June 3, 1952 R. W. SLOANE 2,599,073

LIQUID LEVEL CONTROL MECHANISM

Filed March 12, 1947

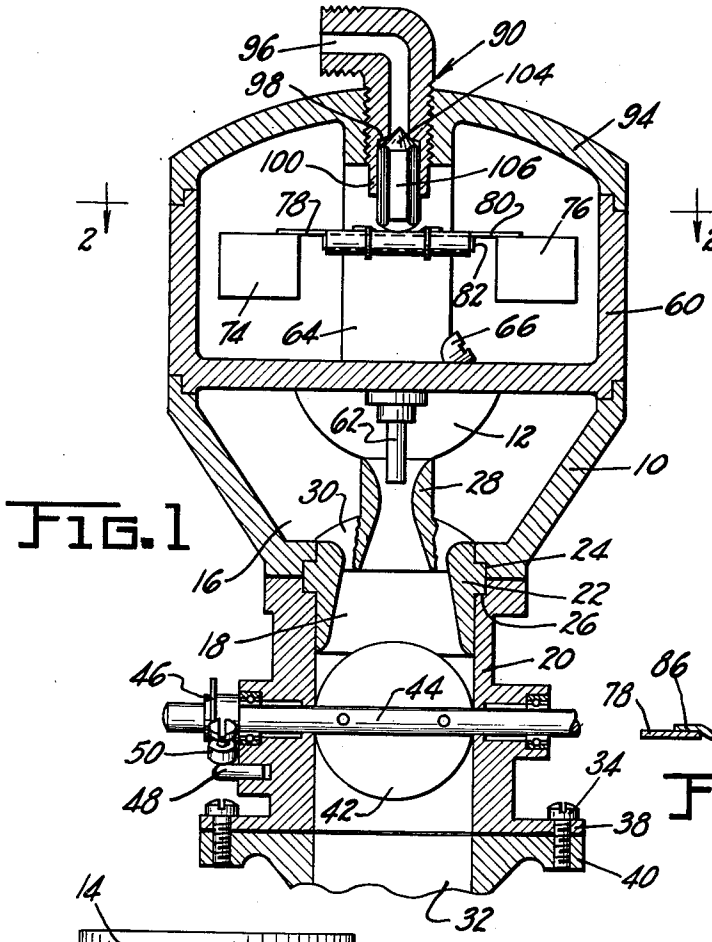



FIG. 1

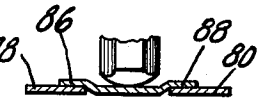



FIG. 3

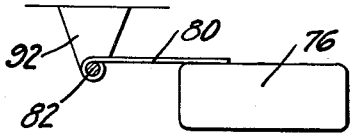



FIG. 4

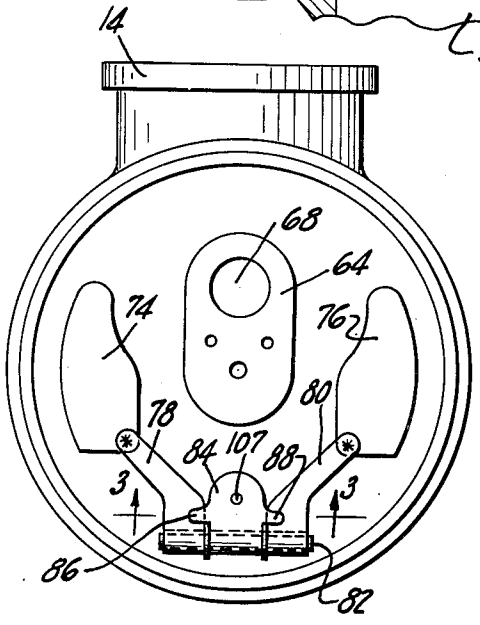



FIG. 2

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Patented June 3, 1952 2,599,073

# UNITED STATES PATENT OFFICE

2,599,073

## LIQUID LEVEL CONTROL MECHANISM

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Application March 12, 1947 Serial No. 734,154

5 Claims. (Cl. 137—104)

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The present invention relates to float type carburetors for internal combustion engines such as those generally used in automotive vehicles and the like and more particularly to a means for maintaining the fuel in the fuel bowl of a float type carburetor at a substantially constant level.

