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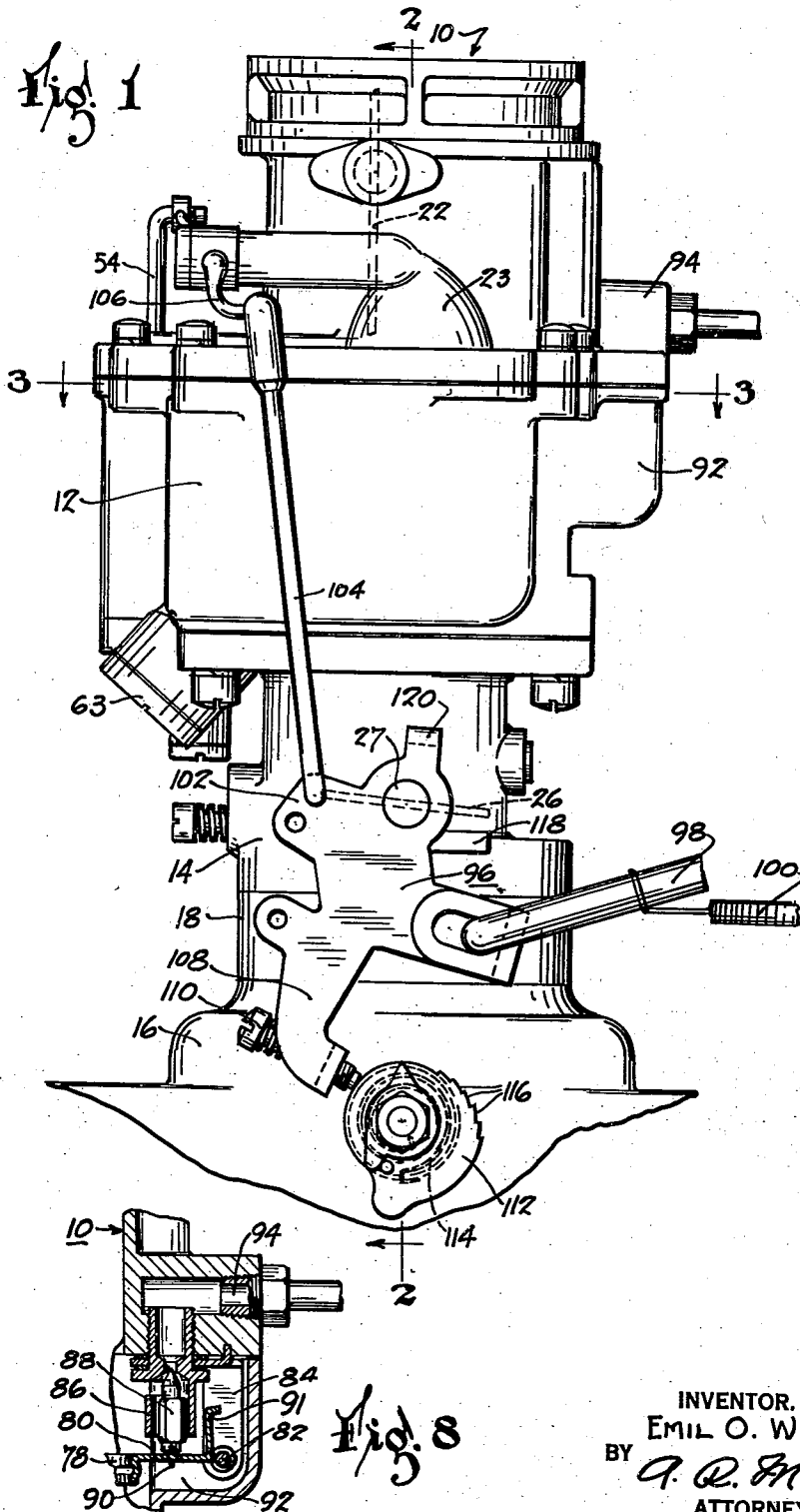
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2,212,926

