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1,604,492

I. E. SMITH

FLOAT CONTROLLED VALVE AND SWITCH

Filed Sept. 21, 1925

Fig. 1

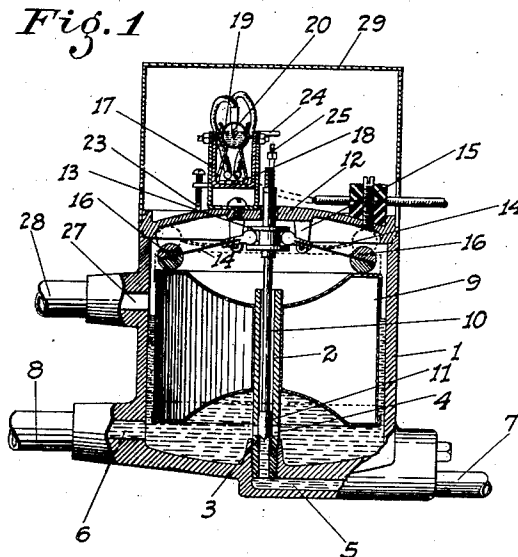


Fig. 2

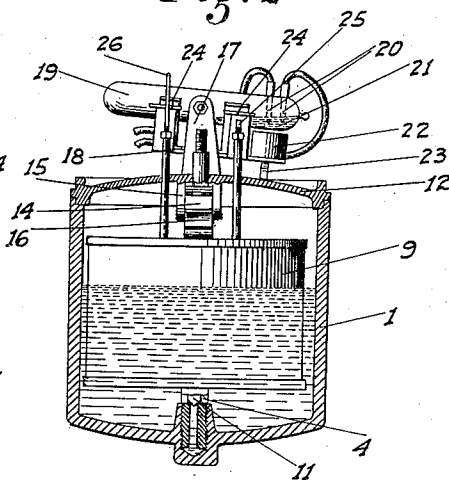


Fig. 3

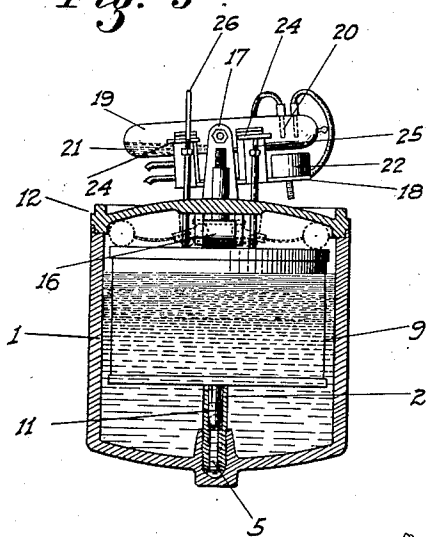


Fig. 4

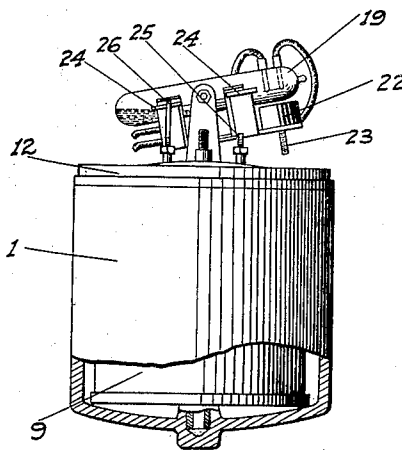
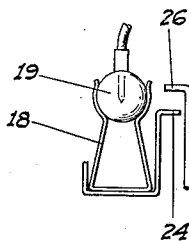


Fig. 5



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FLOAT-CONTROLLED VALVE AND SWITCH.

Application filed September 21, 1925. Serial No. 57,548.

This invention relates to attachments for use in connection with oil supply systems of electrically driven oil burners, such as shown in my co-pending application for patent, Serial No. 750,248 filed November 17th, 1924.

The device of the present invention is a combination of two structures, one a safety switch to take the place of the device shown in my co-pending application for patent, 10 Serial No. 29,386 filed May 11th, 1925; and an oil flow control valve such as is shown in my Patent No. 1,512,247, dated October 21st, 1924.

