Sept. 20, 1938. T. J-B. LAFITTE ET AL 2,130,884

CARBURETOR

Filed July 29, 1935

Fig. 1

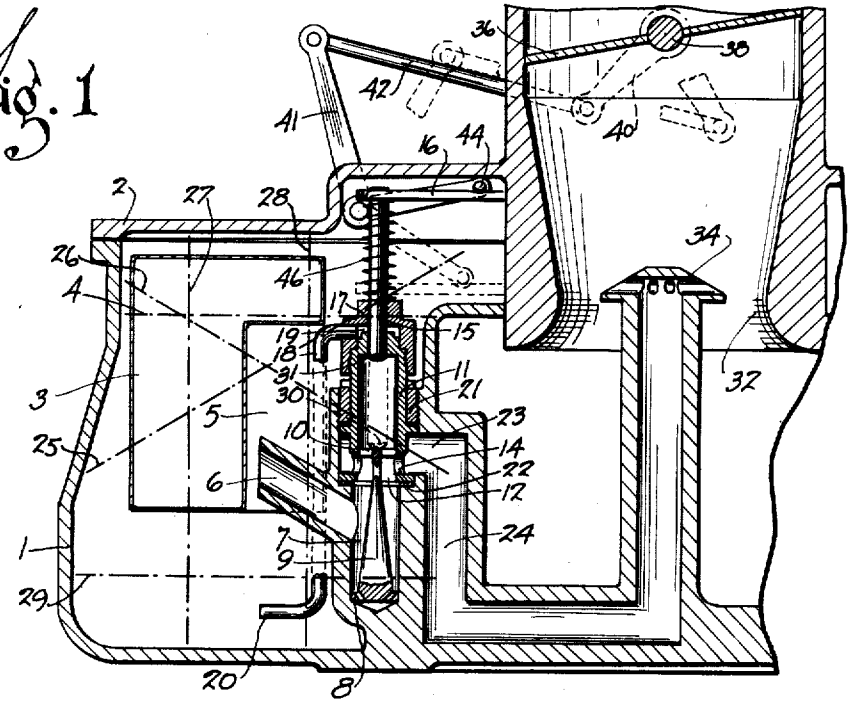
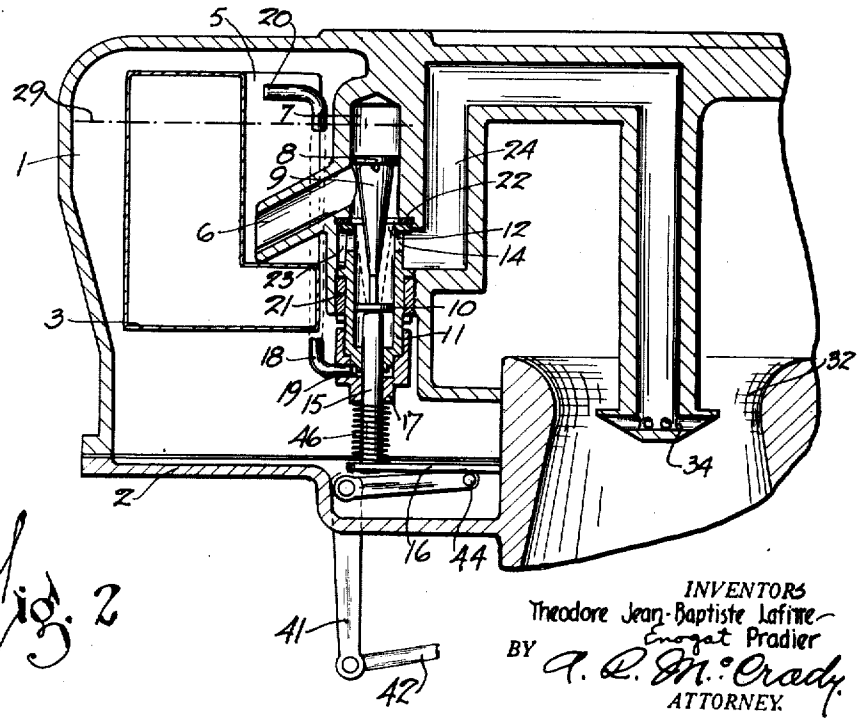