CARBURETOR

Filed Sept. 4, 1936

3 Sheets-Sheet 1



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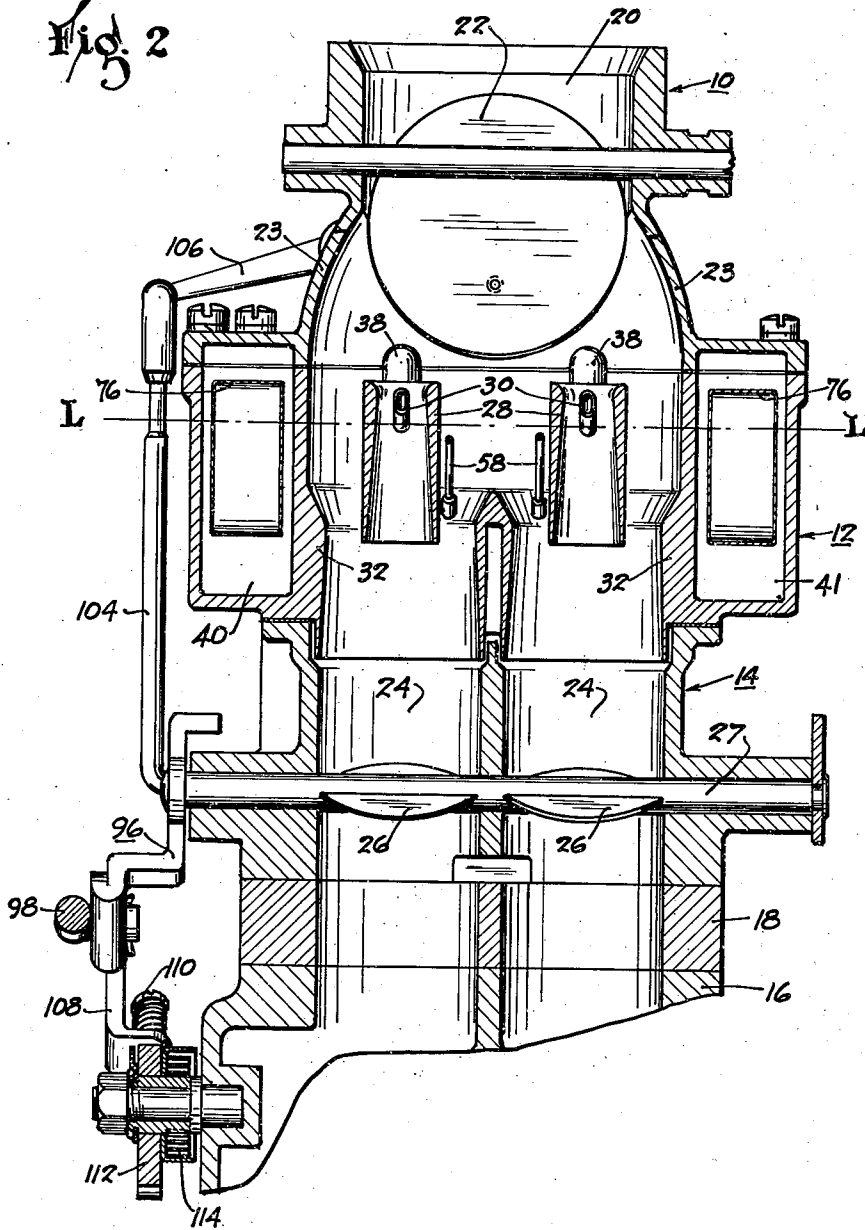
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3 Sheets-Sheet 2

