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FUEL FEED DEVICE

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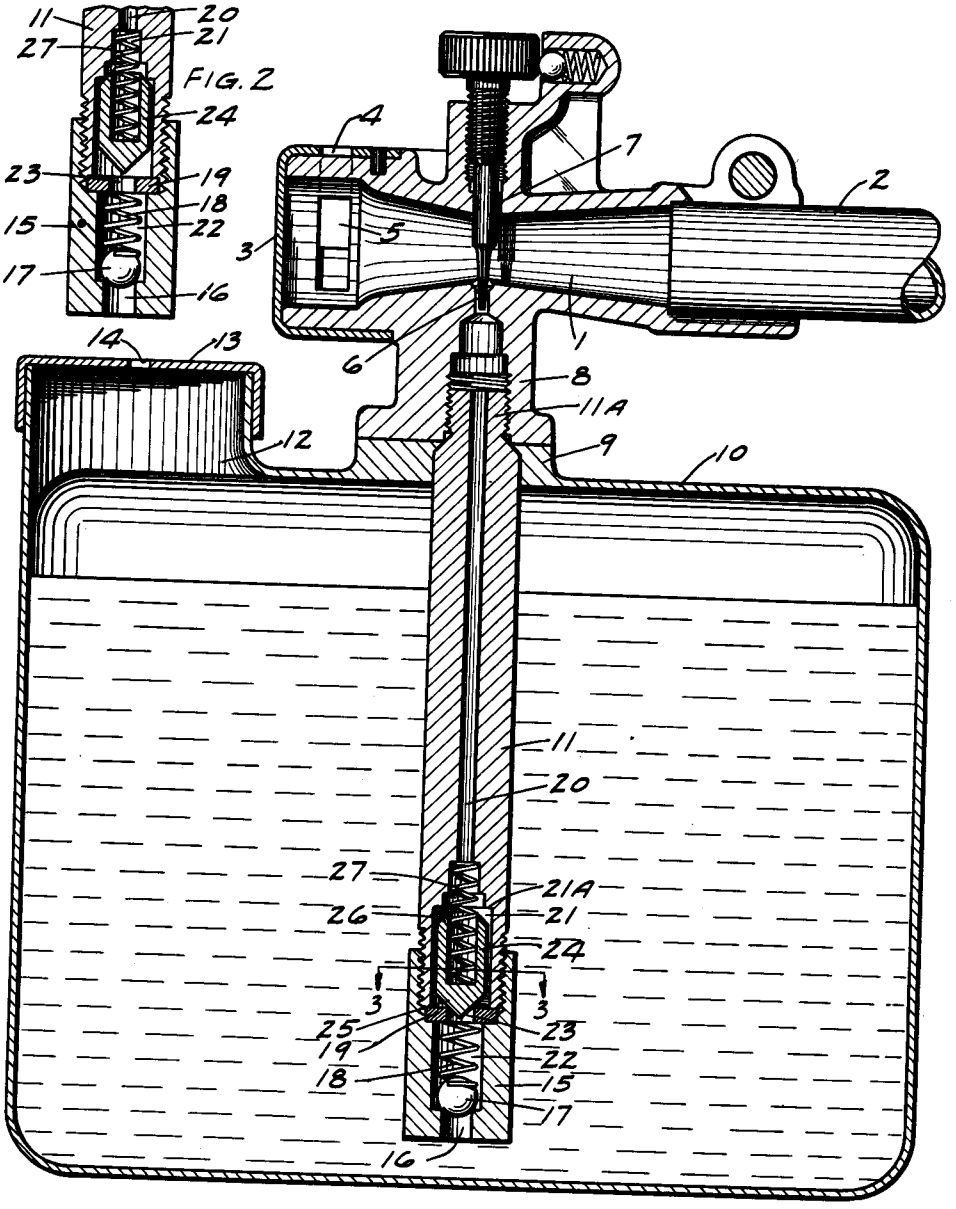


FIG. 2

FIG. 1

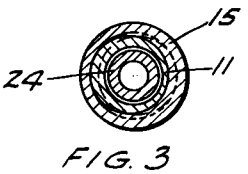


FIG. 3

GEORGE R. ERICSON
INVENTOR.

BY Donald U. Rich

ATTORNEY.

UNITED STATES PATENT OFFICE

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FUEL FEED DEVICE

George R. Ericson, Kirkwood, Mo., assignor to Carter Carburetor Corporation, St. Louis, Mo., a corporation of Delaware

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2 Claims. (Cl. 261—66)

This invention relates to liquid feed means and is applicable more particularly for delivering fuel to internal combustion engine carburetors where no constant level chamber or pump is provided.

Small stationary internal combustion engines, such as are used for operating generators in isolated places, are frequently provided with separate carburetors mounted in connection with the fuel storage tank. Where the carburetor suction alone is relied upon to deliver fuel from an atmospheric tank, the rate of fuel delivery is obviously dependent upon the depth of the liquid in the tank and, accordingly, the fuel and air mixture provided with such an arrangement becomes gradually leaner, resulting in loss of power, and may cause the engine to stop before the tank is drained unless an adjustment is made.

An object of the present invention is to provide means for delivering a liquid, such as gasoline or other fuel, at a uniform rate from a storage tank to a source of intermittent suction outside the tank.

