Aug. 24, 1937. J. R. WILLIAMS 2,090,880

FUEL CONTROL

Original Filed Nov. 28, 1934 2 Sheets-Sheet 1

Fig. 2.

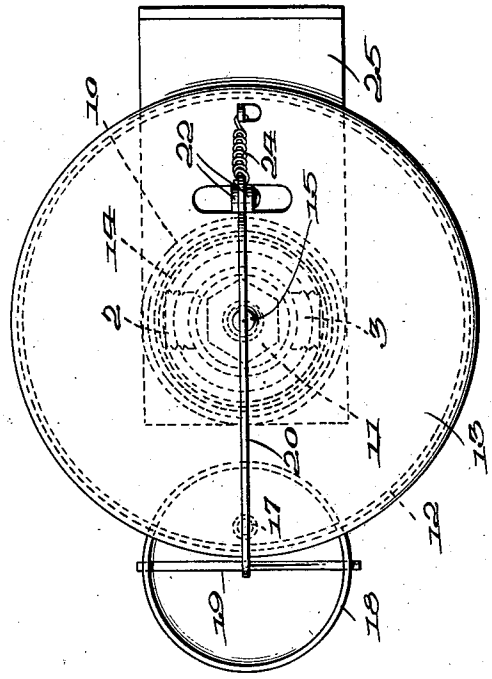


Fig. 3.

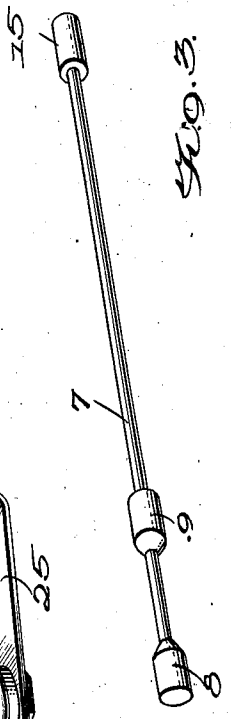
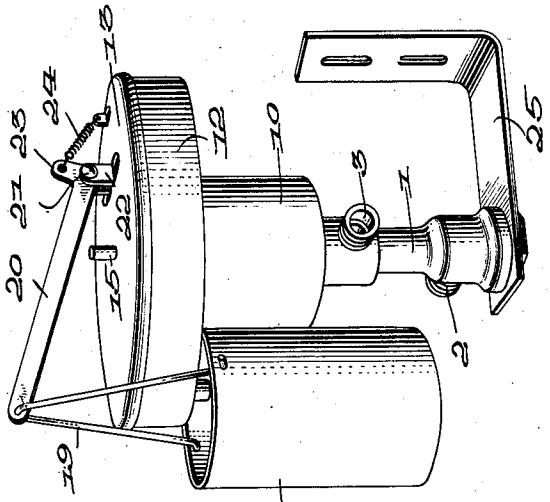


Fig. 1.



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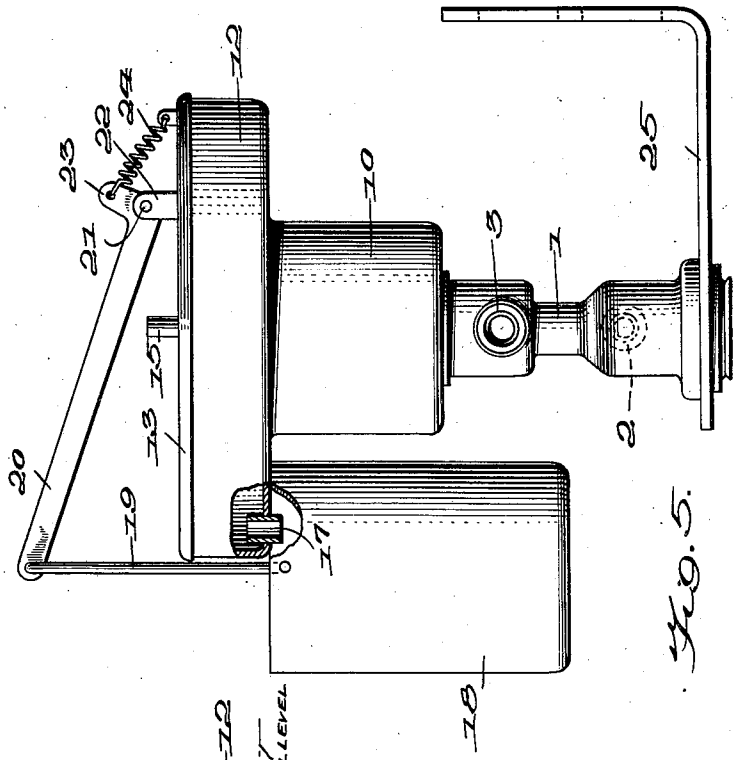


Fig. 5.