Fig. 2



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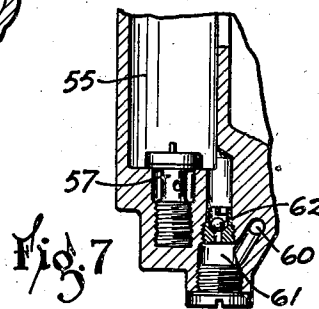
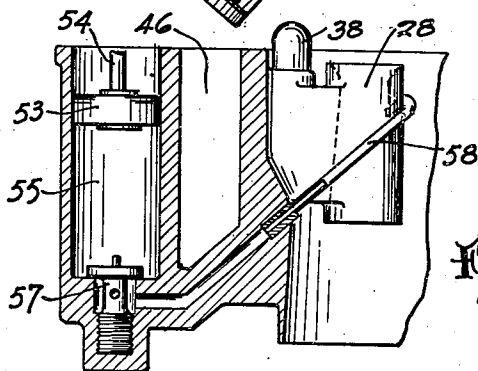
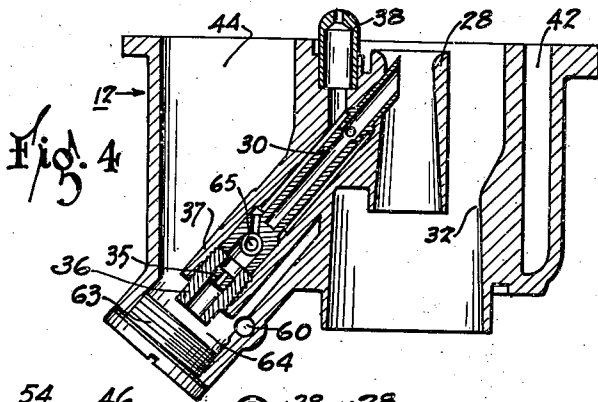
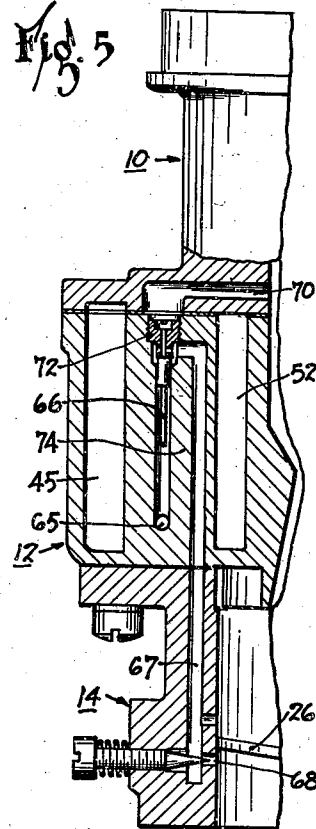
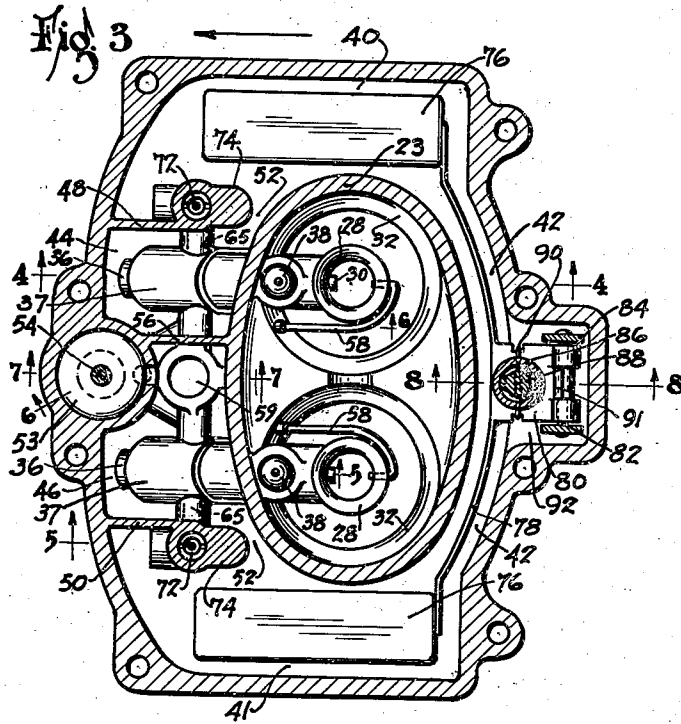
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CARBURETOR

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,212,926

CARBURETOR

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Application September 4, 1936, Serial No. 99,449

9 Claims. (Cl. 261—72)

This invention relates to carburetors, and has for its object to improve the operating characteristics of carburetors, more particularly those used on automotive vehicles.

5 A further object of the invention is to provide a fuel reservoir of improved construction, which will minimize surging due to tilting and to acceleration, whether positive or negative acceleration, or acceleration toward the center of a circle, as
10 occurs when the vehicle to which the carburetor is attached is turning a corner.

Another object of the invention is to provide a carburetor which will have increased efficiency and economy of fuel, and which may be built at
15 minimum cost.

