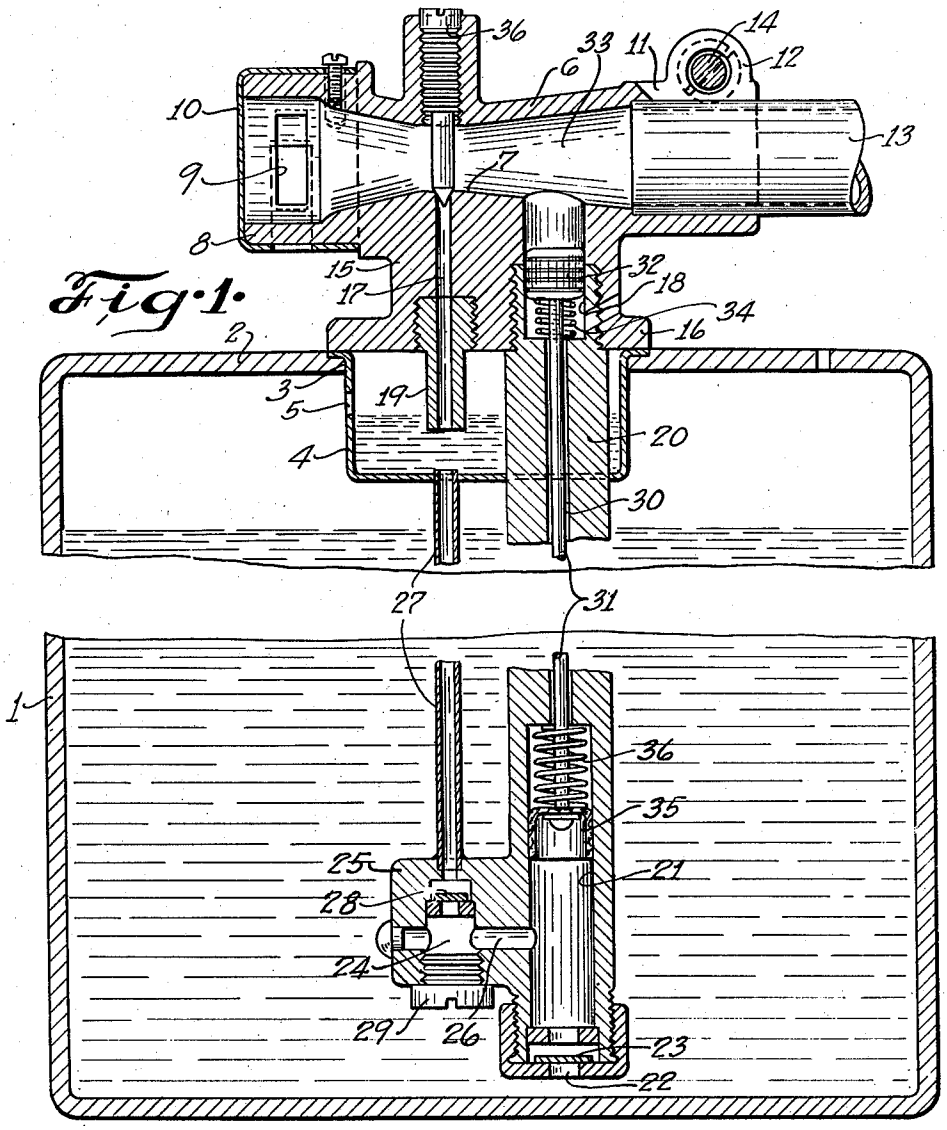
Dec. 7, 1937. G. R. ERICSON 2,101,536

FUEL FEED MEANS

Filed Aug. 19, 1936 2 Sheets-Sheet 1

Fig. 1.



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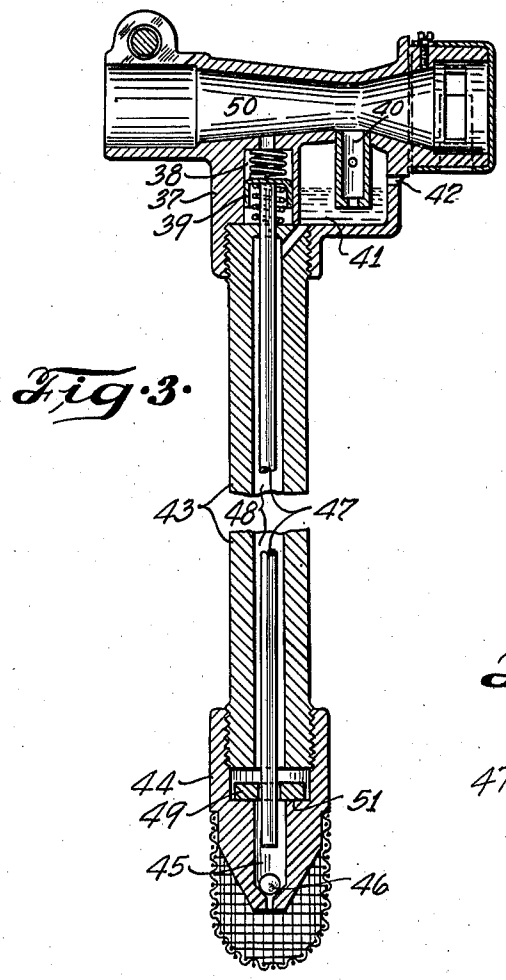


Fig. 3.