Fig. 2



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Patented Sept. 20, 1938 2,130,884

UNITED STATES PATENT OFFICE

2,130,884

CARBURETOR

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Application July 29, 1935, Serial No. 33,726
In France December 28, 1934

10 Claims. (Cl. 261—51)

The present invention relates to improvements in carburetors of the well-known constant level type.

One object is to permit by simple means proper functioning at all inclinations of the carburetor, this being accomplished by the combination of certain elements with the novel elements constituting the essence of the invention.

According to the invention, the fuel intake is located approximately in the center of the float chamber, by means of a tube which opens into a recess provided in the float, and the flow of the fuel, anterior to the main jet and auxiliary jets, is controlled by a conical valve, having a special profile, and which moves by its own weight in an appropriate bore, thereby opening and closing more or less the opening through which the fuel must pass before passing to the jets.

When the carburetor is functioning in an inverted position, the position of this valve is determined by a tappet connected to the throttle valve, and preferably connected with a part of the rod actuating the accelerating pump; such an arrangement has the important advantage, in the case of aviation carburetors, of permitting this actuation in the interior of the carburetor and of making it unnecessary to connect the actuating part to the outside, or through a stuffing box. When the carburetor is functioning in a normal or approximately normal position, the conical valve in question remains at the bottom of its bore and has no effect on the metering of the fuel, which thus passes to the jets in the normal manner.

Another object of the invention is to insure, by means of a sort of hydraulic joint, the sealing of the bearing for the tappet for the conical valve, so as to prevent the introduction of air from the float chamber to the fuel stream flowing to the jets.

The invention contemplates, in addition, certain appplications, for example to carburetors designed for aircraft and also to other industrial uses and in general comprehends all apparatus comprised wholly or partly within the present arrangements.

The accompanying description and attached drawing, given by way of example, will make the arrangements comprehended by the invention readily understood.

Figure 1 is a section of the float chamber of a carburetor in the normal position of operation; and

Figure 2 shows the same section, with the carburetor inverted.

The carburetor to which the invention is applied may be of any suitable type, and as shown comprises a venturi 32 in which discharges a main fuel nozzle 34. A throttle valve 36 controls the flow of fuel mixture through the induction passage, and is manually controlled by any suitable means, not shown. The throttle shaft 38 is connected, by levers 40 and 41 and link 42, to an actuating member 16 which is located within the float chamber 1 and may connect with an acceleration pump (not shown) of any preferred construction. A pin 44 carried by one arm of lever 41 rides on the member 16 to depress it when the throttle is opened, and a spring 46 tends to move the member 16 to its uppermost position in Figure 1.

The reservoir 1 is provided with a cover 2, and contains a float 3, which controls the fuel level therein and has a recess 5, which permits the orifice of the tube 6 to open at the exact center of the reservoir 1 without interfering with the vertical movement of the float; this tube 6 discharges into a chamber 7, in which slides a cylindrical guide member 8 of a conical valve 9 which is guided at its other end by a second cylindrical guide member 10 in a tubular sleeve 11, positioned on the axis of the chamber 7. The two cylindrical guide members 8 and 10 are drilled of suitable size; the sleeve 11 has a predetermined interior diameter 12, as have also the holes 14, sufficient for the passage of all the fuel necessary to carburetion. At its other end the sleeve is formed as a bearing for the tappet 15 which is connected to the actuating member 16. The tappet 15 is guided by a cap 17 which carries soldered to it, a tube 18 bent in different directions in the plane of the figures, which terminates, at one end, at the recess 19 which lies between the sleeve 11 and the cap 17, and, at its other end, at 20, at the base of the reservoir and toward its center; a nut 21 holds the sleeve 11 in liquid-tight contact with a seat 22. The holes 14 discharge into a chamber 23 which communicates by a passage 24 with the main and auxiliary jets. The fuel level is represented for different positions of the carburetor at 4, 25, 26, 27, 28 and 29; these show that in all cases the orifice of pipe 6 is submerged and the flow of fuel to the jets is assured.

