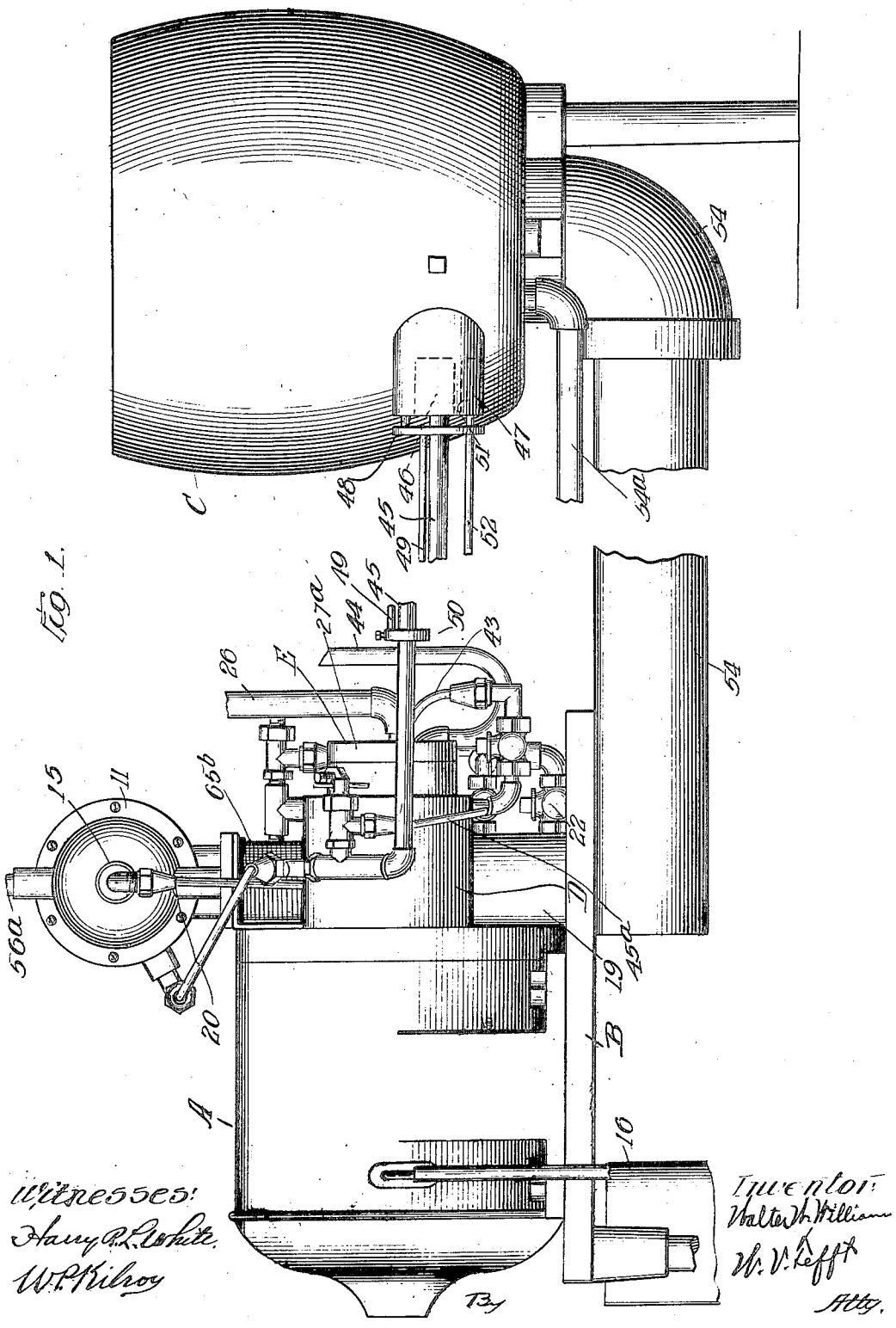


Fig. 1.

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LIQUID FUEL ATOMIZING DEVICE

