

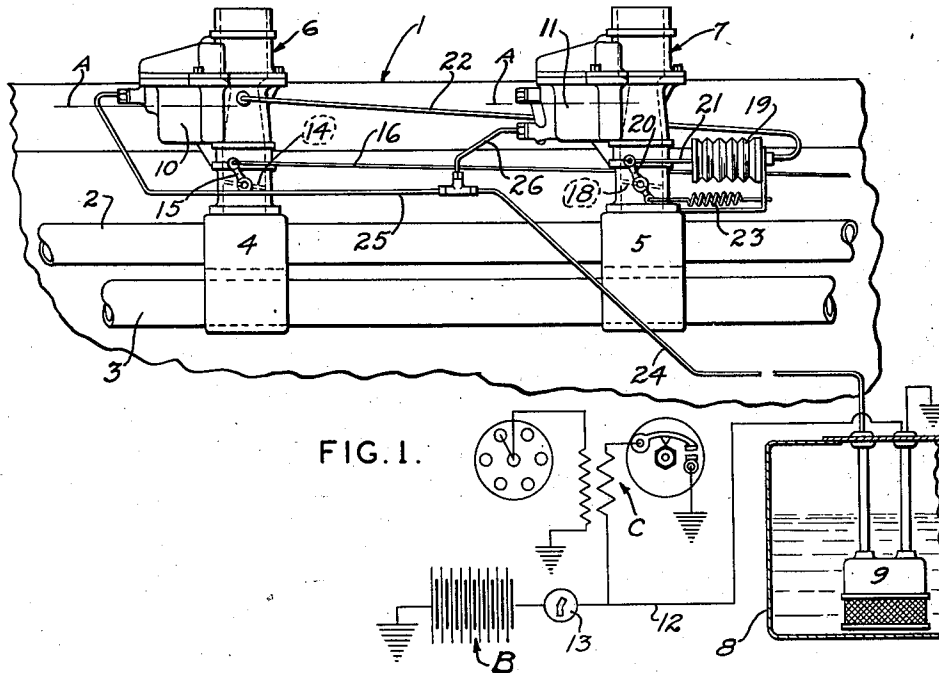
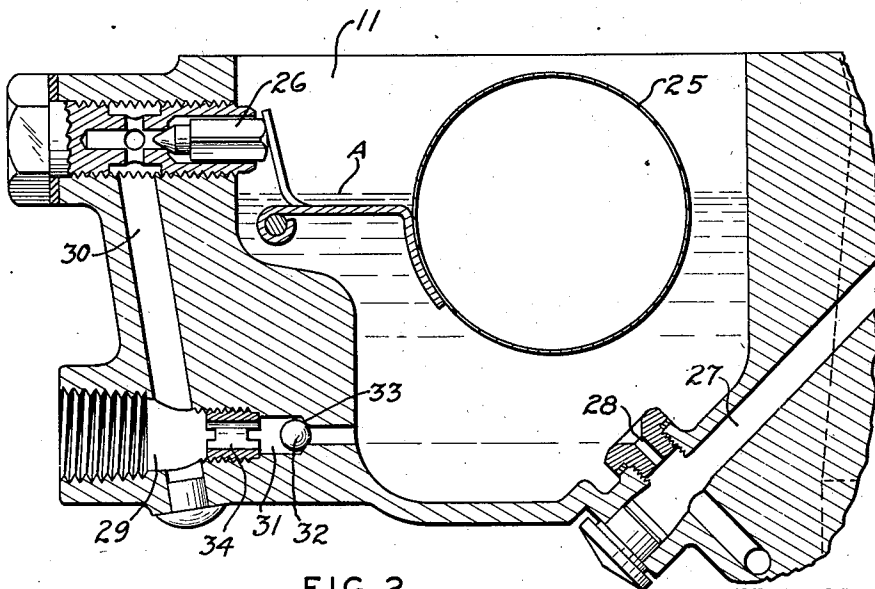
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FUEL SUPPLY MEANS FOR CARBURETORS

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FUEL SUPPLY MEANS FOR CARBURETORS

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This invention relates to carburetors for internal combustion engines and more particularly concerns carburetor float chambers and liquid fuel supply means.

Carburetor fuel chambers being usually closely associated with the engine receive considerable heat therefrom by conduction and radiation. This is particularly true in downdraft installations where the carburetor and float chamber are located immediately above the exhaust manifold. As a consequence, fuel retained for any appreciable period, as it is in conventional constructions, in these chambers boils and the more volatile fractions escape leaving the heavier portions which are not readily atomized. Upon subsequent operation therefore heavy fuel unsuitable for operation and particularly unsuitable for cold starting mixtures is delivered to the carburetor mixture conduit.