The operation of the device is as follows:

In the position shown in Figure 1, the conical valve 9 is maintained by its own weight at the bottom of its chamber 7, and the fuel passes through a predetermined orifice in the form of an annulus which is the difference between a circle of the diameter 12 and of the cylinder which connects the conical valve 9 to its cylindrical guide

18. The tappet 15 may assume all the positions between the very lowest 30 and the very highest 31, which may be imparted to it by its connection with the throttle valve, without being influenced by the position of said conical valve, which is independent of its movement. The carburetor then functions in the usual manner.

Figure 2 represents, by way of example, the carburetor in case of flying upside down; the reservoir 1 fills rapidly with fuel, which carries the float 3 to the position shown and, by means of known fuel control arrangements such as that shown in Miller Patent 1,841,663, keeps open the needle valve (not shown) which controls the entry of fuel thereby filling the reservoir above line 29 and immersing inlet 20. This would admit an unlimited amount of fuel to the various jets if the valve 9 did not prevent it; but it is moved by gravity downwardly until it contacts the end of the tappet 15 in the position in which the latter was at the moment of inversion. The section left for the passage of fuel for carburetion is the difference between a circle of the diameter 12 and the section of the valve 9 in the given position. It will be seen that the size of the annular orifice depends upon the position of the conical valve 9, a position which is defined by the position of the tappet 15. The valve 9 may be given a suitable profile in order to provide for each condition an annular section which will permit a suitable flow of fuel for good carburetion independently of the section of the main and auxiliary jets being supplied.

In this position, good carburetion may be obtained at all speeds of the engine from idling speed, if necessary, to the maximum power.

We shown shown at 4, 25, 26, 27, 28 and 29, various characteristic levels which the fuel in the reservoir assumes in various positions; it will be seen that the orifice of the tube 6 is characteristically placed in the recess 5 of the float, so that it is always submerged, which assures regularly in all cases the supply to the jets.

The different positions assumed by the reservoir determine certain levels; for example 4 and 26, which uncover the bearing of the tappet 15 in the cap 17. Necessarily, for convenient operation, the tappet 15 slides in the cap 17 with an initial clearance which increases with wear. Furthermore, the suction which acts on the jets is transmitted, in reduced amount, to the sleeve 11; it would be objectionable if this would entrain air and form an emulsion of fuel and change the metering characteristics of the carburetor. Due to the arrangement according to the present invention, this suction, when it exists, acts through the tube 18 to cause fuel to rise and fill the space 19 and eventually flow to the interior of the sleeve 11, where it is without effect on the normal operation and in quantity insufficient to disturb the operation in inverted flight.

It will be understood that apparatus following the invention may be embodied in other convenient forms, analogues, and variations, comprised wholly or partly in the present disclosure, or others which may be derived therefrom, without departing from the spirit of the invention as defined in the following claims.

We claim:

1. In a carburetor, a throttle, a fuel jet, a fuel reservoir for supplying fuel to said jet, a conduit leading from the reservoir to the jet, a valve in said conduit to restrict the flow therethrough, and means operated in accordance with throttle position for actuating said valve, said valve being movable by gravity to an inoperative position where it is not influenced by said means.

2. In a carburetor, a throttle, a fuel nozzle, a fuel reservoir for said nozzle, a conduit leading from the reservoir to said nozzle, a valve in said conduit to variably restrict the flow of fuel therethrough, and means operated in accordance with throttle position for actuating said valve to move the same to restrict more or less the flow of fuel through the conduit, said valve being movable by gravity when the carburetor is upright to an inoperative position where it is not influenced by said means.

