

Dec. 31, 1929.

H. F. BRYAN

1,741,401

CARBURETOR

Filed Feb. 16, 1927

2 Sheets-Sheet 1

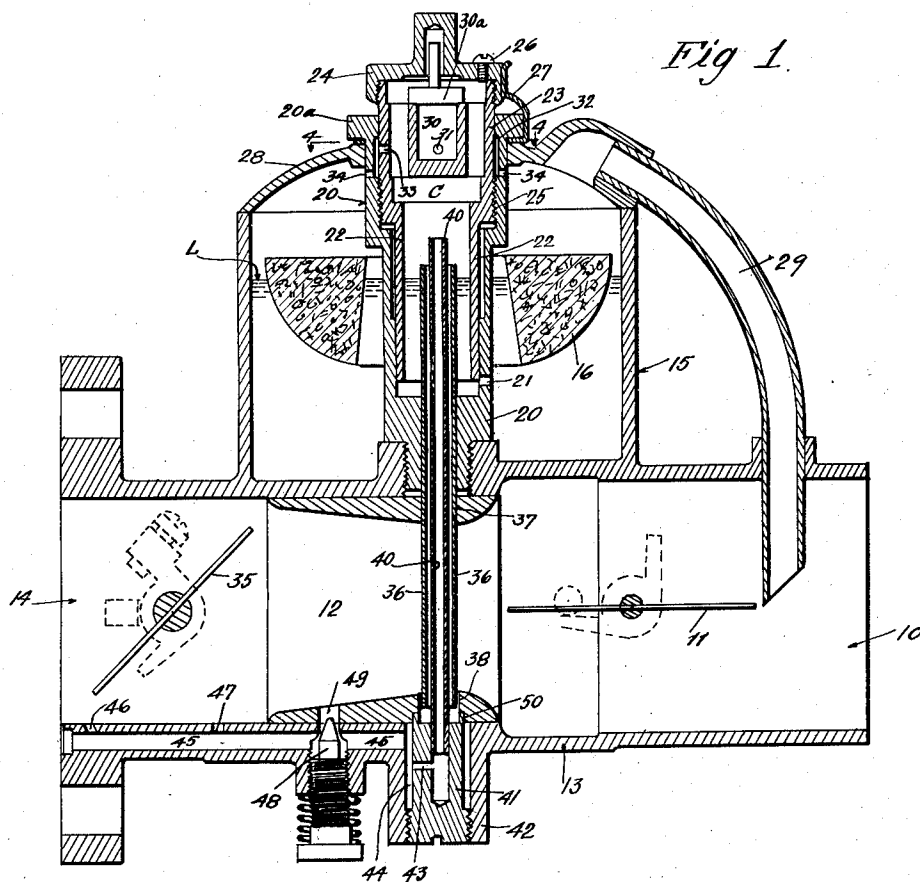
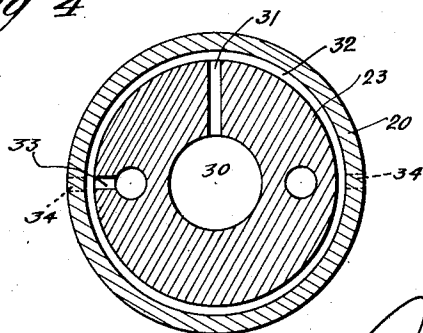


Fig 4



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Fig. 2.