Filed Oct. 8, 1920 6 Sheets-Sheet 2

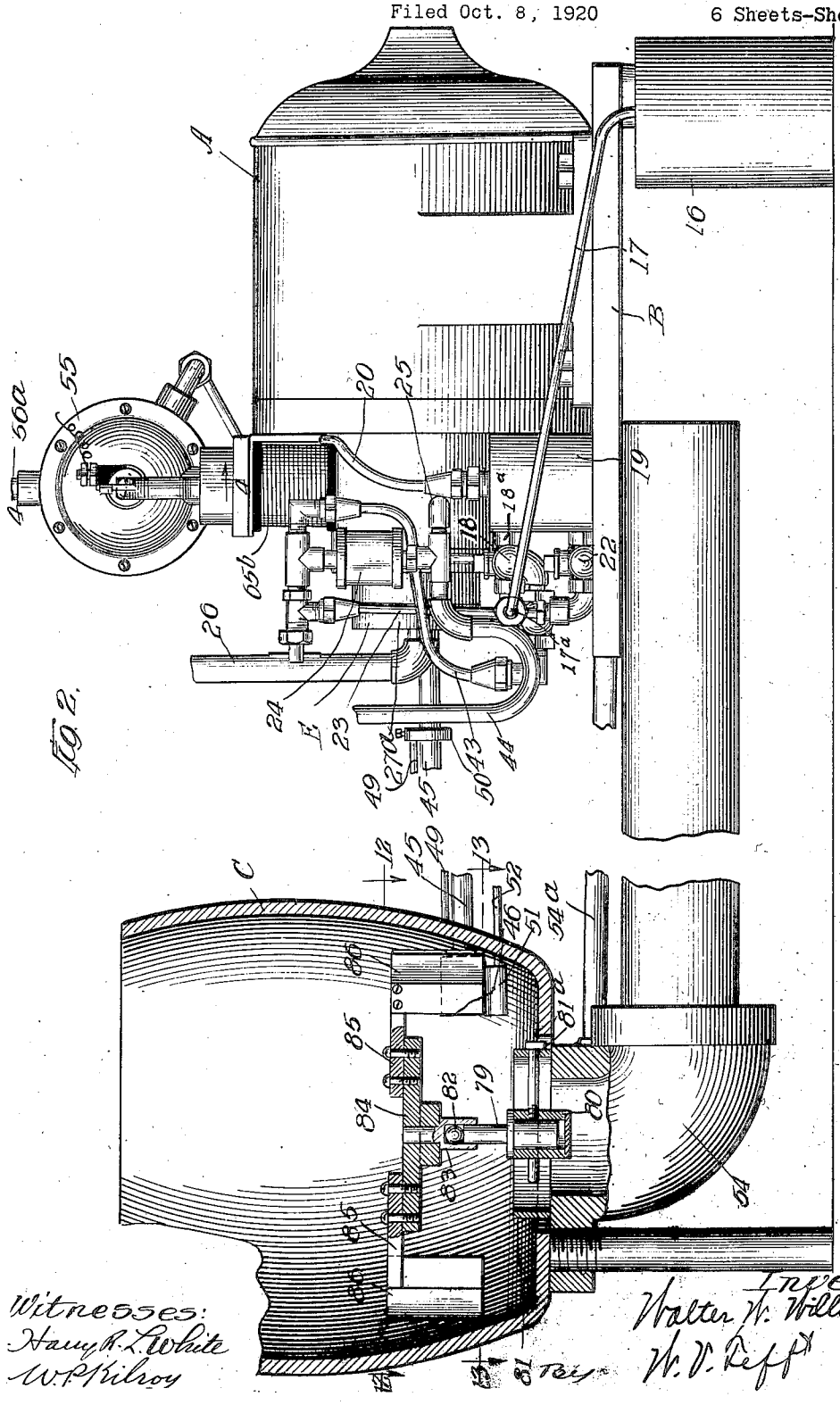


Fig 2.

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LIQUID FUEL ATOMIZING DEVICE

Filed Oct. 8, 1920 6 Sheets-Sheet 3

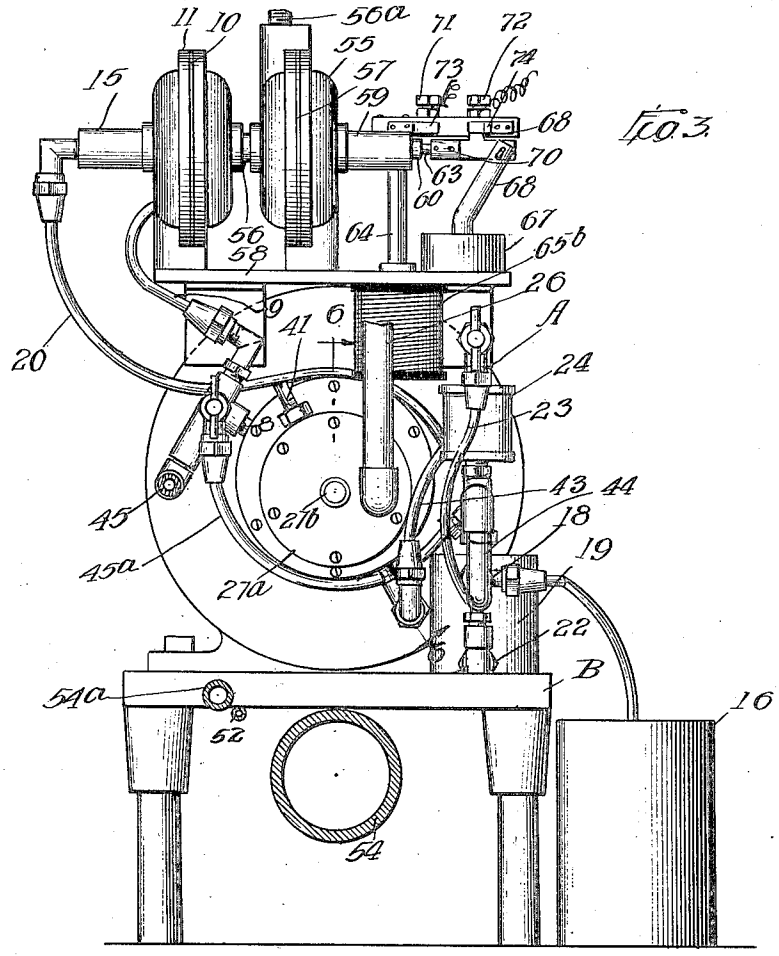


Fig. 3.

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LIQUID FUEL ATOMIZING DEVICE

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Fig. 4.

