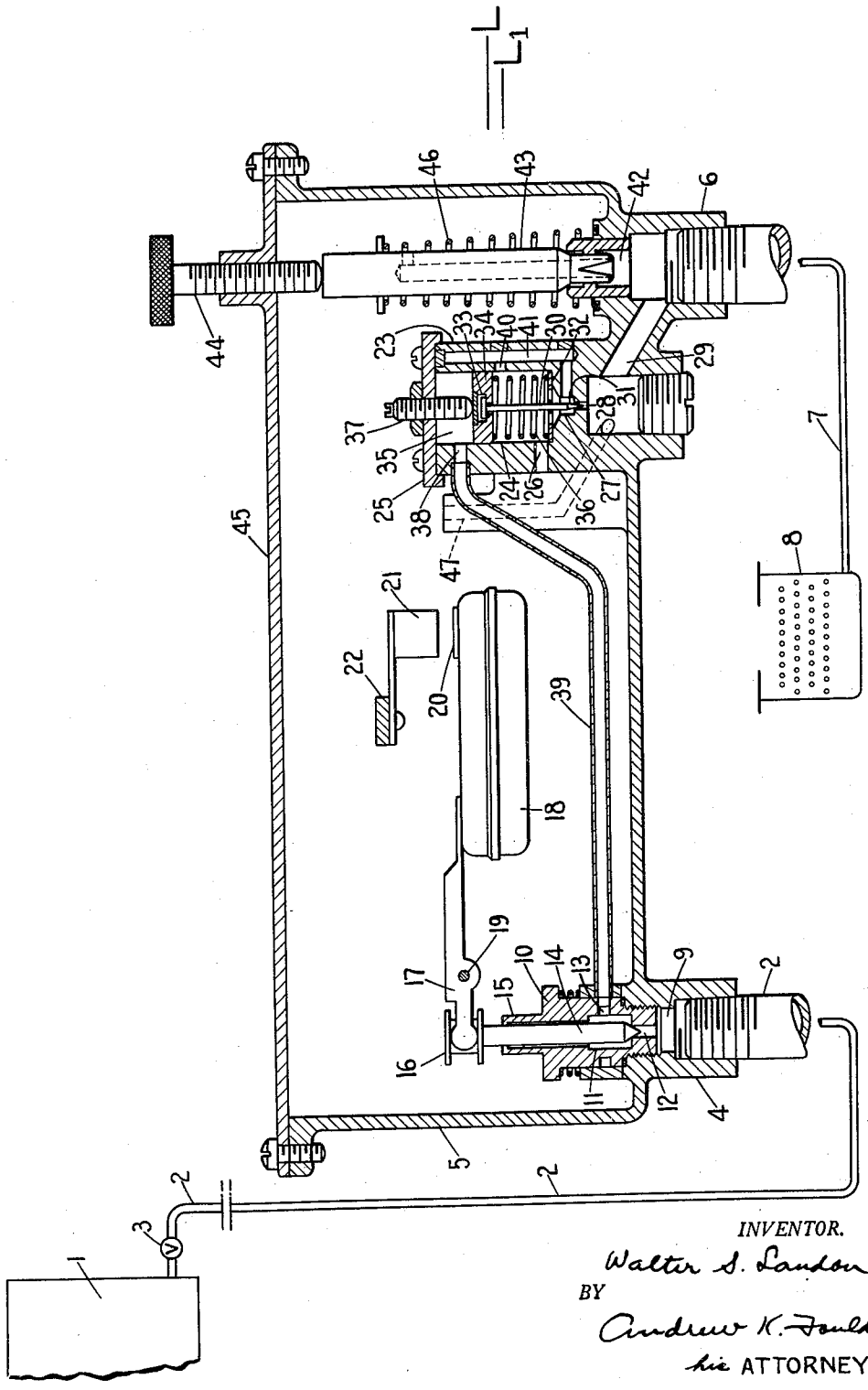
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ORIFICE CLEANING MEANS

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ORIFICE CLEANING MEANS

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This invention relates to new and useful improvements in means for cleaning the outlet orifice of a liquid fuel supply chamber which is particularly adapted for feeding fuel to a pot-type oil burner.

An object of the invention is to provide means operable by fuel pressure to move a cleaning member through the orifice to clear it of foreign matter.

