May 16, 1933. I. LUBBOCK ET AL 1,909,294

OIL FUEL BURNER AND SUPPLY APPARATUS THEREFOR

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FIG. 1.

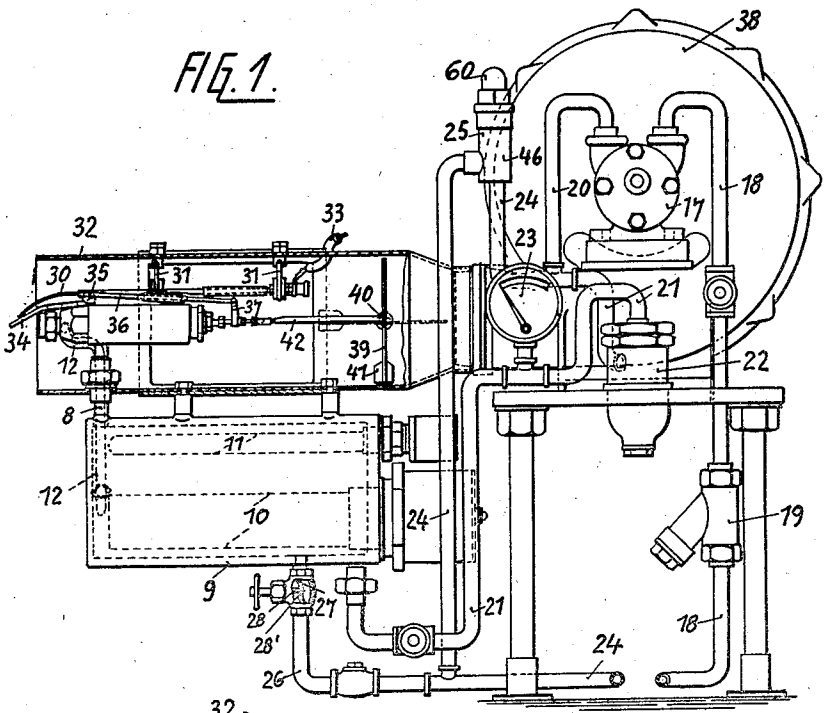
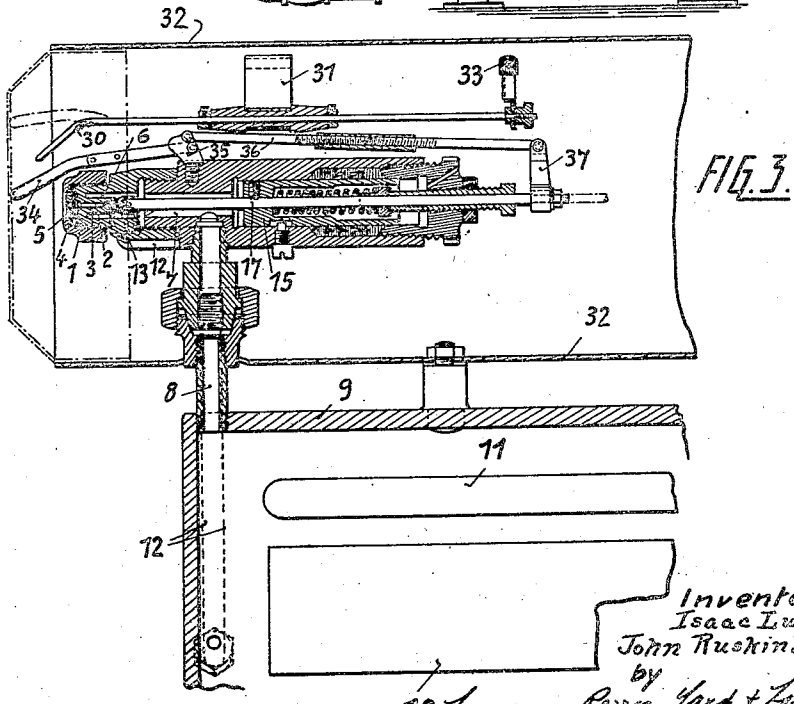


FIG. 3.



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FIG. 2.

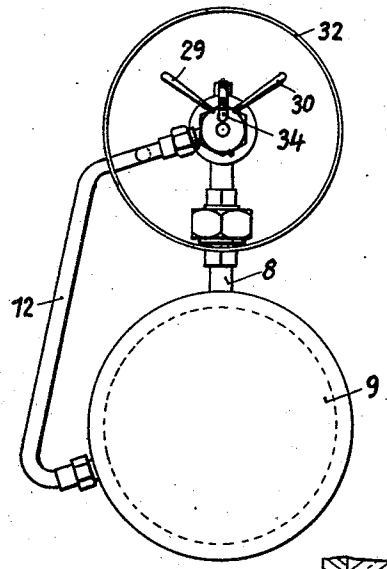
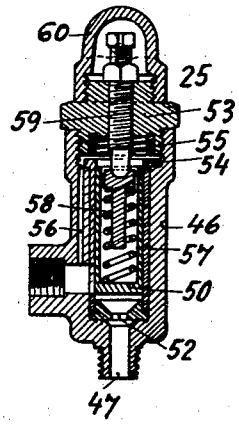


FIG. 4.