A more detailed object is to provide a measuring valve device for delivering fuel at a uniform rate to an internal combustion engine irrespective of the depth of fuel in the storage tank.

These objects and other more detailed objects hereafter appearing, are attained substantially by the structure illustrated in the accompanying drawing, in which:

Figure 1 is a sectional view of a carburetor and storage tank assembly embodying the invention.

Figure 2 is a detail longitudinal section showing the delivery device with the plunger valve in a different position.

Figure 3 is a horizontal section taken on line 3—3 of Figure 1.

The figures show a carburetor having a horizontal Venturi-shaped mixture conduit 1, secured at one end to a tube 2 for connection with the intake of an internal combustion engine. At the opposite end of the carburetor is a cap valve 3, having slots 4 for cooperating with slots 5 in the carburetor for manual control of the air admitted thereto. A fuel delivery orifice 6 opens into the throat of the venturi and is controlled by a needle valve 7. The carburetor also has a base portion 8 secured to a pad 9 on top of fuel tank 10.

A tubular passage member 11 is threadedly secured at its upper end in the enlarged lower portion of carburetor fuel orifice 6, as at 11*a*, and extends through the tank cover well downwardly into the tank. The tank is also provided with a filling opening 12 having a cover 13 with a hole 14 for exposing the interior of the tank to atmosphere.

At the lower end of passage member 11 there is threadedly secured a chambered extension 15 having an inlet opening 16 controlled by inlet check ball 17. A coiled spring 18 constantly urges the ball 17 against its seat in inlet 16 and at its upper end is seated against a separate shoulder stop 19 secured between the end of passage member 11 and the extension member. The central bore 20 in passage member 11 is enlarged at its lower end to form a chamber 21 which, at its lower end communicates with chamber 22 in member 15 through central orifice 23 in stop member 19.

Movably received in chamber 21 is a plunger valve 24 having a tapered lower end 25 for seating against stop member 19 at the lower end of the plunger stroke and a tapered upper portion 26 for seating against a shoulder 21*a* in chamber 21 at the upper end of the plunger stroke. Plunger 24 is constantly urged downwardly by the coiled spring 27 which extends into the hollow interior of the plunger and at its upper end seats against a shoulder at the very top of chamber 21. Spring 27 is preferably weaker than check spring 18. Plunger valve 24 loosely fits within chamber 21 and is proportioned relative thereto so as to accomplish its function as described hereafter.

In operation, suction pulsations from the engine are transmitted through the carburetor and bore 20 to chamber 21, raising both plunger valve 24 and inlet check 17 against springs 27 and 18 and drawing liquid fuel through openings 16 and 23 into chambers 22 and 21. At the end of the suction stroke, check 17 quickly closes inlet 16, trapping liquid fuel in chambers 21 and 22 so that the downward movement of plunger valve 24 under the influence of spring 27 causes a quantity of fuel to pass around the plunger and into the upper part of chamber 21. On the next succeeding suction stroke, plunger 24 is drawn upwardly against shoulder 27 (Fig. 2) lifting this quantity of fuel into bore 20 and eventually when the bore is filled, fuel is delivered to the carburetor. When the plunger valve is against its upper valve seat, communication between the tank and carburetor is sealed, preventing further delivery of fuel.

The space between stop member 19 and shoulder 27 and between plunger valve 24 and the wall of chamber 21 is made sufficient to permit an adequate delivery of fuel for the needs of the associated engine when the fuel level is near the bottom of the tank, and to insure full movement of the plunger valve under this condition. A uniform quantity of fuel is forced above the plunger

valve during each downward stroke thereof under the impulsion of spring **27** and this quantity only is delivered to the carburetor during each suction stroke. Needle valve **7** provides an additional adjustment which, however, may be omitted where cheapness and simplicity are essential. Relatively low suction is applied to the fuel on each stroke of a small stationary engine of the type for which the present invention is especially adapted and the weight and stroke of plunger **24** must be correspondingly calibrated.

From the above description it is apparent that the stroke of plunger valve **24** remains constant regardless of the pressure differences between the tank and the carburetor, as long as this difference is sufficient to cause the plunger to move its full stroke. Thus a uniform quantity of liquid fuel will be delivered to the carburetor regardless of the fuel head in the tank whereby the fuel tank may be drained and refilled without affecting the fuel delivery and without readjustment of the needle valve or of the air valve **3** other than may be necessary for cold starting.

The invention is not limited to the structure shown, but may be modified in various respects as will occur to those skilled in the art, and the exclusive use of all such modifications as come within the scope of the appended claims is contemplated.

I claim:

1. In combination with an internal combustion engine, a suction conduit and a fuel storage tank, structure connecting said conduit and said tank including a passage terminating near the bottom of said tank, an inlet check at the bottom of said passage, spaced valve seats above said check, and a plunger valve movable between said seats and proportioned relative to the space therebetween so that when suction is applied to said passage, said plunger valve is drawn upwardly against the upper of said seats restricting the quantity of liquid drawn into said conduit and at the end of the suction pulsation said plunger valve drops to the lower of said seats, said inlet check maintaining a full column of liquid in said passage during dropping of said plunger valve.

2. The combination of elements specified in claim 1 further including a spring constantly urging said plunger valve toward the lower of said valve seats and a stronger spring constantly urging said inlet check toward its closed position.

GEORGE R. ERICSON.