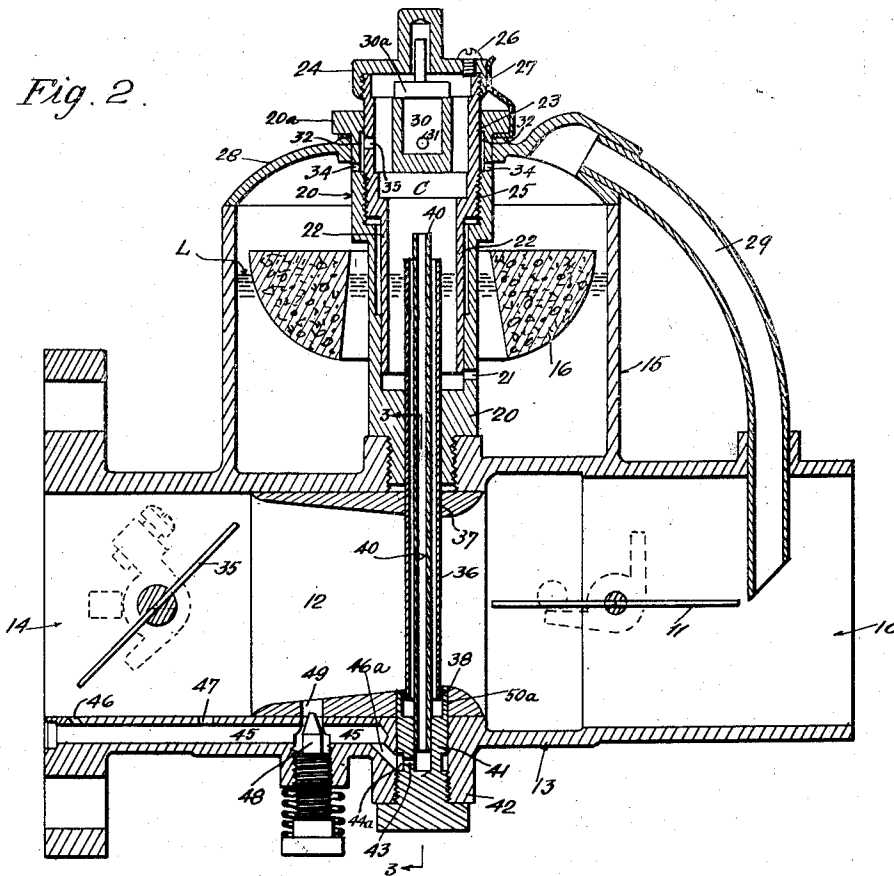
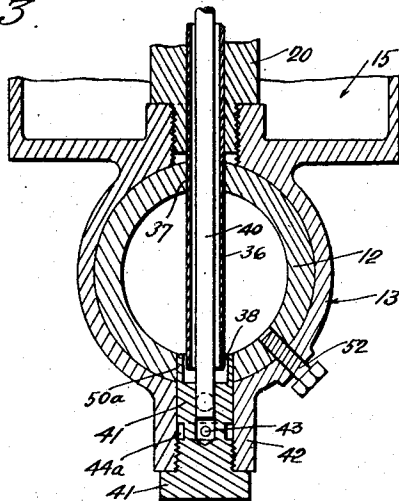


Fig. 3.



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UNITED STATES PATENT OFFICE

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CARBURETOR

Application filed February 16, 1927. Serial No. 168,564.

This invention has reference to carburetors and has particular reference to a carburetor employing a fuel feeding means such as set out in the patent to Roy F. Ensign, No. 1,658,484, issued Feb. 7, 1928, entitled Method of and means for supplying internal combustion engines with fuel and air. The major object of the invention is the application of such a fuel feeding and controlling means to a carburetor of the Venturi type; other objects being the provision of a practical, economical and efficient design and a simple and effective form of carburetor. Other objects will appear from the following detailed specification, reference for this purpose being had to the accompanying drawings, in which:

Fig. 1 is a vertical central longitudinal section of a carburetor embodying the present invention;

Fig. 2 is a similar view showing variant details;

Fig. 3 is a fragmentary cross section on line 3—3 of Fig. 2; and

Fig. 4 is a detailed cross section on line 4—4 of Fig. 1.

In the drawings a simple form of Venturi carburetor is illustrated having an air intake 10 which may be controlled by a choke throttle 11, the Venturi tube 12 being set in the tubular body 13 which forms the air intake and also the mixture outlet passage 14. In the specific form here set out the float chamber, or constant level chamber 15, is set directly above tubular body 13, the float 16 controlling the admission of fuel to chamber 15 in manners well known to keep the fuel level approximately at the point denoted L in the drawings.