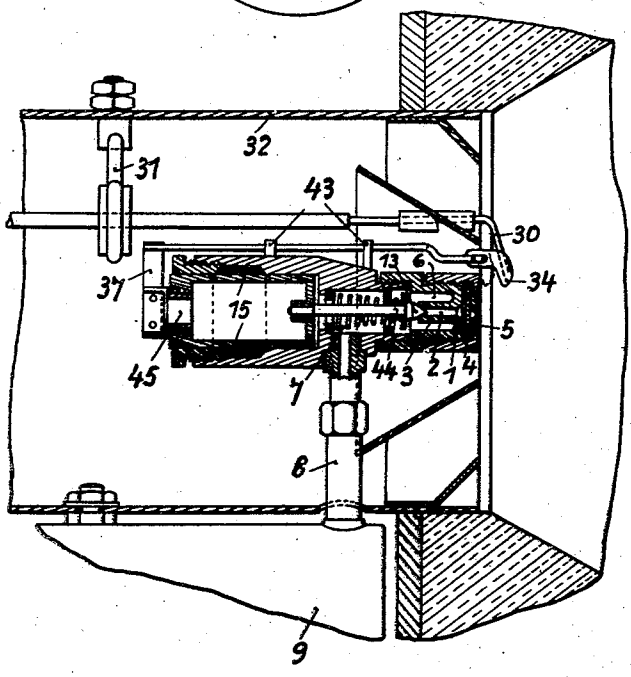


FIG. 5.

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UNITED STATES PATENT OFFICE

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OIL FUEL BURNER AND SUPPLY APPARATUS THEREFOR

Application filed February 12, 1930, Serial No. 427,846, and in Great Britain September 5, 1929.

This invention relates to improvements in oil fuel burners and supply apparatus therefor, and is more particularly concerned with automatic burners (i. e. burners in which ignition is intermittent).

One object of the present invention is to provide an arrangement whereby oil is maintained heated even when the burner is shut down, and whereby the minute quantities of oil which are to be ignited are maintained heated so as to be susceptible to ignition.

A further object of the invention is to provide an arrangement whereby the electrodes of an electric spark igniter are prevented from carbonizing.

According to the present invention a chamber is provided within the body of an oil fuel burner having inlet and outlet openings connected to or adapted to be connected to a heated oil supply, the arrangement being such that oil can circulate from the supply to the chamber and back to the supply, the oil required for burning being supplied to the jet of the burner from said chamber.

Another feature of the invention is the provision of a valve (which may be automatically actuated according to the supply pressure) for controlling the flow of oil from the chamber to the jet and the employment of this valve to actuate an air regulator and/or to actuate a device for cleaning or wiping the electrodes of an electric igniter for the jet.

According to a further feature of the invention, the oil supply apparatus comprises a reservoir provided with a leak device which enables any water and sediment to drain away from the bottom of the reservoir.

With these and other objects in view, which will become apparent in the detailed description below, the invention consists in the combination and arrangement of elements as set forth in the following description, claimed in the claims and shown in the drawings, in which

Figure 1 is a side elevational view with certain parts cut away for greater clearness;

Figure 2 is a front elevational view;

Figure 3 is a vertical cross sectional view showing the burner construction particularly;

Figure 4 is a cross sectional view of the relief valve, and

Figure 5 is a vertical cross sectional view of a modified burner construction.

1 is a burner jet body having a passage 2 formed in a boss 3, the passage 2 opening to discs 4, 5 having orifices arranged to impart a whirling motion to the fuel forced thereto. 6 is an annular chamber which is formed between the boss 3 and inner periphery of the jet body 1, and opens into an oil intake chamber 7, to which oil is supplied through a pipe 8 which communicates with an oil fuel reservoir 9 located as near as possible to the burner. Located in the reservoir are an electrical immersion heater 10 and an immersion controlling thermostat 11. The annular chamber 6 is connected by a second pipe 12 to the reservoir at a lower point than the pipe 8.

Thus the arrangement is such that the oil can circulate from the reservoir 9 to the intake chamber 7 and annular passage 6, and thence back to the reservoir 9, the circulation being set up by the thermo-siphon action due to the heating of the oil in the reservoir.

By this means the heat of the oil is conserved up to a point closely adjacent the jet, on account of thermo-siphonic circulation which provides an annulus of heated oil surrounding the central supply passage 6. By this means, even if the burner starts up after a long inactive period, the oil passes to the jet at a temperature such as to ensure ignition.