One of the principal objects of the present invention is to provide a float type carburetor for automotive internal combustion engines wherein the effect of changes in carburetor position on the fuel level is minimized throughout the normal operation of the engine.

Another object of the invention is to provide a float type carburetor for internal combustion engines for automobiles and the like in which the effect of normal changes in off-level positions of vehicle or the centrifugal force induced by the motion of the vehicle is minimized.

Another object is to provide in a float type carburetor a fuel control mechanism which is adapted to maintain a predetermined quantity of fuel in the fuel bowl regardless of normal variations in the position of the carburetor or in centrifugal force or inertia resulting from the motion of the vehicle.

Further objects and advantages of the invention will appear from the following description when read with reference to the accompanying drawings, wherein:

Figure 1 is a vertical cross section through a float type carburetor of an internal combustion engine showing the fuel control mechanism forming the subject matter of the present invention in operative position in said carburetor;

Figure 2 is a section taken on line 2—2 of Figure 1 showing the top plan view as a control mechanism;

Figure 3 is a section of the float lever taken on line 3—3 of Figure 2 showing only the lower end of the fuel inlet valve; and

Figure 4 is a side elevation of the fuel control mechanism.

With reference to Figure 1 of the drawings, the present fuel control mechanism is shown assembled in a fuel bowl of a horizontal inlet type carburetor which, for the purpose of illustrating the present invention, may be considered conventional in design, including all the principal features usually present in float type carburetors for internal combustion engines. In the carburetor, an air intake body 10 contains a horizontal induction passage 12 therethrough having an air inlet 14 on the far side of Figure 1 and an air outlet 16. A large venturi 18 is disposed in the

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outlet 16 of the induction passage 12 of the air intake body 10 and extends into the top portion of the throttle body 20, said venturi being secured in place by the seating of an annular rib 22 of the Venturi tube 18 in the adjacent recesses 24 and 26 of the main and the throttle bodies respectively. A small or secondary venturi 28 is disposed in the large venturi and held in place relative thereto by an arm 30 extending diametrically across the throat of the large venturi and preferably being formed integrally with said small and large venturis.

The throttle body 20 which is secured to the air intake body 10 is mounted on intake manifold 32 and secured thereto by bolts 34 inserted in holes of external flange 38 of the throttle body and flange 40 of the intake manifold. The throttle valve 42 is mounted on shaft 44 in the induction passage of the throttle body and is actuated by a throttle valve lever 46 mounted on one end of shaft 44, the opposite end of shaft 44 being adapted to receive a governor for controlling the position of said throttle valve in accordance with some engine operating condition. A pin 48 seated in the external surface of the throttle body, in cooperation with screw 50 of the throttle valve lever, serves as a stop for limiting the closing movement of said valve.

A float chamber or fuel bowl 60 is mounted directly above the vertical section of the induction passage and contains a fuel discharge nozzle 62 which extends vertically in boss 64 and which receives fuel from the fuel bowl through a main metering jet 66 and discharges it into the throat of the small venturi 28. The central location of the fuel bowl and discharge nozzle in the carburetor tends to minimize the effect of changes in carburetor position on the level of the fuel. An accelerating pump 68, a part of which is shown in Figure 2, and a power enrichment system also deliver fuel to the induction passage through the main discharge nozzle and are also contained in said boss 64.

The fuel inlet control mechanism shown suspended in the fuel bowl about boss 64 is designed to maintain a substantially constant quantity of fuel in the fuel bowl regardless of any off-vertical position assumed by the carburetor during normal vehicle operation. In the embodiment shown in the drawings, two hollow metallic floats 74 and 76 are suspended in the fuel bowl on opposite sides of boss 64 and are supported by arms 78 and 80 integrally secured to the top side of each float, preferably by soldering or

brazing though any other suitable joining means may be used.