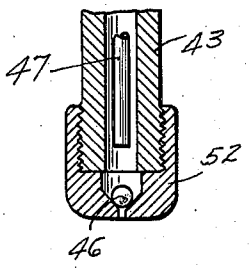


Fig. 4.

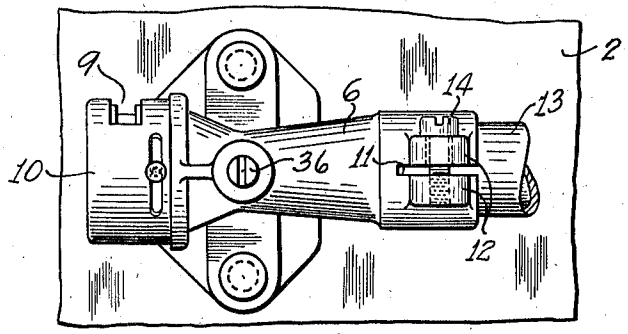


Fig. 2.

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UNITED STATES PATENT OFFICE

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FUEL FEED MEANS

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Application August 19, 1936, Serial No. 96,791

4 Claims. (Cl. 261—36)

This invention relates to fuel feed devices and consists, particularly, in novel means for supplying combustible fuel to an intake passage from an adjacent tank.

Charge forming devices for small stationary engines are frequently carried on top of a fuel tank and draw their supply of fuel directly from the tank by means of suction in the mixture intake passages. With such devices there is a gradual leaning out of the mixture supply, due to the lowering of the head of fuel in the tank and it has been found impossible to keep such engines running without adjusting the fuel controlling needle valve several times before the tank is emptied.

An object of the present invention is to provide fuel feed means for charge forming devices of the above type constructed to overcome the above-mentioned leaning out effect due to emptying of the fuel tank.

Another object is to provide novel means for drawing fuel from a tank to a charge forming device under substantially uniform conditions.

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

Figure 1 is a vertical sectional view of a device illustrating the invention.

Figure 2 is a substantially diminished top view of the charge forming structure.

Figure 3 is a view similar to Figure 1, but illustrating a modification.

Figure 4 is a detail view similar to Figures 1 and 3 but showing still another form.

In Figures 1 and 2 is shown a tank 1 for gasoline or other combustible fuel and having a top portion 2 with a central aperture 3. Secured in aperture 3 is a cup 4 having an overflow orifice 5. Mounted above cup 4 is a carburetor or charge forming device, conveniently formed as a die casting, including barrel 6 forming a venturi 7, and an air inlet portion 8 having one or more holes 9 controlled by cup-like inlet valve 10. The opposite end of the carburetor is longitudinally split as at 11 and provided with ears 12 for attachment to a tube or pipe 13 leading to the engine intake (not shown), pressure being supplied to the ears for gripping tube 13 by a bolt 14.

Depending from the carburetor barrel is the base structure 15 flanged as at 16 for attachment to the top of the tank immediately above cup 4 and apertured as at 17 and 18. The enlarged lower portion of aperture 17 is threaded for receiving a nipple 19 which extends downwardly into cup 4 beneath the level of over-flow hole 5. The lower portion of aperture 18 threadedly mounts an elongated tubular member 20 extending through cup 4 and downwardly into the tank 1. Member 20 has an enlarged chamber 21 in its lower portion communicating with the tank through an inlet orifice 22 controlled by check 23. A chamber 24 in lateral projecting structure 25 communicates with pumping chamber 21 through a hole 26 and with cup 4 through a tube 27 controlled by outlet check 28. Chamber 24 is closed at the bottom by screw plug 29. Loosely received in the longitudinal passage 30 extending through tubular member 20, is a rod 31 carrying a piston 32 slidable in passage 18 and exposed to pressure conditions within the mixing chamber 33 of the carburetor. Piston 32 is urged upwardly by a compression spring 34. At the lower end of rod 31 is a second piston 35 slidable in pumping chamber 21 and constantly urged downwardly by a spring 36, which is somewhat stronger than spring 34 associated with the upper piston. Rod 31 and pistons 32 and 35 thus float on springs 34 and 36.

