Nov. 21, 1939. C. A. SILVESTRI ET AL 2,180,884

FLOAT SWITCH FOR FUEL OIL BURNERS

Filed Aug. 12, 1937

Fig. 1.

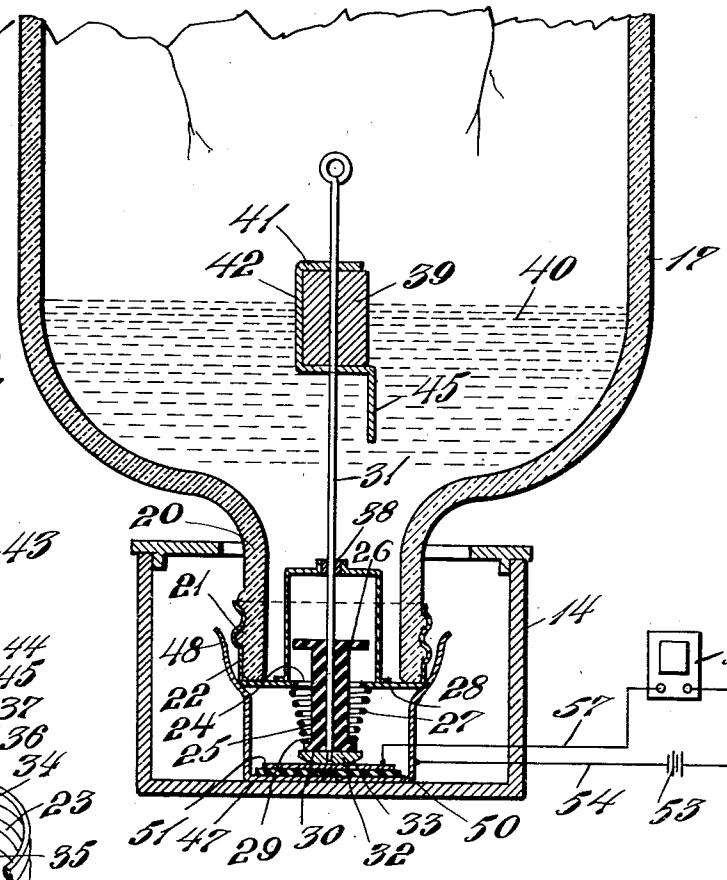


Fig. 2.

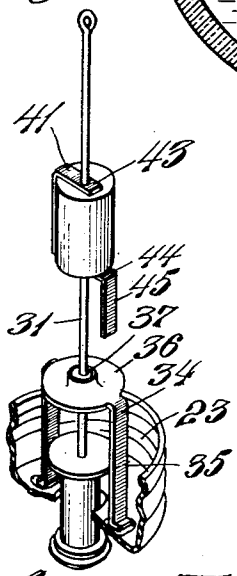


Fig. 3.

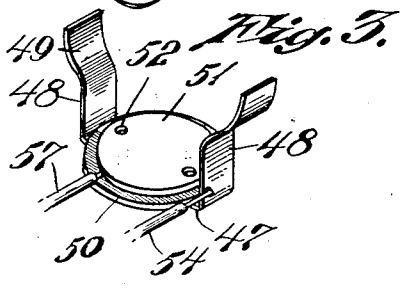
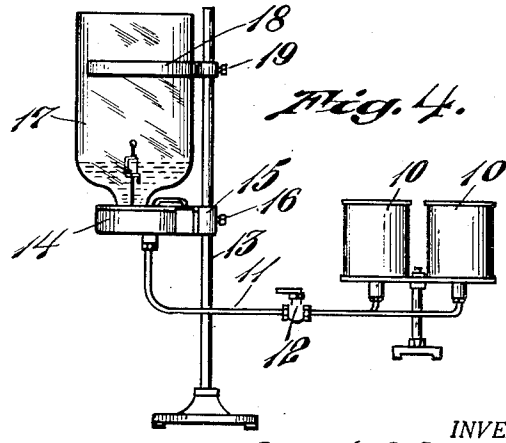


Fig. 4.