Another difficulty arising from the retention of fuel in the fuel chamber during inoperation is that percolation occasioned by fuel vaporizing in the heated carburetor fuel passages may transfer substantially the entire quantity of fuel from the fuel chamber to the mixture conduit. This may and quite frequently does occur following hard driving during hot weather. Permitting this quantity of fuel to flow into the intake manifold would, obviously, give rise to great difficulty in subsequent starting of the engine.

Also in multiple carburetor installations in which one or part of the carburetor only are operative during the lower and normal range of speed and power operation, it will be seen that the fuel in the float chambers of those carburetors which operate only through the high ranges of speed and power may be retained therein for indefinite periods, which may result in the higher range carburetors receiving "stale" or heavy fuel immediately upon coming into operation.

It is an object of the present invention to overcome the above mentioned difficulties by the provision of a novel carburetor fuel chamber. It is a further object of the present invention to provide novel means for maintaining the constant predetermined level of fuel in the carburetor fuel chamber during operation of the engine and to substantially drain the chamber when the engine is inoperative.

Other objects and advantages will appear upon reference to the following description and accompanying drawing. Referring to the drawing

Fig. 1 is a schematic view showing a fragmentary portion of an internal combustion engine, and installation of carburetor thereon embodying the present invention, a fragmentary portion of a fuel tank and a fuel transfer device.

Fig. 2 is an enlarged sectional view of a float chamber constructed in accordance with the present invention.

The illustrated embodiments of the present invention involve a multiple carburetor installation having a manually controlled primary or (low speed and power range) carburetor equipped with a float chamber of conventional design and a secondary or (high speed and power range) carburetor automatically controlled and equipped with a float chamber constructed in accordance with Fig. 2. It will be understood, however, that the adaptation of the present invention is equally advantageous in a single carburetor installation.

Numerals 1 generally indicates a portion of an internal combustion engine having an intake manifold 2 and an exhaust manifold 3 and having intake manifold heating jackets 4 and 5. Mounted on the intake manifold are the primary carburetor generally indicated at 6 and a secondary carburetor generally indicated at 7. A fuel supply tank is indicated at 8 and an electrically driven centrifugal fuel pump 9 delivers fuel under pressure to the float chamber 10 of carburetor 6 and 11 of carburetor 7. The design of pump 9 forms no part of the present invention other than, as previously stated, it is a centrifugal type pump and therefore valveless. Nor is it essential that the pump be electrically driven, it being necessary only that provision be made for rendering the pump inoperative when the engine ceases to operate.

In the preferred arrangement, the pump is driven electrically, energy being supplied by a storage battery B. The centrifugal pump 9 and engine ignition device generally indicated at C are commonly connected to the battery by a conductor 12 in which is interposed the usual ignition switch 13. With this arrangement the engine and pump are jointly rendered inoperative. The fuel tank 8, as indicated, is situated below the level of the carburetor float chamber; as it usually is in motor vehicles.

Carburetor 6 is equipped with a mixture control valve 14 which is manually operated from a convenient point by means of lever 15 and operating rod 16. Carburetor 7 is equipped with a mixture control valve 18. Valve 18 is connected to a bellows 19 by means of lever 20 and link 21. The bellows 19 is connected by the suction tube 22 to the mixture conduit of carburetor 6 at a point anterior to the valve 14. Valve 18 is urged toward a closed position by a spring 23 and is moved toward an open position against spring 23 by the collapsing of bellows 19 when the pressure drop in the conduit of carburetor 6 reaches a predetermined point. Fuel is supplied to the float chambers 10 and 11 by pump 9 through conduits 24, 25 and 26 and a substantially constant level, as indicated at A, is maintained therein during operation of pump 9 by the action of float 25 upon the intake needle valve 26. This operation is well known and understood.

Fuel is conducted from the fuel chambers to a point above the level A in the carburetor mixture conduit through the upwardly directed fuel passages 27 which communicate with the lower part of the fuel chamber at 28 (see Fig. 2). Fuel chamber 11 is provided with inlet passages 29 and 30 and a branch return passage 31 communicating therewith. Return passage 31 is controlled by a ball check valve 32 arranged to seat at 33. A valve retainer 34 is provided. As illustrated, passage 31 communicates with the float chamber at a level which will permit draining of the fuel chamber to a level below the outlet of passage 27. The inlet passageway 29, as shown, is formed concentric with return passage 31 which results in the incoming fuel impacting directly on valve 32 thereby causing the valve to be quickly seated.