Further objects and advantages of the invention will be apparent from the following description, taken in connection with the appended drawings, in which:

25 Figure 1 is a side elevation of a carburetor embodying the invention;

Figure 2 is a vertical section taken on the line 2—2 of Figure 1;

30 Figure 3 is a horizontal section taken on the line 3—3 of Figure 1;

Figure 4 is a fragmentary section taken on the line 4—4 of Figure 3;

Figure 5 is a section taken on the line 5—5 of Figure 3;

35 Figure 6 is a section taken on the line 6—6 of Figure 3;

Figure 7 is a fragmentary section taken on the line 7—7 of Figure 3; and

40 Figure 8 is a fragmentary section taken on the line 8—8 of Figure 3.

Referring more particularly to the drawings, the carburetor disclosed therein is of the down-draft, double-barrel type, although the invention may be applied to other types of carburetors. It
45 includes an air horn section 10 and a main body section 12, both preferably formed by die-casting; and a throttle body section 14, preferably formed by sand-casting, designed to be connected to the intake manifold 16 but separated therefrom by
50 a heat-insulating gasket 18.

Section 10 forms an air inlet 20 which is controlled by a choke valve 22 of any suitable construction, manipulated either manually or automatically in the known manner. Below choke
55 valve 22, the walls of the induction passage are flared as indicated at 23 and the passage then branches into two mixture passages 24 controlled by throttle valves 26 mounted on a common shaft 27 and controlled by means hereinafter described.

60 Each passage 24 comprises a smaller venturi

28 supplied with fuel from a fuel nozzle 30 and discharging into a larger venturi 32. The construction and arrangement of the fuel nozzles is shown in Figure 4, and may be similar to that shown in the copending application of Frank C. 5 Mock, S. N. 98,680, filed August 31, 1936. As illustrated, each nozzle is provided with a calibrated fuel metering restriction 35 positioned in a threaded plug 36 which projects from a boss 37 formed integral with the main body section 12. 10 The nozzle is also provided with an air-bleeding and gas-separating chamber 38, all as more fully described in said Mock application.

Fuel is supplied to the main nozzles at constant head by means of a constant-level fuel 15 reservoir which extends entirely around the venturis 32 and includes float compartments 40 and 41 interconnected by a passage 42, and chambers 44 and 46, separated from the float compartments by baffles 48 and 50 which terminate short 20 of the wall 23 to provide restricted passageways 52 leading to the float compartments 40 and 41.

An acceleration pump is incorporated in the carburetor, and comprises a piston 53 having a piston rod 54 and slidable in a cylinder 55 which 25 is formed integral with a partition wall 56 which completely obstructs communication between chambers 44 and 46. The acceleration pump discharges through a pressure actuated outlet valve 57 of known construction, which also serves as an economizer valve. The valve 57 connects with 30 discharge tubes 58 leading into the venturis 28. A cylindrical recess 59 in chamber 46 is designed to receive a vacuum-actuated economizer valve (not shown), in cases where it is deemed advisable 35 to incorporate this type of economizer in the carburetor. The inlet of the pump is formed by a cross passage 60 which communicates with both of chambers 44 and 46 and, as shown in Figure 7, leads to a well 61 which leads through a check 40 valve 62 to the cylinder 55.

Removable plugs 63 at the bases of chambers 44 and 46 permit insertion and removal of the nozzles 30 and form fuel wells 64 of small capacity at the lowermost portions of chambers 44 and 46. 45 Idling fuel for each mixture passage 24 is drawn from the nozzle 30 through a lateral passage 65, thence upwardly through an idling tube 66 to a point above the normal fuel level in the carburetor (indicated by the line L—L in Figure 2), 50 and thence downwardly through a passage 67 to an idling nozzle 68, of known construction, discharging adjacent the throttle 26. Air is bled into the idling fuel through a passage 70 leading from the air inlet of the carburetor to a calibrated 55

orifice 72 positioned above the normal fuel level. The upper portions of passages 67 are formed in a pair of bosses 74, integral with baffles 48 and 50, respectively.

- 5 Floats 76 are mounted in compartments 40 and 41 and are rigidly connected to each other by a member 78 having a lever 80 formed integral therewith and rotatably engaging a pin 82 carried by a bracket 84 depending from the air
10 horn section 10. A valve cage 86 also depends from section 10, and houses a needle valve 88 which is secured, as by a wire 90, to the lever 80, so that in case the valve sticks to its seat the weight of the floats will draw it therefrom. Wire
15 90 permits a limited amount of lateral movement of valve 88, and cage 86 limits such movement. A stop 91 formed on lever 80 limits the downward movement of the floats by contacting the cage 86.
20 The float valve mechanism just described is mounted in a bay 92 of the fuel reservoir, and controls the inflow of fuel through inlet 94 to maintain the fuel in the reservoir at a constant level.