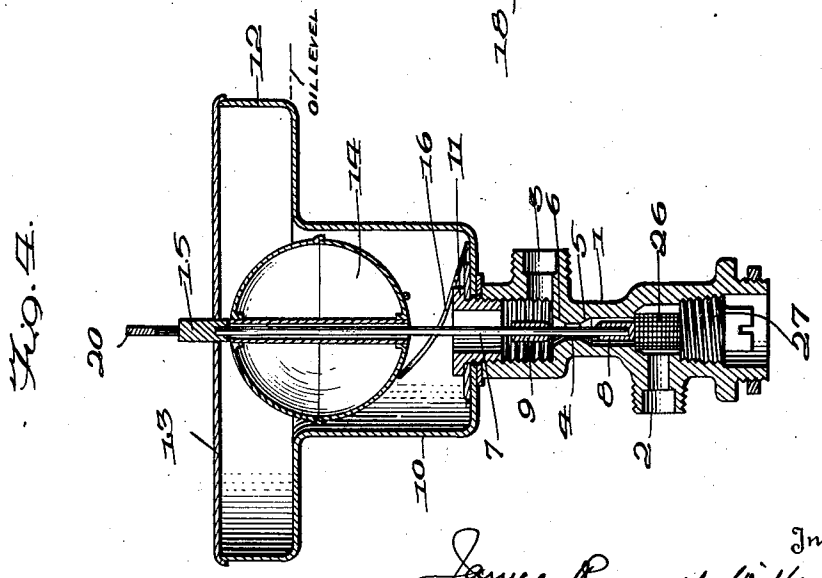


Fig. 4.

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UNITED STATES PATENT OFFICE

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FUEL CONTROL

James R. Williams, Quincy, Ill.

Application November 28, 1934, Serial No. 755,173
Renewed January 16, 1937

3 Claims. (Cl. 137—68)

This invention relates to an improvement in fuel controls and more particularly to a combined float and trip-valve designed for use in float-controlled oil-consuming installations, such as circulating heaters, water-heaters, oil-burning furnaces, etc.

The object of this invention is to maintain a given oil level by float action and to cut off the oil supply in case the oil level becomes too high.

A further object of the invention is to improve and simplify a control of this type for cheaper manufacture and better controlling action thereof.

The ordinary overflow cut-off, which has been used heretofore, uses an over center action with springs to close the overflow shut-off valve. Because of this over center action, quite frequently when the unit on which the control is mounted is bumped or jolted, the suspended trip-bucket, through inertia, will trip the overflow shut-off valve past dead center position of the toggle-spring. In my invention, a vibration will simply depress the bucket for an instant, but it will be returned immediately to its normal position by a spring which has no over center action.

Another feature of my invention is that if the float valve and seat become ineffective, due to the gathering of lint or other foreign material, the oil level will rise and the excess fuel will overflow into the bucket, closing the upper needle valve against its seat which will be clean due to the flow of oil therethrough, which keeps the oil seat clean at all times. The oil level float action is self-cleaning because the plunger moves upward against the seat when the float is controlling the oil level. As oil is consumed, the plunger moves downward as the level lowers, and gives a clearance between the plunger and seat, allowing any deposits to fall clear of the valve mechanism and gather at the clean-out plug below.

Another feature of my invention is the self-accelerating overflow of the fuel. As soon as the oil begins to overflow into the trip bucket, the float valve is opened by the downward movement of the bucket acting on the valve-stem permitting an inrush of fuel into the float-chamber, thus increasing the rate of overflow into the trip bucket. As the trip bucket is lowered, due to the heavier weight of fuel overflowing therein, the float itself is further submerged in the fuel, and displaces additional fuel from the float chamber which further increases the discharge rate of fuel through the overflow into the bucket.

When the weight of fuel in the trip bucket reaches a predetermined point, it overcomes the action of the spring and closes the overflow valve against its seat.

Another feature of my invention is the provision of an enlarged overflow chamber at the upper part of the float chamber, which provides a larger reservoir so that the oil level in the float chamber is not increased to a point where overflow action would start where certain types of burners are used in conjunction with this control which would cause a back flow of fuel to the control when adjustments are made in the height of the burner-bowl, or where the wick is introduced or withdrawn from the burner-bowl, thus causing oil displacement in the burner-bowl with resultant back flow of fuel to the control.

In carrying out my invention, an important feature thereof is the action of the float and the overflow trip device separately and directly on the same valve-stem, which, however, has separate valves closing in different directions for maintained oil level cut-off and for overflow cut-off. The float controlled valve rises against the bottom of a valve-seat as distinguished from being forced down from above, as has been the process heretofore in most units of this type. The latter must operate through a fulcrum-lever, whereas in this invention the float acts directly on the valve-stem without the use of any lever or other device for controlling the valve, thus greatly simplifying the construction and improving the operation.

The use of a separate overflow shut-off valve seat and valve has very evident advantages over any design when the overflow shut-off action is sought merely by putting additional pressure on the oil level float valve which has already failed to shut off in the first place.

A specific embodiment of my invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a perspective view of the control device;

Fig. 2 is a top plan view thereof;

Fig. 3 is a detached perspective view of the valve-stem and valves;

Fig. 4 is a vertical sectional view through the control device; and

Fig. 5 is a side elevation thereof with the overflow partly in section.