The principal object of my present invention is to provide a unitary device, to serve the above purposes, constructed in such a manner that when the normal supply of oil is being fed through the device to the burner, the switch to the motor operating the oil 15 pump and burner will be closed; if the oil supply fails for any reason the switch will be opened, discontinuing the driving of the motor; and if the valve leaks and does not properly control the level of the oil, the 25 switch will also be opened.

The device is automatic in operation, so that it needs no attention on the part of an operator, and by shutting off the motor under abnormal conditions, gives warning that the 30 system is not functioning properly, while preventing the possibility of fire due to an overflow of oil, and the possible damage to the burner and other parts if they are determined to run dry.

Any overflowing oil from the burner returns to the device, no attention being ever necessary to take care of such overflow of oil.

A further object of the invention is to produce a simple and inexpensive device and yet 40 one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims. 45

In the drawings similar characters of reference indicate corresponding parts in the several views.

Figs. 1 and 2 are sectional elevations of the device taken in planes at right angles to each other, the bowl being full to its normal level and the valve and switch closed. 50

Fig. 3 is a side view of the device partly in section showing the liquid level above its normal level and the switch consequently 55 opened.

Fig. 4 is a similar view showing the bowl empty and the switch opened.

Fig. 5 is a fragmentary end view of the switch tube showing one trip or opening 60 means.

Referring now more particularly to the characters of reference on the drawings, the numeral 1 denotes a bowl of suitable size, having a centrally disposed tube 2 project- 65 ing upwardly into the same, this tube near its lower end being formed with a valve seat 3 with lateral openings 4 leading into the bowl above said seat. The tube below the seat is connected to an oil intake passage 5, 70 while an outlet passage 6 leads from the side of the bowl adjacent the bottom thereof. These passages are adapted to be connected to feed and discharge pipes 7 and 8 respectively. 75

Slidably mounted on the tube for vertical movement in the bowl is a float 9. A stem 10 having a needle valve 11 to fit in the seat 3 is slidable in the tube and projects through the cover 12 of the bowl. A grooved collar 80 13 is fixed on the stem inside the cover and above the float, being arranged to allow limited upward movement of the valve from its closing position.

This collar is engaged by opposed arms 14 85 which are pivoted intermediate their ends between lugs 15 depending from the cover. The opposite ends of these arms have weights 16 which bear on the top of the float. This valve controlling arrangement is similar to 90 that commonly used in ordinary carbureter construction, but in the present instance the arms 14 from the lugs to the weights 16 are of spring material. They may therefore flex and allow upward movement of the float 95 even after the valve 11 has seated, as indicated in dotted lines in Fig. 1.

This construction has a valuable function, as will be seen hereinafter.

Pivotally mounted in brackets 17 project- 100 ing above the cover 12 is a frame 18 which carries a horizontal glass tube 19. Contacts 20 project into the tube adjacent one end thereof, said contacts being interposed in the

circuit to the motor, which drives the burner and pump (not shown). A quantity of mercury 21 sealed in the tube, is adapted to engage the contacts to close the same, the tube being normally held at a downward slant toward the contacts so that the mercury will engage the same by a counterweight 22 mounted on the frame 18. A set screw 23 mounted in said frame and adapted to bear against the cover limits the downward movement of the frame and tube.

Projecting horizontally from the frame 18 on opposite sides of one of the brackets 17 are lips 24. One lip is adapted to be engaged on its under side under certain conditions, by a pin 25 fixed on the float and projecting upwardly through the cover 12. The other lip is adapted to be engaged on its upper face under certain conditions by a hook 26 fixed on the float and projecting upwardly through the cover 12. The hook is sufficiently higher than the pin so that a certain vertical movement of the float may be had from its normal valve closing position, without either the pin or the hook engaging the respective lips.

The pin and hook are adjustable as to length so as to be able to adjust the time of opening of the switch with different levels of oil in the bowl.

The bowl also has an inlet 27 above the normal oil level, which is adapted to be connected to an overflow pipe 28 from the burner. Said overflow oil of course controls the movement of the float in the same manner as the oil entering through the regular intake passage 5. An additional cover 29 is preferably removably mounted onto the cover 12 so as to protect the switch tube structure from possible damage.

