Dec. 24, 1940. R. M. SANDFORD 2,226,325

AUTOMATIC CONTROL FOR OIL BURNERS

Filed Aug. 9, 1938

Fig. 1.

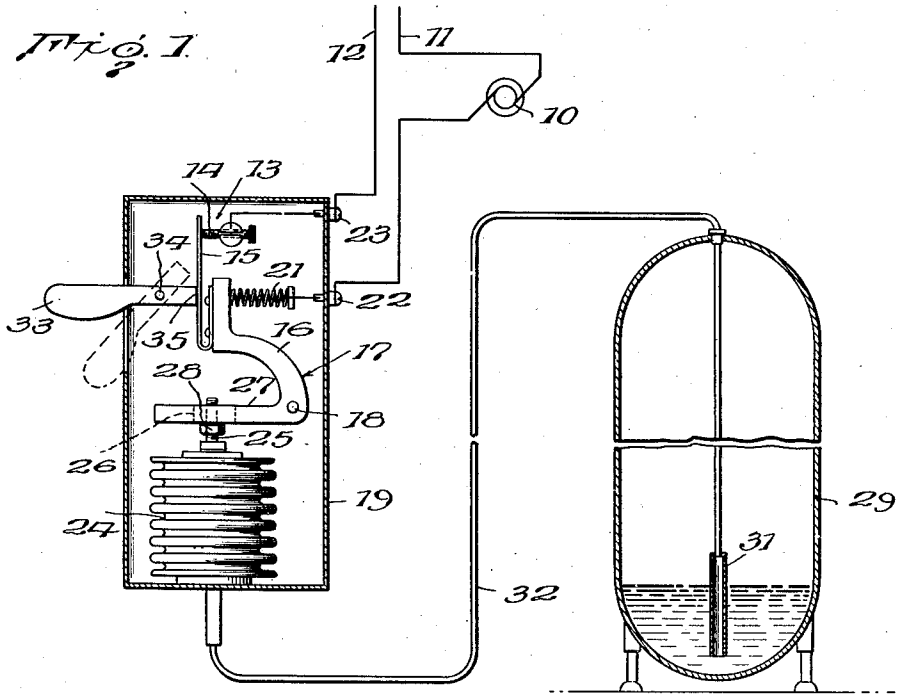
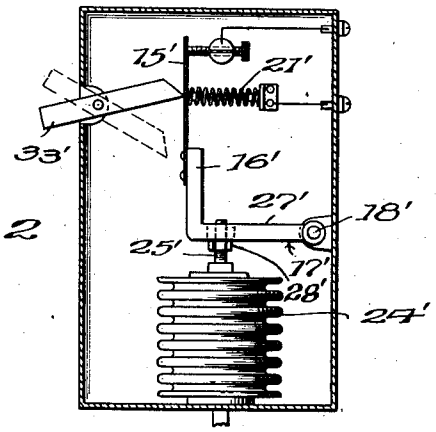


Fig. 2.



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AUTOMATIC CONTROL FOR OIL BURNERS

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3 Claims. (Cl. 200—83)

The present invention relates to automatic controls for oil burners, and more particularly to means for stopping the burner motor when the contents of oil in the supply tank have been reduced a predetermined amount. Specifically, the invention comprises a cut-out switch for the motor, the switch being actuated by expansible means responsive to the level of oil in the oil supply tank.

One of the objects of the invention is to provide a motor cut-out switch operable when the oil in the supply tank has been lowered to a predetermined level.

Another object of the invention is to actuate the switch by fluid pressure acting on an expansible device interposed between the tank and the switch.

Other objects will be apparent from the following description of the invention taken in connection with the accompanying drawing, in which:—

Fig. 1 is a front elevation, partly in section, of a preferred form of the invention; and

Fig. 2 is a modification of the apparatus shown in Fig. 1.

In the drawing, the customary burner motor is indicated diagrammatically at 10 with lead wires shown at 11 and 12. The automatic stopping and starting of the motor is controlled by a switch 13 comprising a fixed adjustable contact 14 and a leaf spring contact 15. Contact 15 is suitably secured to one arm 16 of a rockable bell-crank lever 17, the latter being pivoted at 18 in housing 19. Bell-crank 17 and contact 15 are normally urged to circuit breaking position by a spring 21. It will be seen that contact 15 is connected through spring 21 to terminal 22 and lead wire 11, while contact 14 is connected to terminal 23 and lead wire 12.