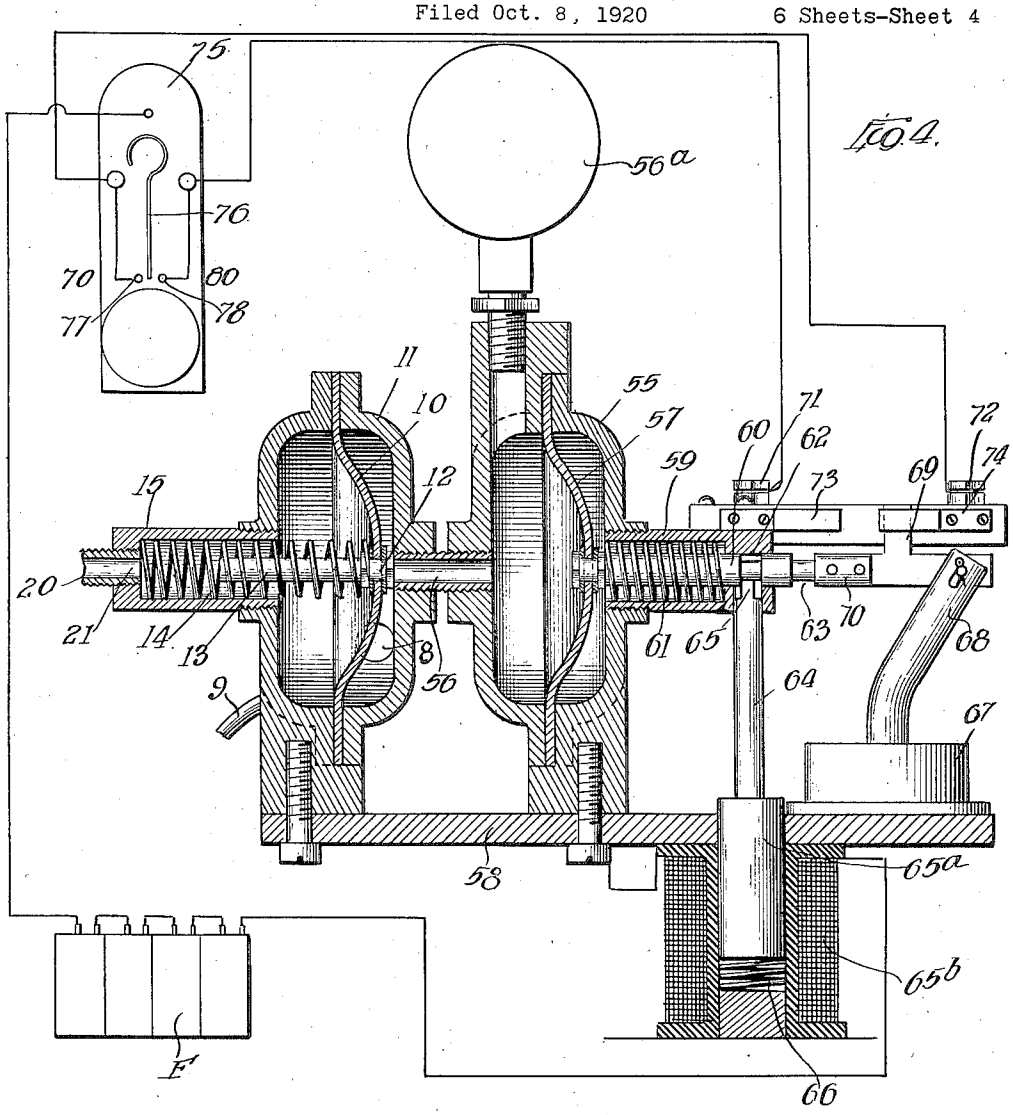
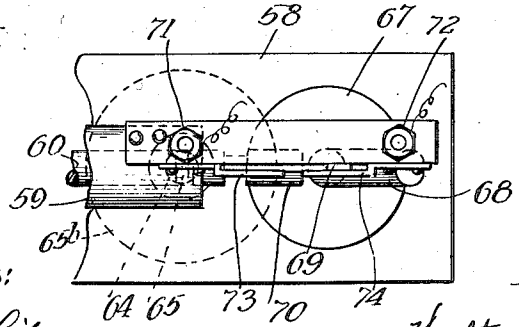


Fig. 5.



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LIQUID FUEL ATOMIZING DEVICE

Filed Oct. 8, 1920 6 Sheets-Sheet 5

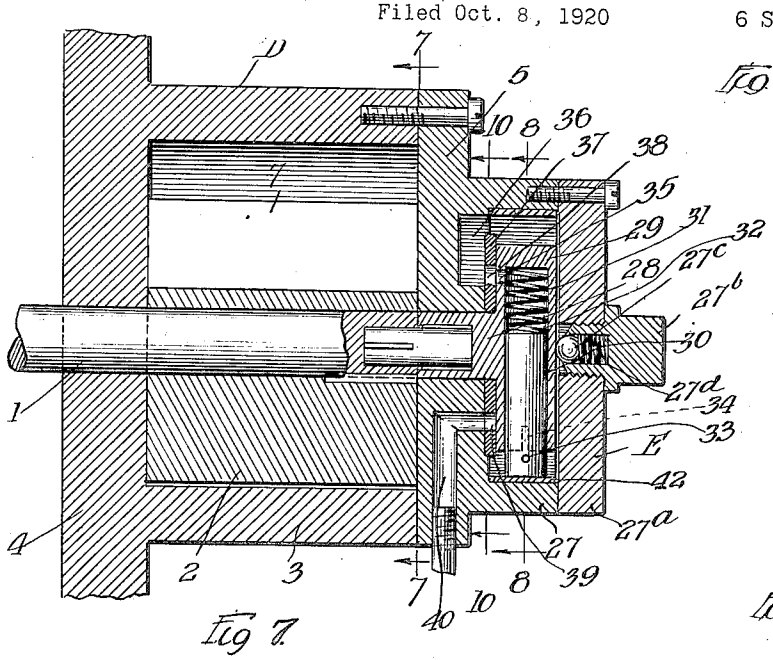
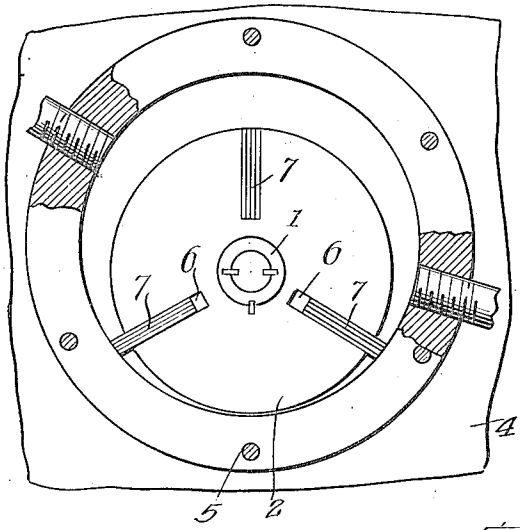


Fig 7.

Fig 8.



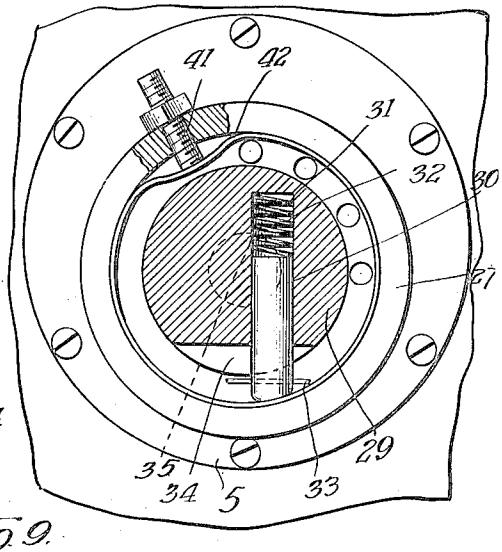
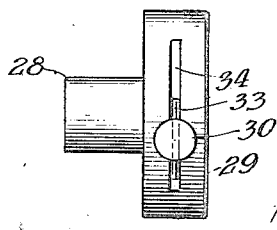


Fig 9.