Screwed into the base of chamber 15 there is a tubular member 20 having a fuel inlet opening 21 whose effective size is adjustable by the vertical adjustment of a sleeve 22 depending from a hollow head 23 which is closed at its upper end by a cap 24. This hollow head 23 is screw-threaded as at 25 into the upper end of tubular member 20, sleeve 22 depending inside member 20, so that by rotatively adjusting head 23 the lower edge of sleeve 22 may be made to cut off opening

21 more or less. Cap 24 at the upper end of head 23 is screw threaded upon the head and is set thereon by a set screw 26 so that the head will always rotate with the cap, a detent spring 27 holding the cap and head in any adjusted position. The suction chamber C of which I hereinafter speak is formed by the interiors of sleeve 22 and hollow head 23, suction being applied to this chamber to raise fuel therein through the lower part of sleeve 22 from fuel inlet opening 21.

The upper end of tubular member 20 has a head or flange 20^a which rests upon cap 28 of fuel chamber 15 to hold that cap in place, the fuel chamber being preferably air tight so that its sole atmospheric communication is through the Pitot tube 29 whose intake end is located in air intake 10. In the upper part of hollow head 23 there is a small chamber 30 having an air bleed orifice 31 leading through its wall and through the wall of head 23 so as to form a communication between chamber 30 and an annular air chamber 32 which is located in the upper part of tubular member 20 in such position that orifice 31 will always register with it, as will also orifice 33 which leads directly from annular air chamber 32 into the interior of the upper part of hollow head 23. Air reaches annular chamber 32 through one or more air openings 34 which take air from the interior of fuel chamber 15. Air which enters the small chamber 30 may only reach chamber C when the check valve 30^a is raised by the suction in chamber C, and the weight of valve 30^a is made such that air from chamber 30 thus enters chamber C as the suction on chamber C increases.

A fuel feed tube 36 extends through the lower part of tubular member 20, being tightly set in member 20, and projecting upwardly inside member 20 and sleeve 22 to a point above the normal standing fuel level L. The lower end of this sleeve passes through an opening 37 in the upper wall of Venturi tube 12 and, depending across the Venturi tube, has its lower end situated in an opening 38 which extends through the opposite lower wall of the Venturi tube; opening 38 being somewhat larger in diameter than tube 36. The downward extension of the lower end of

tube 36 into opening 38 forms the liquid fuel trap that is one of the characteristics of the method of feeding fuel set forth in said prior application. Liquid fuel coming down through tube 36 fills opening 38 and, rising around the lower end of the tube, overflows the edges of that opening and is thus introduced in the air flowing through the Venturi tube.

Extending upwardly through fuel tube 36, preferably concentric therewith but of smaller size so as to leave a fuel feed space therearound, is a suction tube 40 mounted and carried at its lower end on a plug 41 screw threaded into a boss 42 formed on tubular body 13. The upper end of tube 40 stands somewhat above the upper end of fuel feed tube 36; and suction reaches the lower end of tube 40 through a suction port 43 in plug 41. In Fig. 1 port 43 is shown communicating with an annular space 44 around plug 41, the annular space communicating directly with suction passage 45. In Fig. 2 port 43 is shown communicating with an annular groove 44^a and this groove communicates with suction passage 45 through the medium of a small port 46^a. In both cases the suction tube 40 is connected with suction passage 45, and suction passage 45 has one suction port 46 in a position outside throttle 35 and a port 47 in a position inside throttle 35. The function of these two ports, as will be readily understood, is to put comparatively high suction on passage 45 when the throttle is closed, the high suction being modified or relieved to a certain extent by the action of port 47. When the throttle is wide open, or substantially so, the suction that is applied to passage 45 is approximately the same as that which is applied to the lower end of fuel tube 36.