Mounted in housing 19 is an expansible motor or bellows 24, the lower end of which is secured to the housing permitting its upper end to rise or fall depending on the pressure within the bellows. Fixed to the upper end of the bellows is a threaded pin 25 which passes through a slot 26 in the lower arm 27 of bell-crank 17. A nut 28 cooperates with pin 25 to form an adjustable connection between the bellows and the bell-crank lever.

The tank 29 containing a supply of oil is connected by suitable means (not shown) with the usual atomizing mechanism of the burner. Disposed within the tank and extending nearly to the bottom thereof is an inverted hollow tubular bell 31, the lower end of which is open, its upper end being connected by means of a pipe 32 to bellows 24. Thus, air trapped in the bell is forced from the bell into the bellows as the level of the oil in the tank rises causing the bellows to expand and urge the switch to closed position. If, however, the level of oil in the tank falls, the bellows will collapse. The resilience of the bellows is such that, when it has collapsed, spring 21 will open switch 13. Since nut 28 is adjustable longitudinally of pin 25, the device may be made to respond to a predetermined fall of the level of oil in the tank.

It is desirable, of course, that the switch open when the level of oil is some distance from the bottom of the tank so that a warning of low level is given by stopping the motor before the oil supply is completely exhausted. In order that the motor may be operated after the switch has been automatically opened, means are provided for manual closing of the switch. This means comprises an unbalanced or weighted lever 33 pivoted at 34 in housing 19. Normally the weighted portion of the lever holds lever 33 in the position indicated by dotted lines in the drawings, that is, out of engagement with the spring contact arm 15. Lever 33 projects out of the housing and may be tripped to engage contact 15 to hold the latter in switch-closing position, the flat end 35 of the lever abutting the spring. In swinging the lever to the position shown in full lines, the resilience of spring arm 15 permits lever 33 to assume the switch-closing position shown and maintain the lever in this position.

It will be evident, therefore, that the motor will be automatically cut out when the oil drops to a predetermined level but a sufficient supply of oil remains to permit the burner to be operated for a limited time after automatic actuation of the cut-out switch. When a new supply of oil is put in the tank, the switch is automatically closed at which time lever 33 is returned to its dotted line position.

In the modified construction illustrated in Fig. 2, the rockable lever 17' is L-shaped and is pivoted at 18' adjacent one end of arm 27'. Spring contact arm 15' is fastened to the other arm 16' of the lever. Spring 21' is under compression and normally urges contact 15' to circuit-opening position. Adjustable nut 28' threaded on pin 25' on bellows 24' will engage the under side of lever 17' when the level of oil rises to elevate the lever against the pressure of spring 21' and close the switch. When the oil drops to a predetermined level, the bellows will collapse and spring 21' will open the cut-out switch.

Lever 33' is so weighted that it normally occupies the position indicated by dotted lines, but may be swung to the full line position shown to close the switch.

The invention has been described and illustrated with respect to preferred forms thereof, but it is intended that such changes as will be conducive to better operation are contemplated.

What I claim as my invention is:

1. An electric switch for controlling an electrically operated pump comprising a fluid actuated motor responsive to the level of a confined liquid and adapted to close the switch when the liquid is above a predetermined level, said switch including a resilient leaf spring contact arm, means for moving said arm to open the switch when the liquid is below said predetermined level, auxiliary means yieldably engageable with said arm for closing the switch when said motor is out of switch closing position, and weight means on said auxiliary means for moving said auxiliary means out of engagement with said arm when said motor returns to switch closing position.

2. An electric switch for controlling an electrically operated pump comprising a fluid actuated motor responsive to the level of a confined liquid and adapted to close the switch when the liquid is above a predetermined level, said switch including a resilient leaf spring contact arm, means normally opposing said motor and adapted to move said arm to switch opening position when the liquid is below said predetermined level, auxiliary means yieldably engageable with said arm for rendering said opposing means inoperative and maintaining the switch in closed position when said motor is out of switch closing position, and weight means on said auxiliary means out of engagement with said arm when said motor returns to switch closing position.

3. An electric switch for controlling an electrically operated pump comprising a fluid actuated expansible motor responsive to the level of a confined liquid and adapted to close the switch when the liquid is above a predetermined level, said switch including a resilient leaf spring contact arm, spring means normally opposing said motor and adapted to move said arm to switch opening position when the liquid is below said predetermined level, said spring means forming a conductor, manually operated means yieldably engageable with said arm for rendering said spring means inoperative to open the switch, said manually operated means being adapted to maintain said arm in switch closing position when said motor is out of switch closing position, and weight means on said manually operated means for moving said manually operated means out of engagement with said arm when said motor is in switch closing position.

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