Carbureting devices, as described, are ordinarily used in connection with one cylinder, stationary engines, during the operation of which pressure conditions within the mixing chamber of the carburetor are subject to substantial, rhythmic variation. Such pulsations cause pistons 32 and 35 and connecting rod 31 to oscillate, intermittingly drawing fuel through the check controlled inlet 22 and discharging the same past outlet check 28 and through tube 27 into the over-flow chamber formed by a cup 4. The capacity of the pump is sufficient to maintain liquid fuel in the over-flow chamber at the level of the over-flow orifice 5, irrespective of the depth of fuel in the tank, so long as inlet 22 is immersed. Thus liquid fuel will be drawn through nipple 18 and aperture 17 under substantially uniform pressure conditions; regardless of the height of the fuel in the tank proper and, accordingly, the fuel control needle 36 and air valve 10 need not be readjusted after being once set to provide the proper mixture.

In Figure 3 the base portion 37 of the carburetor includes a suction chamber 38 receiving piston 39, and a fuel feed passage 40 extending downwardly into auxiliary chamber 41 and beneath the level of over-flow orifice 42. Tubular member 43 extends downwardly into the tank proper and at its lower end mounts a threaded cap 44 having a restricted pumping chamber 45

in its lower portion controlled by inlet check **46**. A rod or plunger **47** extends from piston **39** downwardly through longitudinal passage **48** in the tubular member and terminates in pumping chamber **45**. A collar **49** loosely receives plunger **47** and is confined in the space between the lower end of member **43** and the shouldered lower portion of cap **44**.

In operation of the modified device, pressure pulsations within the mixing chamber **50**, cause piston **39** and plunger **47** to oscillate, intermittingly drawing fuel past inlet check **46** into the pumping chamber **45** and expelling the same upwardly from the chamber **45** past collar **49** and through passage **48** into the over-flow chamber. During upward movement of plunger **47**, collar **49** rests against shoulder **51** in the cap so as to substantially restrict downward movement of liquid from passage **48** into the pumping chamber, thus permitting a supply of liquid to be drawn in from the main tank. During downward movement of the plunger, check ball **46** seats and collar **49**, which fits loosely within the cap member **44**, is lifted by the pressure of fuel in the pumping chamber permitting the liquid to escape freely into tubular member **43** and the over-flow chamber.

In Figure 4, the loose collar, as at **49** in Figure 3, is omitted, and plunger **47** in tubular member **43** cooperates with inlet check **46** in cap **52** to pump fuel into the over-flow chamber.

In Figures 3 and 4, as in the previous form, the capacity of the pump is such as to maintain liquid fuel within the auxiliary chamber at the level of the over-flow orifice so that fuel will be supplied through induction passage **40** under substantially uniform conditions.

The specific form of the pistons **32**, **35**, **39** and **47** may be substantially modified, and the use of diaphragms or other equivalents of a piston is contemplated. In the present instance, the constant level fuel supply chamber **4** is mounted directly in the main fuel supply tank so that the use of a large capacity pump with an over-flow passage **5**, **42** is quite satisfactory. The constant level chamber may be mounted outside of the main tank, where it is inconvenient to provide a return line, or the ordinary float controlled inlet valve, which is conventional in automotive carburetor constructions, may be used, if desired, to control the flow of fuel through the passages **27** or **43** from the pumping device to the constant level chamber.

The structure shown may be varied in these and other 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, a fuel tank and structure carried by said tank including a carburetor mixture passage, a constant level chamber adjacent said passage, a suction fuel feed communication between said passage and said chamber, a pump having actuating means exposed to pressure conditions in said mixture passage, a pumping chamber and a check valve controlled inlet therefor near the bottom of said tank, and a duct connecting said constant level and pumping chambers.

2. The combination of elements specified in claim 1 in which said carburetor mixture passage is mounted on top of said tank and said constant level chamber is located inside said tank.

3. In combination, a fuel tank and structure carried adjacent the same comprising an induction carbureting passage, a tubular member extending from said passage downwardly into said tank, suction and pumping chambers, respectively, at the top and bottom of said member, a plunger extending through said tubular member between said chambers, valve means associated with said pumping chamber whereby liquid is forced through said tubular member upon pulsation of said plunger, a constant level chamber adjacent said induction passage and constructed and arranged to receive fuel from said tubular member, and a fuel feed conduit between said constant level chamber and said induction passage.

4. In combination, a carburetor for support on a fuel tank and having an induction passage, tubular structure projecting from said carburetor for insertion into the tank, a plunger extending loosely through said structure and exposed at one end to pressure pulsation in said carburetor, said tubular structure having a pumping chamber at its opposite end with a check controlled inlet, an outlet valve seat spaced from said inlet, a collar loosely surrounding said plunger and cooperable with said outlet seat to substantially resist passage of fuel through said seat except outwardly of said pumping chamber, an over-flow chamber adjacent said carburetor and communicating with said pumping chamber through said tubular member, and a suction fuel feed communication between said over-flow chamber and said induction passage.

GEORGE R. ERICSON.