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Apr. 17, 1923. 1,451,798

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LIQUID FUEL ATOMIZING DEVICE

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Fig. 10.

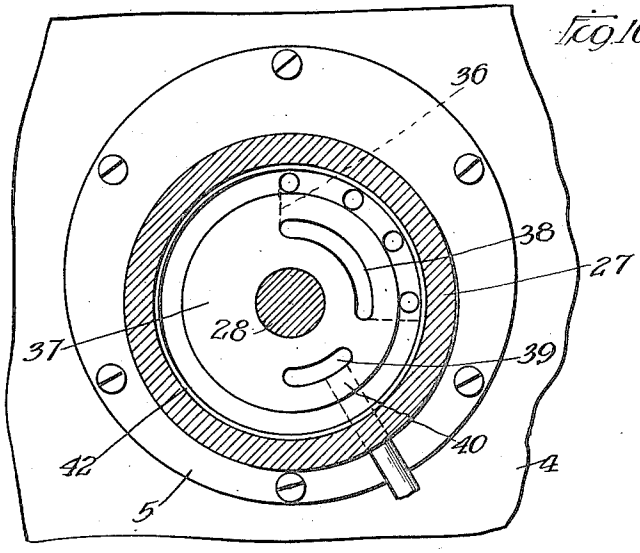


Fig. 11.

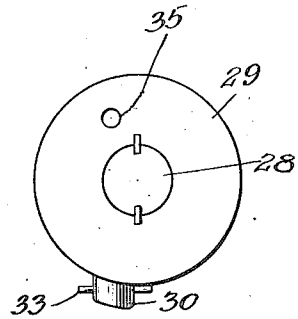


Fig. 12.

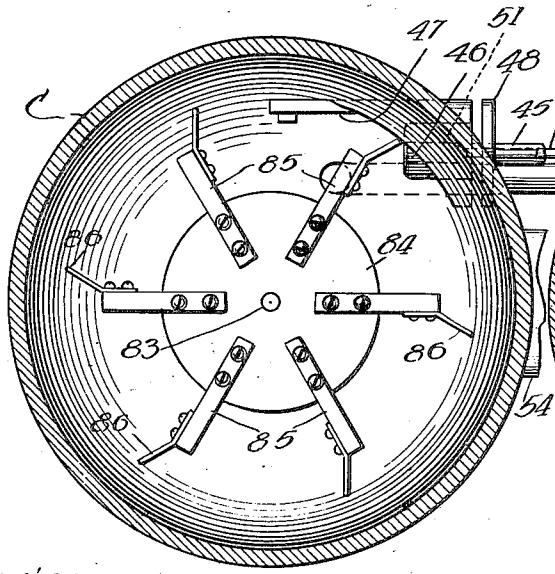
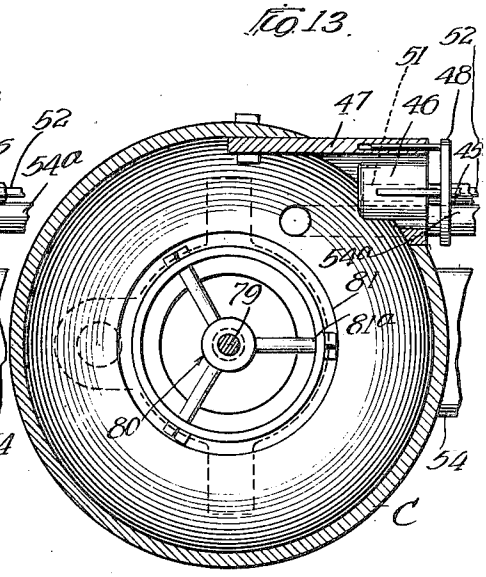


Fig. 13.



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Patented Apr. 17, 1923. 1,451,798

UNITED STATES PATENT OFFICE.

WALTER W. WILLIAMS, OF BLOOMINGTON, ILLINOIS.

LIQUID-FUEL-ATOMIZING DEVICE.

Application filed October 8, 1920. Serial No. 415,501.

To all whom it may concern:

Be it known that I, WALTER W. WILLIAMS, a citizen of the United States of America, residing at Bloomington, in the county of McLean and State of Illinois, have invented certain new and useful Improvements in Liquid-Fuel-Atomizing Devices, of which the following is a specification.

My invention relates to liquid fuel atomizers for heating purposes, in conjunction with the ordinary furnace, being used either alternately therewith or independently thereof.

The object of the invention is to produce a liquid fuel atomizer burning any fuel oil and capable of practical use either in conjunction with the ordinary house furnace or with larger heating plants.

Another object of the invention is to provide a special pump arrangement to provide a constant supply of fuel oil to the device, regardless of the quality of fuel oil used.

Yet another object is to provide a special electric switch mechanism in connection with a pressure switch diaphragm and a thermostat for automatically regulating the operation of the device.

Other objects will hereinafter appear.

The invention consists in the parts and the construction and combination of parts as hereinafter more fully described and claimed, in which—

Fig. 1 is a side elevation of the device;

Fig. 2 is a side elevation of the device, the burner being shown in section to bring out more clearly the special deflecting means for the flame;

Fig. 3 is a front elevation of the device;

Fig. 4 is a longitudinal sectional view of the switch diaphragm and pressure diaphragm, including electric connections therefor;

Fig. 5 is a detail plan view of a portion of the switch mechanism;

Fig. 6 is a longitudinal sectional view on the line 6 of Fig. 3;

Fig. 7 is a cross sectional view taken on the line 7—7 of Fig. 6;

Fig. 8 is a sectional view taken on the line 8—8 of Fig. 7;

Fig. 9 is a detail end view of the plunger and its manner of seating in the rotor of the oil feed pump;

Fig. 10 is a sectional view on line 10—10 of Fig. 6;

Fig. 11 is a detail front elevation of the rotor in the oil feed pump;

Fig. 12 is a sectional view on the line 12—12 of Fig. 2; and

Fig. 13 is a sectional view on the line 13—13 of Fig. 2.