Another object is to utilize the pressure of the fuel being supplied to the chamber to actuate the cleaning member operating means.

Further objects will be apparent from the following description.

The invention consists in the improved construction of parts to be more fully described hereinafter and the novelty of which will be particularly pointed out and distinctly claimed.

In the accompanying drawing to be taken as a part of this specification, there is fully and clearly illustrated a preferred embodiment of the invention in which drawing:

The figure is a view in vertical section of the fuel feeding and orifice cleaning means operatively connected in a fuel feeding system to an oil burner.

Referring to the drawing by characters of reference, 1 designates an elevated fuel supply tank having an outlet conduit 2 containing a shut off valve 3 and connected to the inlet fitting 4 of a liquid fuel chamber 5 having its outlet fitting 6 connected by a pipe or conduit 7 to a pot-type vaporizing burner 8 shown diagrammatically. The inlet fitting 4 has an inlet passage 9 into which is screw threaded a valve casing 10 which extends upward into the chamber 5. The casing 10 has a valve chamber 11 with an inlet port 12 opening upward from the passage 9 and has an outlet port 13. Within the valve chamber 11 there is a vertically reciprocal valve member 14 operable to seat on and close the inlet port 12. The stem of the valve member 14 extends upward through a guide extension 15 on the casing 10 and into the chamber 5. On the upper end of the valve member 14 within the chamber 5 there is a flanged collar 16 which receives between its flanges one end of an operating lever 17 which carries a float 18 responsive to changes of the liquid level in the chamber 5. The lever 17 is pivotally supported on a shaft 19 carried by the walls of the chamber 5. On the float 18 there is an armature 20 cooperable with a permanent magnet 21 secured to a support 22 carried by the wall of the chamber 5. The magnet 21 cooperates with the float 18 such that when the liquid level in the chamber

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5 raises to the line L, the attractive force of the magnet will lift the float slightly to positively seat the valve member 14 and tightly close the inlet port 12. The magnet will also act through the float to hold the valve member closed until the liquid level drops a predetermined amount, say one-eighth inch, when the weight of the float is sufficient to overcome the force of the magnet. The dropping of the float to this lower liquid level indicated by the line L_1 will move the valve member to wide open position.

Positioned within the chamber 5 and extending upward from its bottom wall there is a housing member 23 having therein a vertical cylinder or upward extending chamber 24 which opens upwardly through the top of the housing member 23 and is closed by a cover member 25. The chamber 24 extends downward below the lower liquid level L_1 and has below this lower level a port 26 opening into the chamber 5. Centrally through the bottom wall of the chamber 24 there is an outlet passage 27 which is of reduced diameter at its outlet end as at 28 to provide an outlet orifice which discharges into an enlarged outlet conduit 29 leading to the outlet fitting 6. Cooperable with the orifice 28 there is a cleaning pin 30 which slidably fits the orifice and which has at its lower end a tapered valve portion 31 cooperable with the orifice to regulate flow therethrough from the chamber 5. The cleaning pin 30 extends upward through an apertured guide plate 32 which seats on the bottom wall of the chamber 24. At its upper end the pin 30 has a head positioned within a socket aperture 33 formed in a piston 34 and by which the pin is secured to the piston which has a free sliding fit in the upper portion of the chamber 24. The upper end portion of the chamber 24 therefore provides an expansible pressure chamber 35 above the piston which forms a movable chamber wall. Downward movement of the piston 34 and of the pin 30 through the orifice 28 is resisted by a light coil spring 36 which seats at its lower end on the guide member 32 to hold it in place and which bears at its upper end against the under side of the piston 34. Upward movement of the piston 34 by the spring 36 is limited by an adjustable stop screw 37 screw threaded through the cover member 25. Adjustment of the screw 37 determines the position of the valve portion 31 in the aperture 28 to regulate the effective flow area of the orifice 28. Through the side wall of the housing member 23 there is an inlet port or aperture 38 which opens into the chamber 35 and which is connected by a conduit or pipe 39 to the valve casing outlet