Arms 78 and 80 are pivoted on pin 82 and are separated from one another by needle valve lever 84, said lever 84 having side lugs 86 and 88 which are adapted to overlap the top sides of arms 78 and 80 and to hold lever 84 on a level with the highest float arm. This permits the floats 74 and 76 to seek the level of the fuel independently of one another at any normal off-level position assumed by the carburetor. Arms 78 and 80 and lever 84 mounted on pin 82 are supported adjacent a fuel inlet shown at 90 by a bifurcated bracket 92 secured to the fuel bowl cover 94.

The fuel is supplied from a suitable source through inlet conduit 96, orifice 98 and valve guide 100 and is thence discharged into the fuel bowl. The flow of fuel is controlled by a valve 104 having a fluted or three-sided stem 106 which rests on the top side of valve lever 84 at point 107 shown in Figure 2.

In the operation of the present invention, while the carburetor is in vertical position, the fuel control mechanism functions the same as a conventional float controlled fuel inlet means. When the carburetor tips from off-vertical position to either side as shown in the drawings, so that the fuel level is no longer at right angles with the center line of the carburetor, the float arm on the high side of the bowl drops to the level of the fuel and becomes disengaged from the respective lug 86 or 88; consequently, this arm does not operate to control the inlet of fuel. The float arm on the low side of the bowl supports lever 84 by engaging the respective lug thereon, and any change in the quantity of fuel in the fuel bowl is transmitted by said float and its float arm to lever 84 to regulate the fuel inlet valve entirely independent of the other float and float arm. The control of the fuel inlet valve shifts from one float arm to the other as the bowl is tipped to the right or left.

It is contemplated that other arrangements of elements comprising the present invention than those shown in the accompanying drawings may be provided without departing from the scope of the present invention. The present float lever arrangement is applicable not only to carburetors in which the fuel bowl is over the center of gravity, but also to any carburetor wherein a plurality of floats are used to control the fuel inlet valve. Other modifications of the present fuel control mechanism, as defined in the following claims will occur to those skilled in the art.

I claim:

1. A fuel inlet control device for a carburetor having a fuel bowl comprising at least two floats, an arm for each float pivoted adjacent a fuel inlet valve, and a lever positioned between and having a part overlapping two of said arms and forming a one-way connection therewith, said lever being adapted to be actuated by at least one of said arms for actuating a fuel inlet valve.

2. A fuel inlet control device for a carburetor having a fuel bowl comprising at least two floats, an arm for each float pivoted adjacent a fuel inlet valve on a common axis, and a lever positioned between and having a part overlapping two of said arms and forming a one-way connection therewith, said lever being adapted to be actuated by at least one of said arms for actuating a fuel inlet valve.

3. A fuel inlet control device for a carburetor having a fuel bowl comprising two floats, an arm for each float pivoted adjacent a fuel inlet valve on a common axis, and a lever positioned between and having a part overlapping said arms and forming a one-way connection therewith, said lever being adapted to be actuated only by the arm held on the low side of the fuel bowl when the carburetor is in an off-vertical position

4. A fuel inlet control device for a carburetor having a fuel bowl comprising two floats, a separate and independently operable arm for each float pivoted adjacent a fuel inlet valve, and a lever positioned between and having a part overlapping said arms for actuating a fuel inlet valve, said lever being adapted to be actuated only by the arm on the low side of the fuel bowl when the carburetor is in an off-vertical position.

5. A fuel inlet control device for a carburetor having a fuel bowl comprising two floats, a separate and independently operable arm for each float pivoted adjacent a fuel inlet valve on a common axis, and a lever positioned between and having a part overlapping said arms for engaging and actuating a fuel inlet valve, said lever being adapted to be actuated only by the arm on the low side of the fuel bowl when the carburetor is in an off-vertical position.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 1,872,291 | Hobbs | Aug. 16, 1932 |
| 1,933,360 | Barbarou | Oct. 31, 1933 |
| 2,172,935 | Ewart | Sept. 12, 1939 |
| 2,193,096 | Harrison | Mar. 12, 1940 |

FOREIGN PATENTS

| Number | Country | Date |
|---|---|---|
| 588,837 | France | of 1925 |