June 5, 1956 J. SCHWEISS 2,748,796

CARBURETOR ANTI-SURGE DEVICE

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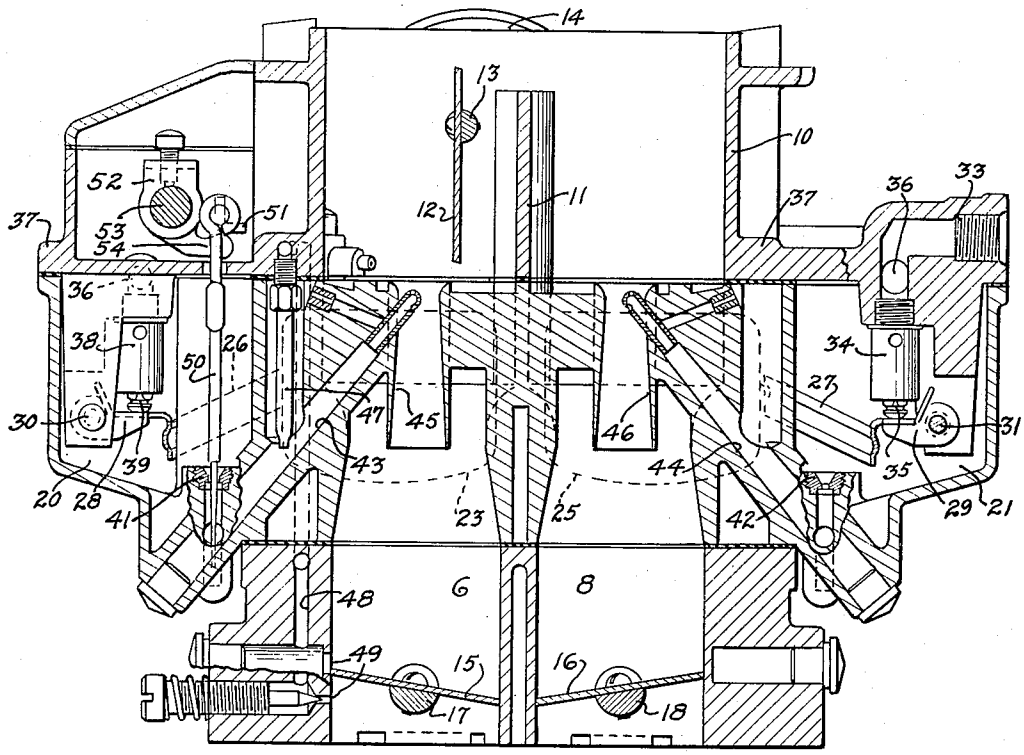


FIG. 1.

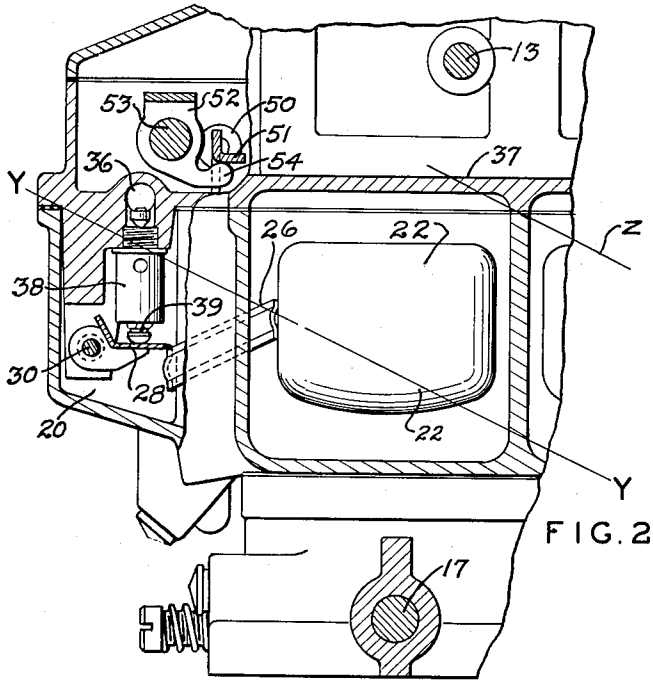


FIG. 2.