A valve-casing is designated generally by the numeral 1. As shown particularly in Fig. 4, it is provided with inlet and outlet connections 2 and 3 adapted to be connected respectively to pipes leading to a source of supply or tank and to a burner or other unit. A fluid passageway 4 ex-

tends through the casing 1 for establishing communication between the inlet and outlet 2 and 3. Valve-seats 5 and 6 are formed in the passageway 4, and are turned in opposite directions, as shown particularly in Fig. 4.

Extending into the passageway 4 and through the valve-seats 5 and 6 is a wire valve-stem 7 carrying float and overflow valves 8 and 9, respectively, in position to engage alternately the valve-seats 5 and 6 upon movement of the valve-stem in opposite directions, in order to regulate the flow through the passageway by the float or by the overflow trip device.

A float-chamber 10 is attached to the upper end of the valve casing 1 and communicates with the interior thereof through a plug 11 which secures the float-chamber 10 to the valve-casing. The float-chamber 10 has an enlarged overflow chamber 12 at the top thereof, and preferably the overflow chamber has a cover 13 thereon.

The oil level should be maintained near the top of the float-chamber 10, but the level may be regulated as desired. A float 14 is located within the float-chamber 10 and loosely surrounds the valve-stem 7, being arranged to act on a head 15 attached to the upper end of the valve-stem, which head is slidable through the cover 13. The float may have a spring 16 therebeneath, if desired, normally tending to press it upwardly against the head 15.

The overflow chamber 12 has an overflow nipple 17 on one side thereof, as shown in Fig. 5, preferably rising within the chamber slightly above the bottom thereof and designed to carry off the excess liquid from the overflow chamber in the event that the oil level rises too high. A bucket 18 is arranged beneath the overflow nipple 17 to receive the liquid therethrough. The bucket 18 is carried by a bail 19 suspended from one end of a lever 20 which extends transversely across the cover 13 and is pivoted as at 21 to a pair of ears 22 rising from the cover. The lever 20 has a short arm 23 to which one end of a spring 24 is attached, the opposite end of said spring being anchored, as, for instance, to an edge of the cover 13. The lever 20 overlies the head 15 of the valve-stem 7 in position to depress said head when a predetermined amount of liquid overflows into the bucket 18.

In operation, the oil level control is secured by the float mechanism which shuts off the oil when a predetermined oil level is reached. When the demand for more oil is felt, the oil is fed from the float-chamber moving through the outlet 3, thus resulting in a drop in the oil level which causes the float 14 to lower slightly, thereby opening the float controlled valve 8 allowing more oil to come in through the inlet 2.

When sufficient oil has been admitted in this way, so that the oil level once more rises to the proper level, this will elevate the float 14 sufficiently to close the float controlled valve, shutting off the supply. This cycle goes on continually, and so smoothly that the oil level is properly maintained without irregularities which are inevitable with the surging characteristics of a vacuum feed type of control.

The overflow shut-off is operated by the trip bucket mechanism. In the event of failure of the float valve to shut off properly for any reason whatsoever, and the oil continues to flow into the float-chamber and overflow chamber, this causes the oil level to rise and overflow into the trip bucket 18. The weight of the oil depresses the bucket which operates lever 20, when the weight is sufficient to overcome the action of the spring 24, pressing the lever down against the head 15 of the valve-stem 7 forcing the overflow valve 9 down against its seat 6, closing the shut-off valve. Furthermore, as the valve-stem is initially pressed down, the float 14 is pushed downward in the float-chamber and displaces more oil which adds to the overflow, thus giving a self-accelerating action. This automatically gives a much quicker shut-off than if the bucket is tripped only by the slower trickle of straight overflow. Also the additional displaced overflow increases the pressure of the valve-stem on the shut-off valve 9.

The control may be supported in any suitable or desired manner, but I have shown a swivel bracket 25 carrying the same, and which may be adjustably supported, if desired.

The inlet portion of the valve-casing 1 is provided with a filter 26 and a clean-out plug 27 in order to keep the oil and the casing clean.

I claim:

1. In a fuel control device, a float chamber having the upper edges turned outwardly in all directions and turned upwardly forming an enlarged overflow chamber at the top of said float chamber, said overflow chamber having an overflow discharge port therein.

2. In a fuel control device, a float chamber having an overflow chamber with a bottom extending laterally from the upper edges of the float chamber, said overflow chamber having side walls above said bottom of greater diameter than the float chamber forming an enlarged overflow chamber at the top of the float chamber having an overflow portion.

3. In a fuel control device, a float chamber having an overflow chamber with a bottom extending laterally from the upper edges of the float chamber, said overflow chamber having side walls above said bottom of greater diameter than the float chamber forming an enlarged overflow chamber at the top of the float chamber having an overflow portion, and a float in said float chamber adapted to control a valve, the overflow from the overflow chamber being adapted to control a shut-off valve.

JAMES R. WILLIAMS.