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L. V. McCARTY
FUEL VALVE WITH FLOW RATE DEPENDENT UPON
COMBUSTION FAN OPERATION
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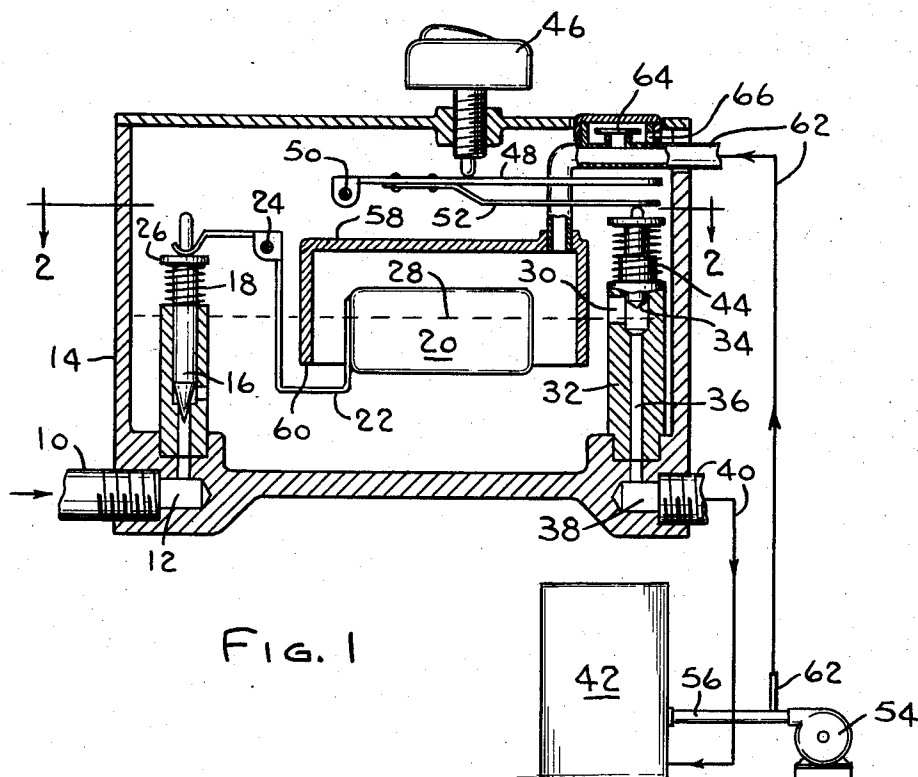


FIG. 1

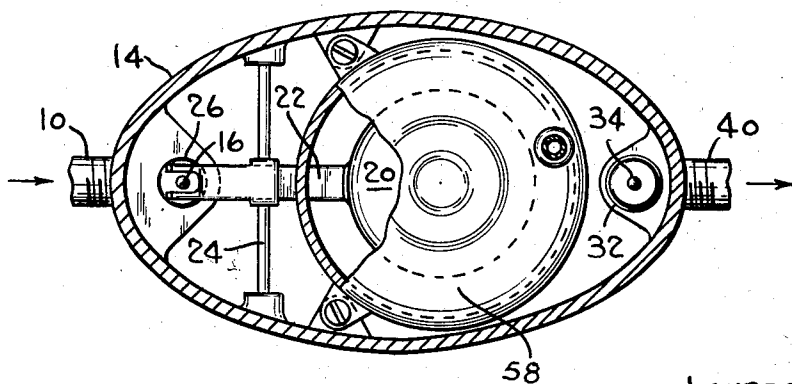


FIG. 2

INVENTOR.
LOURDES V. McCARTY

BY

John W. Michael
ATTORNEY

1

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FUEL VALVE WITH FLOW RATE DEPENDENT UPON COMBUSTION FAN OPERATION

Lourdes V. McCarty, Milwaukee, Wis., assignor, by mesne assignments, to Controls Company of America, Schiller Park, Ill., a corporation of Delaware

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2 Claims. (Cl. 137—209)

This invention relates to apparatus for relating fuel delivery from a constant level oil control valve to the supply of combustion air delivered to the burner by a fan or the like. Thus, the present invention prevents delivery of high rates of oil flow to a burner unless the combustion air supply fan is delivering sufficient air to support combustion of the fuel. Not only will this apparatus prevent excessive flow in the event of fan failure but will provide a properly metered flow rate when the fan delivery is below normal due to low line voltage or other causes.

The principal object of this invention is to provide apparatus for relating fuel delivery to a burner from a constant level oil control valve to the air supplied the burner by a combustion fan or the like.

Another object is to provide apparatus of the type described at low cost.

A further object is to provide apparatus of the type described which is reliable in operation and flexible in installation.

Other objects and advantages will be pointed out in, or be apparent from, the specification and claims, as will obvious modifications of the single embodiment shown in the drawings in which:

Fig. 1 is a schematic drawing, partly in section, of the present apparatus supplying a burner having an air supply fan; and

Fig. 2 is a section of Fig. 1 as indicated by line 2—2.

Referring to the drawings in detail, the fuel supply pipe 10 from the oil storage tank connects to inlet 12 in the constant level valve housing 14. Flow into the housing is regulated by valve 16 biased open by spring 18 and controlled by float 20 mounted on arm 22 pivoted at 24 to act on the valve shoulder 26. This structure would normally maintain the level indicated by dashed line 28.