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FLOAT SWITCH FOR FUEL OIL BURNERS

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6 Claims. (Cl. 200—84)

This invention relates to a float switch, and is particularly adapted for use in connection with a range oil burner. One of the objects of the invention is to prevent the depletion of the fuel supply which causes carbon to form in the burner, which carbon is difficult to remove.

Another object of the invention is to provide a signal or warning of the approaching depletion of fuel in the reservoir of the burner.

Another object of the invention is to replenish the oil in the reservoir prior to its exhaustion and the cooling off of the burner which causes the generation of gas and the formation of carbon, which is detrimental and desired to be avoided.

Another object of the invention is to provide a construction which will be simple to install and will fit upon most of the standard bottles which are used to contain the fuel for the oil burner.

Another object of the invention is to provide a device which is substantially completely mounted on a cap for the bottle so that the cap so equipped may be substituted for the usual cap in use on the bottle.

Another object of the invention is to provide an arrangement so that the switch or alarm will operate at predetermined points which may be easily arranged by the one constructing the device.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawing:

Fig. 1 is a sectional view of the reservoir which is broken away showing the attachment of the device to the neck of the bottle and showing diagrammatically a circuit for completing the alarm or signal;

Fig. 2 is a fragmental perspective view of the cap with the operating parts attached thereto;

Fig. 3 is a perspective view of the portion which is supplied with the cap and which cooperates with the cap for the provision of the contacts desired for the operation of the device;

Fig. 4 is an elevational view of the complete apparatus illustrating the relation of the reservoir and the burners.

When relighting a fuel oil burner soon after it has become extinguished, the oil burner plate is hot and will automatically generate fumes that when striking a match it will result in an explosion. Further, it often occurs in the use of range oil burners that the supply of oil becomes exhausted which causes carbon to form and provides a situation which is rather difficult for the ordinary housewife to relight, inasmuch as the burner must be heated in order to properly form a gas and burn, and the trouble which occurs with starting and stopping a burner is desired to be avoided. Accordingly, we have provided a signal which may be in any form, although we have here shown a buzzer such that when the oil is reduced to a certain level the buzzer will operate to warn of the approaching depletion of the oil in sufficient time so that the supply may be replenished without stopping of the burner; and the following is a more detailed description of the present embodiment of this invention, illustrating the preferred means by which these advantageous results may be accomplished:

With reference to the drawing, 10 designates burners to which fuel is supplied through the pipe line 11, there being a suitable shut-off valve 12 in this line for control of the flow of the fuel. A standard 13 is provided having a base to rest upon the floor while carried by the standard is a container 14 on the bracket 15 held in position on the standard 13 by the set screw 16 into which container an inverted bottle 17 is positioned and held in vertical position by the clamp 18 supported by the standard and held in adjusted position by the set screw 19. This bottle is of a usual known type usually holding two or five gallons of fuel oil and is positioned in its holder on the standard after filling and may be readily taken from this position to be re-filled.

This bottle has a neck portion 20 with a molded thread 21 thereon and a cap 22 has thread portions 23 therein to fit this threaded neck. An opening 24 is formed in this cap and a valve 25 of some non-conducting material is positioned in this opening and provided with a flange 26 for closing the opening when this valve is forced outwardly by the spring 27 to cause the flange 26 to engage the marginal edge of the opening 24 and seal the same. This spring 27 acts between the outer surface 28 of the cap and the abutment 29 of the valve formed by a head 30 at its outer end. A spindle 31 of metal extends through this valve and has electrical connection with the button end 32 at the head end of the valve, which button end is rounded as at 33 and suitably held in position at the end of the valve 25.

When there is no weight of the bottle on the valve 25 the spring quickly moves the valve to

closed position, whereas when the bottle is inverted and lowered into the container 14 the valve by striking the bottom of the container is forced inwardly to permit the fuel to pass outwardly through the opening 24 to seek a level where it closes off the supply of air which may be admitted to the bottle and thus prevent further flow of the oil in a known manner.