3. In a carburetor, a throttle, a fuel nozzle, a fuel reservoir for said nozzle, a conduit leading from the reservoir to said nozzle, a valve in said conduit to variably restrict the flow of fuel therethrough, means operated in accordance with throttle position for actuating said valve, said means comprising an actuating member for the valve, a bearing for the actuating member provided with a recess, and means operable in all positions of the carburetor for supplying fuel to said recess to flood said bearing.

4. In a carburetor, a throttle, a fuel nozzle, a fuel reservoir for said nozzle, a conduit leading from the reservoir to the nozzle, a valve movable by gravity in said conduit for variably restricting the flow of fuel therethrough, means for actuating said valve comprising a movable member, a bearing for said member, and means operable in all positions of the carburetor for supplying fuel from the reservoir to said bearing to flood the same.

5. In a carburetor, a throttle, a fuel jet, a fuel reservoir for supplying fuel to said jet, a conduit leading from the reservoir to the jet, valve means to control the flow through said conduit, and means operated by said throttle for controlling said valve means, said last named means being so constructed and arranged that it is effective only in the inserted position of the carburetor.

6. In a carburetor, a throttle, a fuel jet, a fuel reservoir for supplying fuel to said jet, a conduit leading from the reservoir to the jet, a valve slidably mounted in said conduit to control the flow therethrough, said valve being movable by gravity when the carburetor is in upright position to a position in which it does not substantially restrict the conduit, and means operated by said throttle to control the valve when the carburetor is in inverted position.

7. In a carburetor, a throttle, a fuel jet, a fuel reservoir for supplying fuel to said jet, a conduit leading from the reservoir to the jet, means forming an orifice in said conduit, a tapered valve extending through said orifice, said valve being movable by gravity to control the flow through said orifice, and means operated by the throttle for variably limiting movement of the valve in one direction.

8. In a carburetor, a throttle, a fuel jet, a fuel reservoir for supplying fuel to said jet, a conduit leading from the reservoir to the jet, means forming an orifice in said conduit, a tapered valve extending through said orifice, said valve being movable by gravity to control the flow through said orifice, and a plunger operatively connected to the throttle to be moved thereby and engageable with one end of said valve for variably limiting movement thereof in one direction.

9. In a carburetor, a throttle, a fuel jet, a fuel reservoir for supplying fuel to said jet, a conduit leading from the reservoir to the jet, a vertical chamber in series with said conduit, a valve

slidably mounted in said chamber to control the flow of fuel therethrough, a plunger rod extending into one end of the chamber and engageable with one end of the valve to limit movement thereof in one direction, and means connecting said plunger to the throttle.

10. In an invertible carburetor, a fuel nozzle, a fuel reservoir for supplying fuel to the nozzle, means including a float in the reservoir normally maintaining a constant fuel level therein when right side up, an outlet from the reservoir positioned approximately at the center thereof, the float being provided with an elongated vertical lateral recess extending in the locus of the outlet to permit vertical movement of the float relative to the outlet and means for regulating fuel flow to the nozzle when in inverted position.

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ENOGAT PRADIER.

CERTIFICATE OF CORRECTION.

Patent No. 2,130,884. September 20, 1938.

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 42, for "appplications" read applications; page 2, first column, line 37, for "shown shown" read have shown; and second column, line 42, claim 5, for the word "inserted" read inverted; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 31st day of October, A. D. 1939.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)

slidably mounted in said chamber to control the flow of fuel therethrough, a plunger rod extending into one end of the chamber and engageable with one end of the valve to limit movement thereof in one direction, and means connecting said plunger to the throttle.

10. In an invertible carburetor, a fuel nozzle, a fuel reservoir for supplying fuel to the nozzle, means including a float in the reservoir normally maintaining a constant fuel level therein when right side up, an outlet from the reservoir positioned approximately at the center thereof, the float being provided with an elongated vertical lateral recess extending in the locus of the outlet to permit vertical movement of the float relative to the outlet and means for regulating fuel flow to the nozzle when in inverted position.

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