Flow from the housing passes through slot 30 in sleeve 32 past valve 34 and through passage 36 to outlet 38. Pipe 40 connected to the outlet leads to a burner in housing 42. The level of this burner corresponds to the level 28 in the housing 14 as customary. The outlet valve 34 is urged open by spring 44 and its position may be adjusted by any of numerous means. The structure here shown employs a manual knob 46 adjustable to vary the position of lever 48 pivoted in pin 50 and provided with a leaf spring 52 acting on the valve and preventing damage to the valve in the event of overtravel of the adjustment.

It will be understood that any other means, manual or automatic, may be employed to operate the valve 34. Generally it is desirable to couple operation of the valve operator and energization of the blower 54 which supplies combustion air to the burner through delivery pipe 56. Such coupling structures are well known and are not shown here in order to keep the drawing simple. These coupling structures generally energize the blower simultaneously with opening the outlet valve.

As shown in the drawing, the level 28 is just slightly above the bottom of outlet slot 30. This would allow

2

only a small flow even when the valve 34 is opened fully. This rate can safely be handled by the burner without sooty combustion even if the blower 54 is not operating.

An inverted cup 58 is mounted over the float 20 with the bottom edge 60 below the oil level in the housing. Conduit 62 connects the output side of the blower to the inside of cup 58 so the pressure increase in pipe 56 incident to blower operation will be communicated to the underside of the cup. A simple pressure relief valve 64 vents conduit 62 to atmosphere through vent 66 to prevent excessive pressure under cup 58. When the pressure builds up under the cup as a result of blower operation, the float will operate to maintain a constant level under the cup and the level outside the cup will build up to balance the air pressure. This results in raising the head on outlet slot 30 and increases the flow rate (assuming valve 34 to be open). If the fan should fail, the head on the outlet would decrease to reduce the flow. If the fan delivers only part of its rated capacity, the flow rate will be automatically adjusted to the new condition.

At the conclusion of an "on" cycle of the present apparatus the blower 54 would be de-energized and the outlet valve would be shut simultaneously. The levels inside and outside the cup would be the same until the blower again operates and the level under the cup would drop to the normal level and the level outside the cup would rise. The cup could be made of such size as to permit operation without an outlet valve. The blower pressure would raise the head on the slot 30, and when the blower stopped and the levels balance, the volume under the cup could be made large enough to drop the head on the outlet to a reduced flow which could be burned cleanly without a forced air supply. The flow rate would gradually diminish to a pilot rate or to "off."

The outlet need not employ the slot 30, but the slot does permit better calibration. Similarly, the outlet is most conveniently mounted outside the cup, but could be located under the cup providing an independent vent from the outlet to atmospheric pressure is provided and is sealed with respect to the air space beneath the cup so as to obtain the benefits of the different pressure head acting on the outlet. It should also be observed that the cup need not take the illustrated form. If an annular float is used, the cup might be in the form of an inverted jelly ring mold. Therefore, the use of the word "cup" is to be taken broadly.

Although but one embodiment of the present invention has been illustrated and described, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. Liquid fuel flow control apparatus comprising, a casing provided with an atmospheric vent and including top and bottom wall members, said bottom wall member having a fuel inlet, a valve for the inlet, a float connected to the valve and operable to regulate the valve movement in accordance with the liquid level in the casing, an inverted cup mounted within the casing in spaced relation to the top wall of the casing and positioned over the float with the bottom edge of the cup below any normal liquid level encountered in the casing to provide an air seal, a conduit connected to the interior of the cup for delivering air pressure to the cup interior and adapted to be connected to the output of a combustion air fan, an outlet for liquid from the casing position within the casing externally of the cup to be subjected to a liquid head variable as the pressure within the cup varies, a control valve for the outlet and means for adjusting said control valve including a lever pivotally mounted within the

3

casing between the cup and top wall of the casing, and manually operable means extending through the top wall of the casing and operable exteriorly of the casing for adjusting the control valve.

2. Liquid fuel control apparatus comprising a casing having top and bottom wall members and provided with an atmospheric vent, a fuel inlet in the bottom wall of the casing adjacent one end thereof, a fuel outlet port in the bottom wall of the casing adjacent to the opposite end thereof, an inlet valve controlling the inlet port, an inverted cup member removably mounted within the casing in downwardly spaced relation to the top wall of the casing, said cup being positioned within the casing between the inlet and outlet ports, a float connected to the fuel inlet valve for controlling movement thereof in accordance with liquid level within the casing, said float being disposed within said cup, said cup being positioned at an elevation with respect to said float that the lower end of the cup is maintained in sealing contact with the liquid level maintained within the casing by said float, a conduit connected to the interior of the cup for delivering air pressure to the cup interior, said float regulating the fuel inlet valve to maintain a constant level under the

4

inverted cup, a control valve for the fuel outlet, operating means for said outlet valve including a lever pivotally mounted within the casing between the cup and the top wall of the casing, and means for adjusting said lever extending through the top wall of the casing for access exteriorly of the casing, said fuel outlet being positioned within the casing and with respect to the atmospheric vent so that the pressure head of the fuel thereon is varied in response to air pressure under the cup.

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