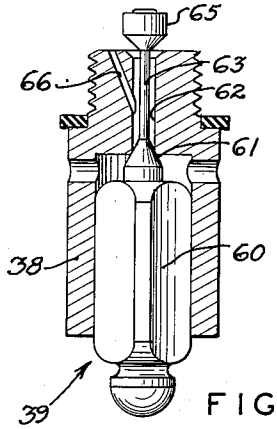


FIG. 3.

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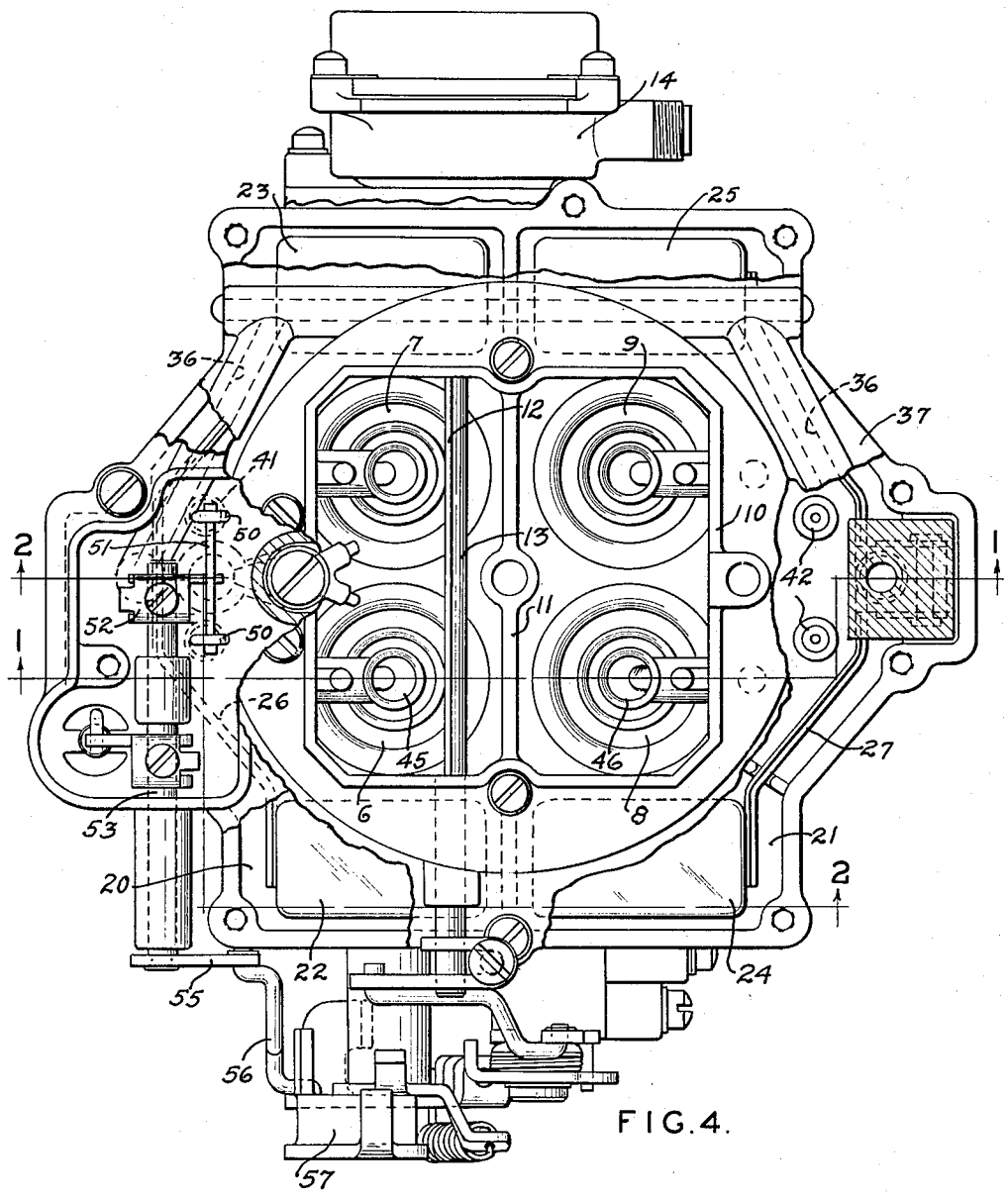


FIG. 4.