A U-shaped structure or bridge designated 34 is supported by its legs 35 attached to the inner surface of the cap 22 and provides an enlarged bridge portion 36 with an opening 37 to receive an insulated bushing 38 which serves as a guide and support for the spindle 31 and also prevents direct electrical connection between the spindle 31 and the cap 22. This spindle slides with the valve as it moves inwardly to open position.

A float 39 of cork or some similar substance is slidable along the spindle 31 and moves up and down the spindle in accordance with the level of the liquid 40. This float carries a contact member 41 which has a portion 42 extending along the float and arms 43 and 44 extending across the ends of the float and having sliding connection with the spindle 31. A leg 46 on this member will engage the bridge portion 36 when the level of the liquid lowers to such an extent that the leg 45 may touch the same.

A contact device consisting of a metal base portion 47 rests upon the container 14 with arms 48 extending upwardly therefrom and flared outwardly as at 49 to receive the cap 22 as it is lowered into the casing 14, there being caused by this engagement a slight outward movement of the arms against their inherent spring tension for good electrical contact therewith. An insulating pad 50 is supported by the base 47 while a contact member 51 is secured to the base through this insulation by some suitable insulating rivet 52. This device forms terminals of a circuit traced from arm 47 over lead 54 to the battery 53 thence over lead wire 55 to a buzzer or other signaling device 56 and thence over lead 57 to the contact plate 51.

It will be apparent that when the leg 45 engages the bridge 36 that the circuit will be closed by means of the electric current passing through the cap 22, the bridge arms 35 of the bridge 36 thence through the leg 45 to the spindle 31 and thence from the spindle through the button 32 to the contact plate 51 and the signaling device will thus operate when the float is lowered into this position.

By this arrangement it will be readily apparent that the length of the leg 45 or the legs 35 may be varied to suit different requirements as to the amount of oil which will be left in the reservoir when the indicator will operate. When the signal operates, the housewife may lift the bottle from the casing 14 whereupon the valve will immediately close and she may then remove the cap, replenish the supply of fuel and replace the reservoir in position for continued operation of the burner which may be running while filling takes place by reason of the liquid fuel supply which is in the container 14.

The foregoing description is directed solely towards the construction illustrated, but we desire it to be understood that we reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

We claim:

1. In a float switch, a bottle cap, a valve, a spindle insulated from said cap and carried by said valve for insertion into the bottle, a float slidable on said spindle and carrying a member making electric contact therewith, and means to cause electrical connection between said member and said cap upon movement of said float to a predetermined position.

2. In a float switch, a bottle cap, a valve, a spindle insulated from said cap and carried by said valve for insertion into the bottle and providing an accessible electrical connection outwardly from the cap, a float slidable on said spindle and carrying a member making electric contact therewith, and means to cause electrical connection between said member and said cap upon movement of said float to a predetermined position.

3. In a float switch, a bottle cap, a spindle insulated therefrom for insertion into the bottle, a float slidable on said spindle and carrying a member making electric contact therewith, a bridge having electrical connection with said cap and with which said member may engage, said bridge carrying an insulating bushing serving as a brace for the spindle, and means to cause electrical connection between said member and said bridge upon movement of said float to a predetermined position.

4. In a float switch, a bottle cap serving as one switch terminal, a valve made of an insulating material in said cap and carrying a portion serving as another switch terminal, a spindle mounted in said valve and electrically connected to said terminal, a float having electrical connection with said spindle, and means comprising a part carried by said float to make electrical connection with the cap terminal.

5. In a float switch, a bottle cap serving as one switch terminal, a valve made of an insulating material in said cap and carrying a portion serving as another switch terminal, a spindle mounted in said valve and electrically connected to said terminal, and float operated means to electrically connect said spindle and said cap terminal upon movement of said float to a predetermined position.

6. In a float switch, a bottle cap serving as one switch terminal, a valve made of an insulating material in said cap and carrying a portion serving as another switch terminal, a spindle mounted in said valve and electrically connected to said terminal, and float operated means to electrically connect said spindle and said cap terminal upon movement of said float to a predetermined position; and a separate contact device for engaging and making electrical connection with said terminals and itself serving as a part of a circuit.

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