- The throttle control mechanism is best shown
25 in Figure 1, and comprises a lever 96 fixed to throttle shaft 27 and connected through an over-running connection to a rod 98 which is actuated by the accelerator pedal in the known manner. The usual return spring is indicated diagram-
30 matically at 100. An arm 102 of the lever 96 is connected through rod 104 and pivoted lever 106 to the piston rod 54 of the acceleration pump. Another arm 108 of the lever 96 is provided with a stop screw 110 designed to contact a rotatable
member 112 which is mounted below the carburetor and controlled by a coiled spring thermostat 114, so that when the engine is cold the member 112 will be rotated so as to bring one
40 of a series of stops 116 into juxtaposition with screw 110 to thereby prevent the throttle valves from returning to their fully closed position, thereby increasing the idling speed of the engine when it is cold. A stop 118 on the carburetor is
45 designed to contact with an ear 120 formed on lever 96 to limit the movement of the throttles in the opposite or opening direction.

- The operation of the carburetor will in general be clear from the foregoing description. Assume
50 that the vehicle to which the carburetor is attached undergoes positive acceleration in the direction indicated by the arrow in Figure 3, which may be the normal direction of movement of the vehicle, although the carburetor may be
55 mounted in the reverse direction if desired. Inertia will tend to cause the fuel in the reservoir to flow into the passage 42 and thus uncover the plugs 36 and cause the engine to misfire or stall. This tendency, however, is resisted by the
60 restrictions 52, which permit only a slow flow of fuel out of the compartments 44, 46. The head of fuel at the plugs 36 will be decreased somewhat, but the inertia effect on the columns of fuel within the nozzles 30 will tend to compensate for this effect, so that the supply of fuel issuing
65 from the main nozzles will be maintained at or about normal. Another factor opposing this tendency is the relatively small capacity of passage 42, which, under the conditions mentioned, causes the fuel level therein to quickly
70 rise to a point where a condition of dynamic equilibrium is quickly reached between the fuel level in the passage and that at other points in the float chamber.

Conversely, when the acceleration of the vehicle in the direction of the arrow in Figure 3

is negative, as when the brakes are applied to an automobile, the fuel will tend to flow from the float compartments 40, 41 to the chambers 44, 46, but restrictions 52 will permit only a slow flow thereto; the level of fuel at the plugs 36 will be increased somewhat, but this will be compensated by the inertia of the columns of liquid in nozzles 30.

When the carburetor is subjected to an acceleration transverse to those above discussed, 10 as when the automobile to which it is attached is turning a corner, the fuel will tend to flow from one of float compartments 40, 41 to the other. Such flow, of itself, does no harm, since the floats 76, being rigidly connected together, will prop- 15 erly control the opening and closing of the needle valve 88 under such conditions. However, it is important that such flow from one float compartment to the other does not drain the chamber, 44 or 46, which is on the side toward which the carburetor is being accelerated, nor flood the other chamber by forcing excess fuel thereinto. Assuming that the carburetor is being accelerated upwardly as viewed in Figure 3, it will be noted that excessively rapid surging of the fuel from 25 float compartment 40 to the other compartment 41 is prevented by the relatively narrow width of passage 42, while partition 56 prevents flow on the opposite side altogether. Some of the fuel from the compartment 40 will drain into chamber 44, 30 thereby preventing exposure of its plug 36. Some of the fuel from chamber 46 may drain into the compartment 41; in both cases the flow will be relatively slow, rather than a rapid surge. If this condition is maintained over a considerable 35 period, as when driving at high speed over a small circular track or when driving for some distance on a laterally inclined roadway, the compartment 41 will be come almost completely filled with fuel and the compartment 40 almost 40 completely empty. Unless the conditions are extreme, however, there will be maintained in the compartment 40 a sufficiently high fuel level to provide a continuous flow from the inlet 94 through said compartment and restriction 52 45 to chamber 44, to replenish the supply discharged through the nozzle. Likewise, there will be a continuous flow of fuel from inlet 94 through the compartment 41 and restriction 52 to chamber 46, to replenish the supply discharged by its nozzle; 50 in this latter case, the flow of fuel from the compartment 41 through restriction 52, against the accelerative or gravity force, is assisted by the high level of fuel in the float compartment 41, assuming that sufficient time has elapsed to per- 55 mit the conditions to become stabilized.