Referring to the drawings in detail, A indicates an electric motor mounted on a base B, and C a bowl shaped burner. A rotary pressure pump D is mounted in conjunction with the electric motor, the shaft of the motor furnishing the axis for the pump and designated as 1. A rotator 2 is mounted on the axis in eccentric relation with a cylinder 3, and rotates within cylinder 3, said cylinder having a base plate 4 which is attached in any suitable manner to the electric motor. A plate 5 closes the forward end of the rotary pump, making an air tight enclosure. The rotator 2 has three or more longitudinal slots indicated at 6, said slots being parallel to the axis and running the full length of the rotator. In these slots are laminated vanes 7, slidable therein and acting as a seal under the influence of centrifugal force when the pump is rotating.

When the motor is started and the pump rotated, pressure is raised therein which is communicated through outlet 8 and connection 9 to the rear face of a diaphragm 10 mounted in a primer diaphragm casing 11. Within this casing and connected to the diaphragm at 12 is a shaft 13. Surrounding said shaft is a coil spring 14, which is held at its outer end in a suitable bearing 15 conforming to the shape of the spring, said spring at its other end abutting the outer face of the diaphragm 10. The spring is of such strength as to be capable of thrusting the diaphragm inwardly when there is no pressure against the inner face thereof, but not strong enough to resist a certain determinable pressure raised against the inner face of the diaphragm when the rotary pressure pump is in operation.

A priming fluid container 16 is mounted in any suitable manner in connection with the device and has the connection 17 with elbow 17ª therein, including a ball check valve 18 and short connection 18ª, with a priming chamber 19 mounted in any suitable place on the base plate B. A tube 20 and opening 21 connect the priming chamber with the chamber within the primer diaphragm casing on the outer side of the diaphragm 10 therein. The pressure that is

communicated from the pressure pump through connection 9, to the rear face of the diaphragm when it has attained such a degree as to overcome the strength of the coil spring 14, forces the diaphragm 10 outwardly, thereby exerting pressure through the connection 20 on the priming chamber 19 and forcing the priming fluid contained therein through connections 23 having the ball check valve 22 therein and the sight feed cup 24, to the inlet 25 of the rotary pressure pump.

It may be said in explanation here that the cessation of action of the motor and rotary pressure pump releases the pressure against the rear face of the diaphragm 10 and the action of the spring 14 against its outer face creates a vacuum within the connection 20 and priming chamber 19, thereby causing priming fluid from the container 16 to be drawn into the priming chamber 19. It is therefore seen that the priming chamber is always filled at the stopping of the device so that it may be there in readiness to be fed to the pressure pump when the motor is started.

It may be said in this connection that fuel oil, which is usually low grade, is not capable of being ignited at low temperatures and to facilitate an immediate ignition of the fuel mixture, it is necessary to have some fuel which is easily ignitable, and therefore the priming mechanism is introduced to provide a temporary feeding of a quickly ignitable fuel in connection with the main fuel oil, the immediate ignition of the priming fluid heating the main oil, which is introduced in conjunction with it, to such a temperature that it may also be ignited. It may also be seen that as the cessation of the action of the pump with a consequent reduction of pressure within the primer diaphragm, is necessary to the filling of the priming chamber that only the amount of priming mixture contained in the priming chamber at one time will be used, thus providing merely a temporary ignition preparatory to the lighting of the main fuel oil.

The priming mechanism, which has just been described, is merely an aid to the oil feed which is now to be described. The fuel oil is contained in a tank, not shown, which has a communicating tube 26 to the outer face of the rotary pressure pump. The plate 5, which forms the end wall of the rotary pressure pump, also forms the base plate for the oil feed pump. This plate has integrally formed therewith the outer cylinder 27 of the pump, and mounted on the outer end of said cylinder is the end plate 27^a. A plug 27^b is centered in this plate, said plug having mounted on its inner face a socket containing a ball 27^c, which is yieldingly held by a spring 27^d against a rotor to be described later, said ball being an auxiliary means to aid in truing the rotary movement of said rotor. It is noted that the cylinder is of a reduced diameter to that of the rotary pressure pump. A rotatable shaft 28 is keyed in any suitable manner to the axis 1 of the pressure pump, which is also the main shaft of the electric motor, said rotatable shaft forming the axis of the oil feed pump. Integrally or otherwise mounted on said axis is a rotor 29. This rotor is of smaller diameter than the cylinder casing 27.

As shown in Fig. 8, a plunger 30 is slidably mounted within a plunger socket 31. The plunger socket has mounted therein a coil spring 32, said spring abutting the inner end of the plunger. The outer end of the plunger is rounded in such a manner as to present as great a bearing surface as possible. A key 33 is mounted in the upper end portion of the plunger, said key fitting in a corresponding groove 34 in the outer surface of the rotor. An aperture 35 forms a connection between the chamber formed by the spring at the inner end of the plunger socket and the oil supply chamber 36. The fuel oil is supplied to this chamber 36 through the supply tube 26, there being a gasket 37 between the supply chamber and the inner surface of the rotor said gasket having formed therein a large arcuate slot 38 which registers with the hole 35 on the rotor 29, at certain times during the movement of the rotor. This slot is so shaped as to provide sufficient oil feeding surface. The gasket also has a smaller arcuate slot 39, which registers at certain times with the hole 35 on the inner side of the rotor.