In operation, upon starting the engine, switch 13 is closed, the ignition devices and pump 9 being energized, the engine may be started by cranking. During the operation of cranking, pump 9 will have supplied fuel to the carburetor fuel chamber, valve 32 being forced closed by the pressure of the incoming fuel. When the engine is rendered inoperative by breaking the ignition circuit at switch 13, the pump will also be rendered inoperative and the fuel in chamber 11 will drain back through passage 31, 29 and conduits 26 and 24 and the centrifugal pump 9 to the fuel tank 8. Valve 33 being unseated by the head of fuel in the fuel chamber.

The following description and accompanying drawing are intended to be illustrative and not limiting and the exclusive use of all modifications within the scope of the appended claims is contemplated.

I claim:

1. In an internal combustion engine, a carburetor having a fuel chamber, a fuel supply tank located at a level below said fuel chamber, a centrifugal pump located in said supply tank for transferring fuel to said fuel chamber, a conduit leading from the discharge side of said pump to said fuel chamber, a passageway in the wall of said fuel chamber communicating with said conduit and the interior of said fuel chamber, a float actuated valve controlling said passage, a second passageway in the wall of said fuel chamber communicating with said conduit and with the interior of said chamber at a point near the bottom thereof, and a check valve in said last-mentioned passageway arranged to be held closed by fuel pressure during the operation of said pump and to permit the return of fuel from said fuel chamber to said supply tank when said pump is inoperative.

2. In combination, an internal combustion engine, a primary and a secondary carburetor for said engine, said secondary carburetor being arranged to operate above a predetermined speed and/or load only, a constant level fuel chamber for each of said carburetors, a fuel supply tank located at a level below said fuel chambers, pump means for transferring fuel from said supply tank to said fuel chambers, a passageway for returning fuel from said secondary carburetor fuel chamber to said supply tank, and a check valve in said passageway arranged to be held closed by the pressure of the fuel being transferred.

3. In a carburetor, a fuel chamber, an inlet passageway to said fuel chamber, a float actuated valve in said passageway, a branch of said passageway diverging at point anterior to said

valve and communicating with said fuel chamber near the bottom thereof, and a check valve in said branch operating to prevent fuel from entering said fuel chamber through said branch and permitting the flow of fuel therefrom.

4. In a carburetor, a fuel chamber, an inlet passageway to said fuel chamber, a float controlled valve in said inlet passageway arranged to maintain a predetermined level of fuel in said chamber, a branch passageway diverging from said inlet passageway at a point anterior to said valve and communicating with said fuel chamber at a point below the predetermined fuel level, and a check valve in said branch passageway operating to prevent fuel from entering said chamber therethrough and permitting the flow of fuel therethrough from said chamber by gravity.

5. In combination with an internal combustion engine, a carburetor having a fuel chamber, a fuel supply tank normally located at a level below said fuel chamber, a centrifugal pump for transferring fuel from said supply tank to said fuel chamber, a branched discharge passage connected to the discharge side of said pump and opening as inlets at spaced points in said fuel reservoir, a float actuated valve for controlling one of said inlets, and a check valve for controlling the other of said inlets, said check valve being constructed and arranged to be held in a closed position by the pressure developed by said fuel pump.

6. In combination, an internal combustion engine, a carburetor having a fuel chamber, a fuel tank located at the level below said fuel chamber, means including a pump for transferring fuel from said supply tank to said fuel chamber, a passageway leading from said fuel chamber for returning fuel by gravity to said supply tank when said pump is inoperative, and a check valve in said passageway arranged to be held in a closed position by the pressure of fuel being transferred by said pump.

7. In combination with an internal combustion engine, a carburetor having a fuel chamber, a fuel supply tank located at a level below said fuel chamber, a centrifugal pump for transferring fuel from said supply tank to said fuel chamber, branched conductor means connected to the discharge side of said pump and at spaced points with the interior of said fuel chamber, a float actuated valve for controlling one of said branches, and a valve in the other of said branches arranged to be closed by the pressure developed by said fuel pump and to be opened by the head of fuel in said fuel reservoir when said pump is inoperative to permit the return of fuel to said supply tank by gravity.

8. In combination with an internal combustion engine carburetor having a constant level fuel chamber, a float actuated valve for controlling the inlet to said chamber, an outlet from said fuel chamber, a check valve in said outlet arranged to permit the flow of fuel from said chamber and to prevent the flow thereinto, a fuel supply tank located at a level below said fuel chamber, a valveless pump for transferring fuel from said supply tank to said fuel chamber and a conduit jointly connecting said fuel chamber inlet and outlet with the discharge side of said pump whereby fuel is permitted to return from said fuel chamber to said supply tank during inoperation of said pump.

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