In cases where the carburetor, instead of being accelerated, is tilted in any direction, the operation is substantially the same as in the cases of acceleration just described. 60

Although the invention has been described with reference to a specific embodiment thereof, it is not limited to that embodiment, nor otherwise except by the terms of the appended claims.

I claim:

1. In an automotive vehicle, a carburetor comprising a vertical induction passage of elongated cross-section having its shorter dimension extending in the normal direction of movement of the vehicle, a fuel reservoir extending substan- 70 tially around said induction passage and comprising a pair of fuel compartments of relatively large capacity positioned laterally of the induction passage, level-controlling members in said compartments, a passage of relatively small capacity con- 75

necting said compartments, baffles forming a pair of fuel chambers separated from each other by a partition and from the remainder of the reservoir by restricted passages, and nozzles connecting the chambers with the induction passage.

2. The invention defined in claim 1, wherein the inlets of said nozzles are disposed relative to the induction passage in the direction of normal movement of the vehicle to which the carburetor is attached.

3. The invention defined in claim 1, wherein each of the fuel chambers comprises a well of small capacity at the lower-most point thereof, and the nozzles extend into said wells.

4. In a carburetor for an automotive vehicle, an annular fuel reservoir, an induction passage extending vertically through the fuel reservoir, said reservoir comprising a pair of fuel wells separated from each other by a partition extending across one side of the reservoir and communicating with the remainder of the reservoir by restricted passages, and inclined fuel nozzles leading from the fuel wells to the induction passage.

5. In a carburetor, an annular constant level fuel reservoir, a pair of induction passages extending vertically through the fuel reservoir, said reservoir including a pair of vertically extending fuel wells of relatively small capacity and cross-sectional area compared to that of the entire reservoir, each of said wells having restricted communication with the remainder of the reservoir whereby the fuel level therein will not be materially changed upon sudden acceleration of the carburetor in a substantially horizontal plane, and a pair of main fuel nozzles having metering restrictions therein extending from the wells to the induction passages, said fuel wells being positioned in the forward portion of the fuel reservoir and the reservoir opposite said fuel wells consisting of a narrow passage of relatively low capacity.

6. In a carburetor for an automotive vehicle; a vertical induction passage of elongated cross-section having its shorter dimension extending in the normal direction of movement of the vehicle; an annular fuel reservoir surrounding said induction passage comprising a pair of fuel compartments of relatively large capacity positioned at opposite sides of the induction passage, a passage of relatively small capacity connecting

the fuel compartments, and a pair of fuel chambers of relatively small capacity separated from each other by a partition extending across one side of the reservoir and communicating with the remainder of the reservoir by restricted passages whereby the fuel level in said chambers will not be materially changed upon sudden acceleration of the carburetor in a substantially horizontal plane; a fuel inlet to said reservoir; a pair of interconnected floats in said compartments controlling said inlet; and main fuel nozzles connecting the chambers with the induction passage.

7. In a carburetor, an annular fuel reservoir, a downdraft induction passage extending through said reservoir, a fuel inlet to said reservoir, interconnected floats positioned at opposite sides of the reservoir controlling the inlet, a main fuel nozzle having an inlet in the forward portion of said reservoir and discharging into the induction passage, and vertically extending wall structure forming a partition in said reservoir and partially surrounding said fuel nozzle inlet to form a chamber of limited capacity and small cross-sectional area having restricted communication with the remainder of the fuel reservoir.

8. The invention defined in claim 7 wherein the reservoir opposite said chamber comprises a narrow passage of limited capacity to prevent rapid flow of fuel from the vicinity of one float to the vicinity of the other float.

9. In a carburetor for an automotive vehicle, a constant level annular fuel reservoir, a vertical induction passage extending through said reservoir, a main fuel nozzle connecting said reservoir with the induction passage and having a metering restriction therein, a wall partially surrounding the inlet to said nozzle for forming a vertically extending fuel well of limited capacity and cross-sectional area, said well having restricted communication with the remainder of said reservoir whereby the effective fuel level at said inlet will not be materially changed upon sudden acceleration of the carburetor in a substantially horizontal plane, fuel inlet to said reservoir at a point spaced from said fuel well, a valve in said inlet, and means responsive to the level of the fuel in the reservoir for controlling said valve.

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