Communicating with the smaller arcuate slot and leading therefrom is an outlet 40. Projecting through the cylinder casing 27 of the oil feed pump is an adjustable lug 41 which forms a cam surface in connection with the outer end of the plunger 30. A spring band 42 on the inner side of the cylinder casing rides over the inner end of lug 41, forming thereby a smooth cam surface to prevent any additional jar when the end of the plunger 30 strikes it, as the rotor passes by the cam. It will be seen from the above description that the constant movement of the rotor with the cam and plunger means produces a pumping action of the plunger within the rotor, and there is a continuous suction stroke of the plunger wherein the oil is taken in through the large arcuate slot 38 and a power stroke when the end of the plunger strikes the lug 41, and driving the plunger downwardly, forces oil taken within the lower chamber outwardly through the slot 39 and outlet 40. The lug 41 being adjustable, is capable of regulating the flow of oil from the pump. The lug, however, being once set to produce a deter-

mined and efficient flow of oil, need not be changed should different grades of oil be used. In other words, no matter what kind or grade of oil is used, the same time will be consumed by the pump in feeding it to the rotary pressure pump, and the efficiency of one oil over another will appear in the heat given off when the mixture is burned, the same time, however being consumed by the oil feed pump for the same volume. The outlet 40 has a connection 43 having suitable elbows and joints therein to carry the oil to the sight feed cup 24, and then through the opening 25 to the rotary pressure pump.

An air inlet means is designated at 44, wherein air is introduced into the oil feed at a point just below the sight feed cup.

The action of the rotary pressure pump on the mixture of air and oil which is introduced through the opening 25 is such that the mixture is completely atomized within the pump and placed under a high pressure. The fuel mixture is then taken from the pump through the opening 8 to the tube 45, wherein it is carried to the nozzle 46 within the burner C, said nozzle projecting into the burner at an angle thereto, as shown in Fig. 13 of the drawings. A by-pass 45[a] connects the tube 45 with the fuel intake tube that enters the oil pressure pump at the inlet 25. This by-pass provides means for taking off any excess air pressure there may be in the fuel mixture and passing it back to the intake tube. It has been found that this by-passing of the excess pressure of air in the mixture prevents to a great extent the noise in the burner, and hence a comparatively quiet device is the result.

A special bracket arrangement 47 is mounted on the burner to receive the angularly injected nozzle, the outer end of said bracket being circular in formation and capable of a tight fitting connection with a plate 48 slidable on the tube 45, said plate being adjustably mounted with relation to the outer end face of the bracket 47 by means of the rod 49 and adjustable yoke and screw means 50 slidable also on the tube 45. The above described means furnishes an auxiliary draft means for the nozzle and may be useful under some conditions, the normal operation of the device, however, requiring that the draft plate 48 be tight against the outer end of the bracket 47.

A pilot light 51 projects through the plate 48 passing beneath the nozzle, and parallel to it, the flame from said pilot being partially in the fuel spray ejected from the nozzle.

The burner C mounted within the furnace has any suitable draft means 54 entering the lower portion thereof. An oil drain pipe 54[a] is mounted in such a manner in connection with the bottom of the burner that any unburned fuel oil that might accumulate in the bottom of the burner will be drained off through said pipe.

The liquid fuel atomizing device above described is automatically operated by an electric switch arrangement in connection with a switch diaphragm and a thermostat of known construction. A switch diaphragm casing 55 is mounted in connection with the primer diaphragm casing 11, communicating therewith through the connection 56. A pressure gage 56[a] is mounted in conjunction with said diaphragm and indicates, through connections before described, the pressure as set up within the rotary pressure pump.

Within said casing 55 is mounted a switch diaphragm 57. The diaphragm casings above mentioned are suitably mounted on a base 58, as are the other portions of the switch subsequently to be described. The inner end of the switch diaphragm casing has a cylindrically shaped bracket 59 mounted in connection therwith. Slidable within said bracket is a shaft 60, said shaft being connected at its inner end to the diaphragm 57. A coil spring 61 surrounds the portion of the shaft within the bracket and abuts at one end the bracket 59 and at the other the switch diaphragm 57.

The shaft 60 has formed thereon the notches 62 and 63, said notches having an interlocking engagement with a vertically disposed rod 64, said rod having at its upper end a lug 65 capable of entering said notches. The rod 64 has an enlarged portion 65[a] slidable within a socket in an electro-magnet 65[b] mounted beneath the bracket 58. In the lower portion of said socket and abutting the portion 65 is a coil spring 66. A toggle switch 67 of standard construction is mounted on the plate 58, the electric connections for said switch not being shown, but of course being in connection with the electric motor A. The switch 67 has a toggle lever 68, said lever being pivotally connected to a ground contact 69, said contact being connected at 70 to the outer end of the rod 60. 71 and 72 represent insulated electric contacts having suitable engagement plates 73 and 74 respectively for contact with the ground contact 69. The insulated electric contacts have suitable bracket means holding them in position above the plate 58.

A thermostat 75 of ordinary construction has the arm 76 capable of movement between the contact points 77 and 78, representing merely as an example the temperatures 70 and 80. The operation of the switch in connection with the thermostat will be brought out later when the operation of the device is described.

Under normal conditions, the thoroughly

atomized fuel mixture discharged from the nozzle within the burner C, travels approximately parallel to the inner wall thereof, causing the flame to travel about the surface of the chamber. This manner of injecting the fuel mixture will take care of all normal conditions and will produce a very efficient burner. A special means is shown here, however, for more thoroughly deflecting the fuel mixture ejected from the nozzle. This means has a shaft 79 mounted in a socket in a bracket 80, said bracket being held by suitable mountings 81 on the bottom of the burner. The shaft 79 has a ball 82 integrally mounted therewith at its upper end. Surrounding said ball is a bearing portion 83 conforming to the diameter of the ball and capable of rotary movement about said ball. Bearing portion 83 has either integrally, or otherwise, connected thereto, the plate 84, said plate having arms 85 radiating therefrom. The outer ends of the arms 85 have wings 86 mounted thereon, said wings being bent at such an angle that they will absorb the full blast from the nozzle which is set at such an angle in the burner to discharge directly against them.

To make possible the rotation of this special deflector, under the terrific heat that is developed within the burner, a graphite packing surrounds the ball 82 and provides a bearing surface for the portion 83 which will not be affected by high temperatures or variations of temperature.