In operation the oil flowing into the bowl through the intake 5 causes the float to rise until a certain predetermined level has been reached, at which time said float, acting on the stem 10 through the arms 14, will cause the valve 11 to be seated and the intake shut off.

As the oil is drawn through the discharge pipe 8, under normal conditions, the float fluctuates back and forth to allow sufficient oil to enter the bowl to offset the amount drawn therefrom. In such case, as previously stated, neither the pin 25 nor the hook 26 are in engagement with the lips 24, and consequently the switch will remain closed.

This position of the parts is illustrated in Figs. 1 and 2.

If for any reason the valve 11 should fail to seat properly and would cause oil to flow into the bowl faster than it was being drawn out of the same, the float would continue to rise. This it is able to do on account of the flexibility of the arms 14. When this takes place the pin 25 approaches and engages the

corresponding lip 24 and with a further upward movement of the float said pin will push up on said lip and cause a reversal of position of the switch tube so that the mercury will flow away from the contacts, thereby opening the switch.

This position of the parts is shown in Fig. 3.

If on the other hand the oil supply should fail for some reason and no oil would enter the bowl, the float would lower away from the arms 14 until it reached the bottom of the bowl. In this case the hook 26 would engage and pull down its lip 24 and would also cause a reversal of position of the switch tube in a similar manner to that had with the engagement of the pin 25 with its lip as above stated. In other words the switch will again be opened.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention what I claim as new and useful and desire to secure by Letters Patent is:

1. A float controlled valve and switch comprising a bowl to contain a liquid, an intake leading to the bowl, a valve to control the intake comprising a vertical needle stem, a float, connections between said float and stem arranged to cause the valve to be opened when the float is lowered and to close the valve when the float rises to a certain level and to then permit of further rising of the float without affecting the stem, switch means normally closed when the float is at said certain level, and means between the float and switch means for causing the latter to be opened when the float rises or lowers a predetermined distance from its normal valve-closing level.

2. A float controlled valve and switch comprising a bowl to contain a liquid, an intake leading to the bowl, a valve to control the intake, switch means associated with the bowl, and normally closed when the liquid in the bowl is at a predetermined level, a float controlling the opening and closing of the valve, means permitting raising and lowering movement of the float to a greater extent than that necessary to close and open the valve and without then affecting the valve, and means between the float and switch means for causing the latter to be opened with such greater movement of the float in either direction.

3. A structure as in claim 3, in which said switch means comprises a pivoted tube, con-

tacts projecting into the same at one end, mercury in the tube adapted to engage the contacts, and means normally holding the tube on a slant sufficient to cause the mercury to engage the contacts; and the control means comprises lips projecting horizontally from the tube on both sides of its pivot, a pin projecting upwardly from the float to engage the under side of one lip, and a hook projecting upwardly from the float to engage the upper side of the other lip, said pin and hook being clear of the lips when the float is in its normal valve-closing position.

4. A float controlled valve and switch comprises a bowl to contain a liquid, an intake leading to the bowl, a valve to control the intake, a switch structure pivotally associated with the bowl, means incorporated with said structure whereby only when turned a certain distance about its pivot in one direction will the switch be closed, a float controlling the opening and closing of the valve, and means between the float and switch structure for turning the latter in said one direction to open the switch with either an upward or downward movement of the float a predetermined dis-

tance from its normal valve closing position.

5. A float controlled valve and switch structure comprising a bowl to contain a liquid, an intake passage for the bowl, a valve to open and close the passage, a float controlling the movement of the valve and causing the same to close when the liquid in the bowl is at a predetermined level, and the float is in a corresponding position, a switch structure on top of the bowl, means independent of the float tending to hold the switch closed, and means mounted on the float and acting on the switch structure but independent thereof for causing the same to be opened by the upward or downward movement of the float a certain distance from said above named position.

6. A structure as in claim 1, in which said connections comprise a collar on the stem above the float, and vertically resilient arms pivoted intermediate their ends in a fixed position relative to the stem and float; said arms at one end engaging the collar and at the other end normally resting on the float.

In testimony whereof I affix my signature.

IRA EDWARD SMITH.