port 13. Below the top face of the piston 34 when it is in its upper position there is an outlet port 40 in the side wall of the chamber 24 which is uncovered on downward movement of the piston 34 to provide outflow from the chamber 35. The port 40 is connected by a conduit 41 in the housing member 23 to the outlet passage 27 on the inlet side of the orifice 28. Fuel discharging from the chamber 35 will flow into the chamber 5 after flow around the cleaning pin 30. Therefore when the piston 34 is moved downward so that the chamber 35 is opened to its outlet port 40, fuel will flow from the chamber 35 through the passage 41 into and through the passage 27 removing the foreign matter from around the inlet side of the orifice 28 and will flow thence through the aperture plate 32 and chamber 34 and out of the port 26 into the chamber 5. The outlet 40 is a sufficient distance from the top face of the piston 34 so that the pin 30 above the valve portion 31 will have moved into and through the orifice 28 before the outlet 40 is opened to the chamber 35 sufficiently to stop further downward movement of the piston by release of pressure. Fuel flow through the orifice 28 from the chamber 5 is for the purpose of maintaining a pilot flame in the burner 8 and this flow is supplemented for high fire burner operation by an outlet 42 from the chamber 5 and discharging into the outlet fitting 6. The outlet 42 is controlled by a metering valve 43 which is adjustable by a manual operating member 44 extending through the cover member 45 of the chamber 5. The valve 43 is movable downward by the member 44 against the force of the valve opening spring 46 and to a full closed position to shut off flow from the chamber 5 through the outlet 42. A vent 47 leads from the outlet conduit 29 below the orifice and extends to a point above the upper liquid level.

The operation is as follows. Assuming that the valve 43 is closed and the burner 8 is lighted and operating at pilot flame then with the liquid filling the chamber 5 to the line L, fuel will flow by gravity head through the port 26 to and through the orifice 28 and thence through conduit 7 to maintain the pilot burner flame. At the low flow rates desired for pilot flame operation which rate may be as low as 1 c. c. per minute, the orifice may become clogged with foreign matter in the fuel such as waxes or gum carried in oil fuel. In order to clean the orifice and clear it of any such foreign matter the cleaning pin 30 is intermittently and automatically forced downward through the orifice 28. When the outflow from the chamber 5 decreases the liquid level to the line L_1 at which the flow rate through the orifice 28 is not materially decreased, then the unsupported weight of the float 18 will overcome the attractive force of the magnet 21 so that the float 18 will drop to its new float level thereby quickly opening the valve member 14 to wide open position. As soon as the valve member 14 is opened, fuel under the head pressure from the elevated tank 1 will flow under this head pressure through the conduit 39 into the cylinder or expansible chamber 35. This fuel pressure in the chamber 35 acting on the piston 34 will move the piston downward against the force of the spring 36 and force the cleaning pin 30 through the orifice 28. As soon as the piston 34 uncovers the port 40 to the chamber 35 then as above noted the fuel will discharge from the chamber 35 through the port 26 into the supply chamber 5. Since the valve member 14 is in wide open position the fuel will flow rapidly into the chamber 5 and quickly raise the level to the upper limit at line L. The float 18 will move upward with the increasing liquid level and as above noted the magnet 21 will cooperate therewith to seat the valve member 14 and stop further flow of fuel into the chamber 35 when the upper liquid level at the line L is reached. As soon as the valve member 14 is closed, the spring 36 will move the piston 34 upward thereby withdrawing the cleaning pin 30 from the orifice 28 until it is stopped by the adjustment screw 37 so that the valve portion 31 is again in its flow metering position in the orifice 28. The piston 34 can be moved upward due to clearance around the piston or to clearance between the guide extension 15 and the stem of the valve member 14, or if desired, a bleed hole could be provided from the chamber 35. It may be noted that the interval during which the orifice 28 is closed by the cleaning pin 30 is of such short duration that the operation of the burner 8 at pilot flame is unaffected. It may also be noted that the spring 36 needs only to exert sufficient force to withdraw the pin 30 from the orifice 28 and to support the weight of the piston and cleaning pin in their upward inactive position against the abutment screw 37. Accordingly the elevation of the outlet from the tank 1 above the port 33 into the chamber 35 can be a relatively short distance depending upon the area of the fuel pressure receiving face of the piston 34.

What is claimed and is desired to be secured by Letters Patent of the United States is:

1. Fuel feeding means for supplying liquid fuel to a fuel burner, comprising a liquid fuel chamber, a fuel supply conduit leading from the exterior of and discharging into said chamber, said chamber having an outlet orifice, means to maintain a level of liquid in said chamber between predetermined limits to maintain a liquid head on said orifice, a cleaning pin movable through said orifice, and means operable by fuel pressure in said conduit to move said pin through said orifice.