The supply of oil to the discs is regulated by a needle valve 13 which is adapted to cooperate with a valve seating formed at the end of the boss 3 and is mounted on a stem

14 connected to a piston 15 subjected to the pressure of the oil, the piston being urged by a spring 16 in such directions as to tend to close the valve seating. Thus, should the oil pressure drop below a certain value, the passage 2 will automatically be closed, and when the pressure again rises, the passage will automatically be placed into communication with the supply chamber 7.

Oil is supplied under pressure by a pump 17 having an intake pipe 18 connected to a suitable supply source and having a strainer 19 and a delivery pipe 20. The pipe 20 is connected to a pipe 21 which is connected to the lower side of the reservoir 9 and is provided with a filter 22 and pressure gauge 23. The pipe 20 is also connected to a branch 24 which is connected to the source of supply and is provided with a relief valve 25.

Branched from the pipe 24 is a pipe 26 which communicates with the lower side of the reservoir 9 through a valve comprising a diaphragm 27 having a small aperture, the area of which can be regulated by a needle valve 28 having a conical portion 28′ adapted, when the valve is closed to extend completely through the aperture. By this means a constant leak device is provided to prevent the accumulation of water and sediment at the bottom of the reservoir, due to the heating of the oil within the reservoir.

Moreover, any impurities which become seated around the aperture are removed by the conical portion.

The fuel issuing from the burner is ignited by an electric spark which forms between two electrodes 29, 30, carried by supports 31 secured to a cylindrical open-ended casing 32 in which the burner is located, the electrodes being supplied with current through leads of which only one, indicated at 33, is shown. In order to clean the electrodes, a wiper 34, pivotally mounted at 35, is connected by an adjustable link 36 pivotally connected to an arm 37 secured to the rod 14, whereby, when the piston 15 is caused to move either to open or to close the needle valve 13, the wiper is caused to move between the electrodes 29, 30 and to clean them. By this means any possibility of non-ignition, due to dirty electrodes, is avoided.

The casing 32 constitutes an air supply conduit, the air being forced through the casing by a blower 38 driven by the shaft which drives the oil pump 17. Located within the casing 32 is an air regulating vane 39, pivotally mounted at 40 and biased to move by a weight 41 to its closed position. To an eccentric pin on the vane is connected one end of a link 42 whose other end is pivotally connected to the rear end of the rod 14. Thus, the supply of air is automatically controlled by the movement of the piston 15, the arrangement being such that when the piston 15 is in its forward position (i. e. when the valve 13 is closed), the vane cuts off the air supply.

In the modification shown in Figure 5, the electrode wiper 34 is reciprocated between the electrodes instead of being rocked as in the arrangement shown in Figure 3, the wiper being slidably mounted in guides 43 secured to the body of the burner. In this modification also, the rod 14 is replaced by a short rod 44 which terminates at and is secured to the front of the piston 15, while the arm 37 is secured to a plug 45 closing the end of the piston.

The relief valve 25 comprises, as is shown in Figure 4, the casing 46 having passages 47, 48 in communication respectively with the pressure supply from the pump and with the reservoir. Located within the casing 46 is a liner 49 slidably mounted within which is a piston valve 50 whose lower end is adapted to seat against a disc 51 having a port 52. The liner is formed with a slot 49′ in register with the passage 48. The upper end of the chamber 46 is closed by a plug 53 between which and a flange 54 on the liner 49 is interposed a spring 55 which forces the liner into position.

The chamber formed between the upper end of the piston 50 and the inner surface of the plug 53 is placed into communication with the passage 48 by a passage 56, whereby any oil which leaks between the piston 50 and the liner 49, and between the liner 49 and the casing 46, and passing to the chamber, passes down the passage 56 and thence returns to the reservoir.

The piston 50 is hollow to receive a spring 57 which tends to move it to its closed position, and the spring is interposed between the bottom of the hollow piston and a shoulder formed on a guide 58 whose upper end is shaped to receive the rounded end of an adjusting screw 59 mounted in the plug 53. The projecting end of the screw 59 is covered by a cap 60 screwed on to the plug 53.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:

1. In an oil fuel burner, the combination of a member responsive to variations in the pressure of the oil fed to the burner, electrodes for igniting the oil issuing from the burner, an electrode wiper, and means connecting said pressure responsive member to said electrode wiper.

2. The combination with a burner as claimed in claim 1 of a valve for regulating the supply of oil to the burner, and means connecting said pressure responsive member to the valve.

3. An oil fuel burner as claimed in claim 1 said wiper adapted to be moved between said electrodes, and said means comprising a link

connected to said wiper and to said pressure responsive member.

4. The combination with a burner as claimed in claim 1 of an open-ended casing surrounding the burner, a pivotally mounted vane located within said casing and a link connected to said vane and to said pressure-responsive member.

In testimony whereof we have signed our names to this specification.

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JOHN RUSKIN JOYCE.