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2,748,796

Patented June 5, 1956

2,748,796

CARBURETOR ANTI-SURGE DEVICE

Joseph Schweiss, St. Louis, Mo., assignor to Carter Carburetor Corporation, St. Louis, Mo., a corporation of Delaware

Application December 28, 1951, Serial No. 263,879

4 Claims. (Cl. 137—411)

This invention relates to carburetors for internal combustion engines and consists particularly in novel means for preventing the supply of an excessive quantity of fuel to the carburetor constant level chamber in case of surging of the fuel which may permit the float to drop sufficiently to open the fuel inlet valve.

The problem of excessively raising the level of fuel in the constant level chamber of a carburetor in case of surging of the fuel, is increased where the fuel bowl area is relatively large and, particularly, where the float or floats are located to one side of the center of volume of the bowl. In such case, when the vehicle stops suddenly, for instance, fuel may be caused to surge forward, permitting the float to drop and extra fuel to gush into the fuel reservoir. This extra fuel causes increased richness of the fuel supplied by the carburetor with the result that the engine may stumble or stall, especially if the carburetor is idling.

I solve this problem by providing a special type of fuel inlet valve which has two oppositely facing valve seats, one of which acts to control the fuel supply normally to maintain the constant level of fuel and the other of which closes the fuel inlet in case the float drops excessively, as in case of surging.

In the accompanying drawings which illustrate the invention,

Fig. 1 is a vertical, transverse section through a four-barrel, multi-stage type of carburetor and is taken substantially on broken section line 1—1 of Fig. 4.

Fig. 2 is a partial, vertical, transverse section taken on line 2—2 of Fig. 4.

Fig. 3 is an enlarged section through the fuel inlet valve seat and valve disassembled.

Fig. 4 is a top view of the carburetor, portions being broken away and sectioned.

The carburetor shown is of the four-barrel, multistage type which is illustrated more fully in a co-pending application, Serial No. 263,291, filed December 26, 1951, now Patent No. 2,715,522, granted August 16, 1955, in the names of Harold A. Carlson and James T. W. Moseley. The carburetor has a pair of primary mixture conduits 6 and 7 and secondary mixture conduits 8 and 9 which open at the top through a rectangular air horn structure 10 having a transverse partition 11. On the primary side of the partition there is provided a choke valve 12 pivotally mounted on a shaft 13 which, at one end, extends into an automatic choke control housing 14 of familiar form. At the bottoms of the mixture conduits, there are provided primary and secondary throttle valves 15 and 16 mounted on shafts 17 and 18. A suitable sequential control for the throttle valves is illustrated in the above-mentioned Carlson and Moseley application, but, in itself, does not constitute part of the present invention.

Extending around the mixture conduits are a forward constant level chamber 20 and a rear constant level chamber 21 enclosing floats 22, 23, 24, and 25. Each pair of floats 22 and 23 and 24 and 25 is rigidly connected by a yoke 26 or 27 having a central lip 28 or 29 pivoted as at

30 or 31 to the float bowl. Fuel is supplied directly to right-hand float bowl 21 through a threaded connection 33 and a needle valve seat element 34 which receives a needle type inlet valve 35. Fuel from fitting 33 is also supplied to the forward bowl 20 through passages 36 extending around the top of bowl cover structure 37, and needle valve seat element 38 receiving a needle-type inlet valve generally indicated at 39. Needle valves 35 and 39 are controlled, normally, by means of the floats through lips 28 and 29 so as to admit fuel to the bowls to maintain the same at a substantially constant level therein.