2. Fuel feeding means for supplying liquid fuel to a fuel burner, comprising a liquid fuel chamber, a fuel supply conduit leading from the exterior of and discharging into said chamber, said chamber having an outlet orifice, float operated valve means in said chamber and controlling flow through said conduit to maintain a level of liquid in said chamber between predetermined limits to maintain a liquid head on said orifice, a cleaning pin movable through said orifice, and means operable by fuel pressure in said conduit to move said pin through said orifice, said means including a chamber having a movable wall member cooperable with said pin.

3. Fuel feeding means for supplying liquid fuel to a fuel burner, comprising a liquid fuel chamber, a valve controlling admission of fuel to said chamber, said chamber having an outlet orifice, a cleaning pin movable through said orifice, a piston for actuating said pin, a cylinder receiving said piston and having an outlet to said chamber, a conduit for conveying fuel under pressure from the outlet of said valve to said cylinder to actuate said piston, and means to intermittently open said valve.

4. Fuel feeding means for supplying liquid fuel to a fuel burner, comprising a liquid fuel chamber, a valve controlling admission of fuel to said chamber, said chamber having an outlet orifice, a cleaning pin movable through said orifice and having a metering portion positioned in said orifice to regulate flow therethrough, a piston for

actuating said pin, a cylinder receiving said piston and having an outlet to said chamber, a conduit for conveying fuel under pressure from the outlet of said value to said cylinder to actuate said piston, and means to intermittently open said valve.

5. Fuel feeding means for supplying liquid fuel to a fuel burner, comprising a liquid fuel chamber, a valve controlling admission of fuel to said chamber, said chamber having an outlet orifice, a cleaning pin movable through said orifice, a piston for actuating said pin, a cylinder receiving said piston and having an outlet in its side wall to said chamber, a conduit for conveying fuel under pressure from the outlet of said valve to said cylinder to actuate said piston, said piston cooperating with and uncovering said side wall outlet upon movement of said pin through said orifice thereby to stop movement of said piston, and means to intermittently open said valve.

6. Fuel feeding means for suppling liquid fuel to a fuel burner, comprising a liquid fuel chamber, a valve controlling admission of fuel to said chamber, said chamber having an outlet orifice, a cleaning pin movable through said orifice, a piston for actuating said pin, a cylinder receiving said piston and having an outlet controlled by said piston, a conduit leading from said outlet to said chamber below the chamber liquid level, said orifice being positioned intermediate the ends of said conduit, a conduit for conveying fuel under pressure from the outlet of said valve to said cylinder to actuate said piston, and means to intermittently open said valve.

7. Fuel feeding means for supplying liquid fuel to a fuel burner, comprising a liquid fuel chamber, a valve controlling admission of fuel to said chamber, said chamber having an outlet orifice, a cleaning pin movable through said orifice, a piston for actuating said pin, a cylinder receiving said piston and having an outlet to said chamber, a conduit for conveying fuel under pressure from the outlet of said valve to said cylinder to actuate said piston, means responsive to liquid level in said chamber and controlling said valve, and means cooperable with said responsive means to hold said valve closed until the liquid level in said chamber drops to a predetermined level.

8. Fuel feeding means for supplying liquid fuel to a fuel burner comprising a liquid fuel chamber, a valve controlling admission of fuel to said chamber, said chamber having an outlet orifice, a cleaning pin movable through said orifice and having a metering portion positioned in said orifice to regulate flow therethrough, a piston engaging and operable to move said pin through said orifice, an adjustable abutment member engageable by said piston and determining the position of said metering portion in said orifice, a spring opposing movement of said pin by said piston and tending to hold said piston against said abutment member, a cylinder receiving said piston and having an outlet to said chamber, a conduit for conveying fuel under pressure from the outlet of said valve to said cylinder to actuate said piston, and means to intermittently open said valve.

9. Fuel feeding means for supplying liquid fuel to a fuel burner, comprising a liquid fuel chamber, a valve controlling admission of fuel to said chamber, said chamber having an outlet orifice, a cylinder communicable with said chamber and with said orifice, a movable piston in said cylinder, a conduit for conveying fuel under pressure from the outlet of said valve to said cylinder to actuate said piston, means to intermittently open said valve, and means cooperable with said piston and operable to clean said orifice.

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