For a more complete understanding of the atomizer, its operation is recited:

The device, as has been brought out in the statement of the invention, is for use in conjunction with the ordinary furnace, the electric motor and pump means being mounted without the furnace, and the burner and nozzle within it. An oil supply tank (not shown) furnishes a continuous supply of fuel oil. A thermostat of ordinary construction furnishes the means for operating the special electric switch for automatically starting and stopping the device. In an attempt to keep a house, for instance, at a normal temperature, say between 70 and 80 degrees, it will not be necessary to use the device continuously, in other words, when it is in operation and has raised the temperature of a house to eighty degrees, the thermostat, in conjunction with the special electric switch described will automatically shut off the device, and again, when the temperature of the house has dropped to, say, 70 degrees, the thermostat by its action through the special switch, will automatically start the device. This intermittent action of the device keeps the house at a slightly varying temperature and acts in an efficient manner in regard to the fuel supply.

In describing the operation of the device, we will say that the temperature of the house which is being heated, has fallen to 70 degrees, whereupon the arm 76 strikes the point 77, making contact therewith. With reference to Fig. 4 of the drawing, which shows in detail the special switch mechanism, when the device is not in operation, we see that when the contact is made between the arms 76 and 77 through the batteries F, the electro-magnet 65^a is charged, thereby withdrawing the rod 64 from the notch 62 in rod 60. Immediately upon the withdrawal of the rod 64 from the notch 62, the coil spring 61 forces the switch diaphragm 57 inwardly. The rod 60, by its inward movement, and its connection with the lever 68 of the toggle switch 67, throws said switch on and the electric motor A of the atomizing device is started. The shifting of rod 60 inwardly also withdraws the ground contact 69 from its contact point 74 and breaks the circuit which was set up when the arm 76 of the thermostat contacted with the point 77. This breaking of the circuit releases the vertical rod 64, which was drawn downwardly by the electro-magnet and by the pressure of the spring 66 beneath it, the rod is forced upwardly, interlocking now, however, with the notch 63 on the rod 60, the latter having been forced inwardly by the action of the spring 61 as described.

The toggle switch 67 having been thrown to an "on" position and the electric motor of the device started, the action of the rotary pressure pump and oil feed mechanism starts simultaneously therewith. Pressure is raised almost immediately within the pressure pump, and this pressure, through the outlet 8 and connection 9, is transmitted to the rear of the primer diaphragm 10, said diaphragm being driven outwardly, overcoming the spring 14 and putting pressure through the connection 20 on the priming chamber 19 containing the priming charge. The priming fluid is forced through the connection 23, said connection having a ball check 22 therein, through the sight feed cup 24 through the inlet 25 to the rotary pressure pump. As has been stated before, this introduction of the priming fluid into the pressure pump is merely a temporary fuel feed to enable the main fuel oil to be ignited.

The feeding of the main fuel oil takes place simultaneously with the operation of the electric motor, rotary pressure pump and the oil feed pump, all being operable from the same shaft. Fuel oil from the supply tank, not shown, is transmitted to the fuel supply chamber 36, through the communicating tube 26, said fuel oil being introduced to the rotor 29 through the large arcuate shaped opening 38 in the gasket 37. The rotor 29 has a hole 35 therein, which communicates with the chamber formed by the action of the spring 31 against the inner

end of the plunger 30, said opening also registering with the arcuate slot 38 at each revolution of the rotor. Slidably mounted in the socket in the rotor is the plunger 30, said plunger having a large bearing surface at its outer end, as previously described. Projecting through the cylinder casing which houses the rotor is the adjustable lug 41, which has the spring band 42 riding over it and encasing the inner surface of the cylinder. At each revolution of the rotor, the end of the plunger 31 strikes the inwardly projecting end of the lug 41 and thereby receives its downward thrust. A small arcuate slot 39 in the gasket 37 registers with the hole 35 in the rotor just as the plunger 30 receives its downward thrust, and the oil contained in the rotor beneath the plunger is forced through said opening through suitable communicating tubes and sight feed to the inlet 25 of the rotary pressure pump. The plunger within the rotor, in its downward stroke having contacted with the inner end of the lug 41 drives the oil out of the oil feed pump. However, the end of the plunger having ridden by the lug 41, the coil spring 31 within the plunger socket throws the plunger outwardly, thereby forming a vacuum within the inner end of the socket, and when the opening 35 registers with the opening 38 communicating with the fuel supply, oil is drawn into the chamber. Due to the high speed at which the oil feed pump operates, the oil will be placed under suitable pressure to force it to the rotary pressure pump, and also due to the special arrangement of said pump, a constant volume of fuel oil will be introduced to said pressure pump.

As has been stated before, the same volume of oil will be fed by the oil feed pump to the pressure pump, regardless of quality.

Just before the entrance of the fuel oil to the pressure pump, air through the air inlet 44 is mixed with it and together they are thoroughly atomized within the pump, being ejected therefrom under a high pressure, through the outlet 8 to the tube 45 having the nozzle 46 thereon projecting into the burner in an angular relation thereto. This nozzle 46 is formed in such a manner that the thoroughly mixed fuel will be ejected into the burner in a cone shaped spray. The fuel mixture ejected from the nozzle at a high pressure is immediately ignited by the constantly burning pilot light 51 directly beneath the nozzle. As has been stated before, the priming fluid, which is first ejected from the nozzle along with the main fuel oil, permits the fuel mixture to be ignited immediately.

We now see the device in operation and generating a heat within the burner that consequently raises the temperature of the house.

We will say now that the temperature of the house has been raised to eighty degrees and the arm 76 of the thermostat makes contact with the point 78. This contact having been made, an electric circuit is set up through the batteries F which again charges the electro-magnet 65ª, thereby withdrawing the rod 64 from its corresponding notch 63, and hence the pressure which has been raised against the inner surface of the diaphragm 57 by the action of the rotary pressure pump thrusts the switch diaphragm 57 outwardly, the action of said diaphragm causing the rod 60 to move outwardly and accordingly throw the toggle switch 67 through the lever 68 to an "off" position, thereby stopping the electric motor A and of course the action of the atomizer.

The movement of the arm 60 outwardly throws the ground contact 69 which had been in contact with the contact point 73, into contact with the point 74, thereby breaking the electric circuit and permitting the rod 64, by pressure of the spring 65 against its lower end, to be thrust upwardly and to interlock with the notch 62 on the rod 60.