At the central, lower portions of both bowls, there are provided main metering orifice elements 41 and 42 through which fuel is fed to upwardly inclined main nozzle passages 43 and 44 discharging into venturi tubes 45 and 46 within the respective mixture conduits. The forward main nozzles are provided with idling systems including metering tubes 47 and passages 48 leading to ports 49 located adjacent and posterior to primary throttle valves 15 when closed. No idling system is shown on the secondary side, but such a system may be provided and may connect directly to the secondary main fuel nozzles or may be fed from one of the fuel bowls independently of these latter main nozzles. Forward metering orifices 41 are controlled by metering pins 50 actuated by means of engine suction and throttle valve position through the intermediary of a crossbar 51, a small arm 52 rigid with a countershaft 53 pivoted above the bowl cover structure and having a finger 54 underlying crossbar 51, and a lever 55 and a link 56 connected to a lever 57 rigid with one end of primary throttle shaft 17, as shown in Fig. 4, and as better shown in the above-mentioned co-pending application.

As best shown in Figs. 2 and 3, forward fuel inlet needle valve 39 has a non-circular portion 60 received within valve seat element 38, a lower, conical valve element 61 for cooperating with a seat-forming shoulder at the bottom of passage 62 through the threaded, upper portion of the valve seat element. A stem 63 extends from valve element 61 through passage 62 and, at its upper extremity, carries a small valve 65 which may seat about the tapered, upper extremity of passage 62. A small by-pass 66 is also provided in the threaded, upper portion of the valve seat element.

In operation, floats 22 and 23 will drop, when fuel is withdrawn from bowl 20, opening needle valve element 61 to admit fuel into bowl 20 to maintain the desired constant level therein. Preferably, this level will be just slightly below the outlet tips of the primary fuel nozzles at the discharge ends of main fuel passages 43 and 44. In case the vehicle is suddenly stopped, fuel will be caused to surge forward in both bowls, assuming a position approximately as indicated by inclined lines Y—Y and Z of Fig. 2. Fuel is partially evacuated from the rear portions of the forward float bowl 20 which permits the floats 22 and 23 to drop excessively. Under this condition, upper needle valve 65 is dropped upon its seat formed in the tapered, upper extremity of valve seat passage 62 so as to cut off the passage of fuel therethrough. The capacity of the inlet is reduced, and the slight amount of fuel which may pass through by-pass 66 and valve 61, which is open is not sufficient to raise the fuel level in the forward bowl excessively in the short time in which the fuel remains displaced as shown by lines Y—Y and Z. However, this by-pass is available for pumping fuel into the forward bowl in case it is dry.

Broadly, the needle valve arrangement may be varied; for instance, these valves may be separated and separately controlled from one or more floats. The exclusive use of all modifications as come within the scope of the appended claims is contemplated.

I claim:

1. In a carburetor for an internal combustion engine, a fuel reservoir, an inlet therefor, a pair of oppositely seating valves in said inlet, a float in said chamber, and an operative connection between said float and said valves acting in response to operation of said float for selectively closing one of said valves when said float is positioned at normal fuel level, for opening said one valve when said float drops slightly below said position, and for closing the other valve when said float drops excessively.

2. A carburetor as described in claim 1 further including a restricted by-pass around said latter valve for filling the reservoir when dry.

3. In a carburetor for an automotive internal combustion engine, a constant level fuel reservoir, a fuel inlet therefor, a pair of oppositely facing valve seats in said inlet, a stem projecting through said seats and carrying valve elements for cooperating therewith, a float in said reservoir, and an operative connection between said float and said valve stem constructed and arranged to maintain both of said valves open, when said float is in a medial, running position, and to alternately close one of said valves and further open the other when said float is moved either substantially above or substantially below said medial position.

4. In a carburetor for an internal combustion engine, a fuel reservoir, an inlet for said reservoir, valve seating means in said inlet, a pair of valves operating on said seating means, a float in said reservoir, mechanism for actuating said valves from said float connected to alternately move said valves to and from said seating means during motion of said float from one extreme position to the other, and means under control of said valves for partially reducing the capacity of said inlet by one of said valves or closing said inlet by the action of the other of said valves.

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