Having thus described the invention, what I claim is:

1. The combination with an electric motor, of a rotary pressure pump, an oil feed pump, a burner, a fuel tube connecting said pressure pump and burner, an air inlet means, priming mechanism, and electric switch mechanism for automatically starting and stopping said electric motor.

2. In a liquid fuel atomizing device, the combination with an electric motor and a rotary pressure pump, of an oil feeding means for supplying a constant volume of fuel oil to said pressure pump regardless of the quality of said fuel oil.

3. The combination with an electric motor, of a rotary pressure pump, a burner, a fuel tube connecting said pressure pump and burner, and means for supplying a fuel mixture to said rotary pressure pump, including a rotary oil feed pump.

4. In a liquid fuel atomizing device, the combination with an electric motor and a rotary pressure pump, of a fuel feed pump for said pressure pump, including a cylinder mounted in connection therewith, an end plate for said cylinder having a fuel inlet opening therein, a rotor within said cylinder, the axis of said rotor being mounted in connection with the shaft of the rotary pressure pump, a spring pressed plunger slidably mounted within the rotor, adjustable cam means mounted in the cylinder for operating said plunger, and means for taking the fuel oil under pressure from said rotor.

5. In a liquid fuel atomizing device, the combination with an electric motor and a

rotary pressure pump, of an oil feed pump for said pressure pump, including means for supplying a constant volume of fuel oil to the rotary pressure pump regardless of the quality of the fuel oil, and adjustable means for regulating said volume.

6. In a liquid fuel burner device, a burner, fuel oil atomizing means for said burner, and means for supplying fuel oil to said atomizing means, said means being constructed to automatically ensure a constant rate of supply to said atomizing means irrespective of the quality of the fuel oil.

7. In a liquid fuel atomizing device, the combination with an electric motor and a rotary pressure pump, of an oil feed pump, and switch mechanism for automatically starting and stopping said electric motor, including a diaphragm casing, a diaphragm therein, a toggle switch, a horizontal shaft having connection at one end with said diaphragm and at the other with said switch, a coil spring surrounding a portion of the rod and abutting the diaphragm, a spring pressed vertically disposed shaft having interlocking relation with said horizontal shaft, an electromagnet surrounding the lower portion of said vertical shaft, and electric contact instrumentalities in connection with said magnet for effecting either engagement or disengagement of said vertical shaft with the longitudinal shaft.

8. The combination with an electric motor, of a rotary pressure pump, a burner, a fuel tube connecting said pressure pump and burner, an oil feed pump, a thermostat, means in connection with said thermostat for starting said electric motor at a relatively low temperature, and means in connection with said thermostat for stopping said electric motor at a relatively high temperature.

9. In a liquid fuel atomizing device, the combination with an electric motor and a rotary pressure pump, of an oil feed pump, means dependent upon the operation of said motor for supplying oil to said pump, and means dependent upon the cessation of operation of said motor for stopping the fuel feed to said pressure pump.

10. The combination with an electric motor, of a rotary pressure pump, a burner, a fuel tube connecting said pressure pump and burner, an oil feed pump, means including electric switch mechanism for automatically starting said electric motor, and means, including electric switch mechanism, for automatically stopping said motor.

11. In a liquid fuel atomizing device the combination with an electric motor of a burner, a rotary compression chamber, means for admitting mixed air and oil thereto, means within said chamber for compressing the fuel mixture preparatory to discharge to the burner, and means for supplying a constant volume of fuel oil to said compression chamber, regardless of the quality of said oil.

12. The combination with an electric motor of a burner, a rotary compression chamber, means for supplying a constant volume of fuel to said chamber, regardless of the quality of said oil, and means dependent upon temperature variations for controlling the action of said chamber and fuel supply means.

13. In a liquid fuel atomizing device the combination with an electric motor of a burner, means for supplying a contant volume of fuel to said burner, regardless of the quality of said fuel, including a pump mechanism for measuring the supply of fuel fed therefrom.

14. In a liquid fuel atomizing device the combination with an electric motor of a burner, means for supplying a constant volume of fuel to the burner, regardless of the quality of said fuel, including a pump mechanism for measuring the supply of fuel fed therefrom, and means responsive to temperature variations for controlling said fuel feeding means.

15. In a liquid fuel atomizing device the combination with a burner of an electrically operated means for supplying a constant volume of liquid fuel to the burner, regardless of the quality of said fuel, including a pump mechanism for measuring the volume of fuel fed therefrom and means responsive to temperature variations adapted to control said electrically operated means.

16. In a liquid fuel atomizing device the combination with a burner, of electrically operated means for supplying a constant volume of fuel to the burner regardless of the quality of said fuel, including a pump mechanism capable of measuring the fuel fed therefrom and forcing it to the burner under pressure.

17. In a liquid fuel atomizing device, in combination, with an electrical motor and a rotary pressure pump, of a fuel feed pump, adapted to automatically insure a constant rate of supply to said rotary pressure pump, including a cylindrical housing, a rotor therein, a spring pressed plunger slidably mounted within the rotor, a cam member interposed between the rotor and housing member, and an adjustable screw member inserted through the housing and abutting the said cam with the result that an adjustable means for controlling the stroke of the plunger in the rotor is provided.

18. In a liquid fuel atomizing device, in combination, with an electrical motor and a rotary pressure pump, adapted to automatically insure a constant rate of supply to said rotary pressure pump, including a cylinder, a rotor within said cylinder, a spring pressed plunger slidably mounted within said rotor

and cam means interposed between the rotor and cylinder.

19. In a liquid fuel burner device, a burner, fuel oil atomizing means for said burner and means for supplying fuel oil to said atomizing means, said means being constructed to insure a constant rate of supply to said atomizing means, including a cylinder having arcuate shaped inlet and outlets, a rotor having a fuel cylinder therein, a spring pressed plunger in said cylinder and a cam surface disposed between the rotor and cylinder.

In testimony whereof I have affixed my signature.

WALTER W. WILLIAMS.