The amount of suction which is transmitted through passage 45 to suction tube 40 may be adjusted by the adjusting valve 48 as will be well understood, this valve controlling an opening 49 which leads through the wall of Venturi tube 12 and through which the entry of air may further modify the suction that is applied to passage 45 through port 46.

In Fig. 1 the plug 41 is shown as having an upper annular cup flange 50 which fits into a corresponding recess around opening 38 in the underside of Venturi tube 12, the plug being screwed into place so that cup flange 50 fits up tightly against the lower side of the Venturi tube, making a fluid tight joint and holding the Venturi tube rigidly in place. In Fig. 2 the corresponding cup flange 50^a on the upper end of plug 41 is shown as long enough to extend clear through the wall of the Venturi tube, the upper end of the plug thus having a cup formation which forms the fuel chamber around the lower end of fuel feed tube 38. Venturi tube 12 is fitted fairly

snugly into tubular body 13, but not by a force fit. Consequently there is always some slight looseness of the Venturi tube in the tubular body. In the form of Fig. 1 that looseness is taken up by the plug 41 pressing tube 12 up against the upper wall of body 13; and in the form of Fig. 2 that looseness may be taken up around the lower part of the Venturi tube by the provision of a cap screw 52 which extends through the wall of body 13 and screws into the Venturi tube, holding the lower part of the tube down tightly against the body wall.

The fuel feeding and controlling means is in general the particular subject-matter of said prior application and therefore will not be explained in more detail than is necessary to an understanding of the particular improvements that are the subject-matter of this present application. During ordinary running the depression generated at the throat of the Venturi tube is applied through opening 38 or through the cup 50^a to the lower end of fuel feed tube 36, that depression being thereby transmitted to suction chamber C and raising the fuel level in that chamber high enough that the fuel flows over the upper end of tube 36 and fuel and air are drawn down through the tube, entering the trap 38 and then flowing out over the edge of the trap into the air passing through the venturi, thus supplying the air with fuel to make the proper mixture.

As suction on the lower end of tube 36 increases with the throttle open, the fuel seal in 36 and 38 is drawn out and air and fuel are drawn down through tube 36 and through the seal space 38. Only at low speed does fuel stand as a column of liquid in 36 and 38.

The above described operations are not my particular inventions. The particularly novel feature of the present invention resides in the arrangement of the fuel feeding means, the fuel and suction tubes, etc., with relation to the Venturi tube and the tubular body in which the Venturi tube is set. It will be noted that the construction and arrangement are simple and easily manufactured and assembled. The fuel is delivered to the Venturi tube near its throat; and the parts which play a part in fuel delivery also play a structural part in the assembly, particularly in holding the Venturi tube in place in the body.

I claim:

1. In a carburetor, the combination of a body having an air and mixture passage therethrough, a Venturi tube in the passage, a fuel supply means above the body, and a fuel feed tube and a suction tube extending across the Venturi tube between the fuel supply means and the lower wall of the Venturi tube, the Venturi tube having an opening in its lower wall into which the lower end of the fuel feed tube extends to form

therewith a trap, the suction tube being within the fuel feed tube and extending down through the lower Venturi wall, the body wall having an opening therethrough below the Venturi wall opening, a conduit extending between said suction tube and the mixture passage, and a removable plug in said body wall opening and in which the suction tube is mounted at its lower end.

2. In a carburetor, the combination of a body having an air and mixture passage therethrough, a Venturi tube in the passage, a fuel supply means above the body, and a fuel feed tube and a suction tube extending across the Venturi tube between the fuel supply means and the lower wall of the Venturi tube, the Venturi tube having an opening in its lower wall into which the lower end of the fuel feed tube extends to form therewith a trap, the suction tube being within the fuel feed tube and extending down through the lower Venturi wall, the body wall having an opening therethrough below the Venturi wall opening, a conduit extending between said suction tube and the mixture passage, and a removable plug in said body wall opening and in which the suction tube is mounted at its lower end, the Venturi tube being non-integral with the body, and the plug extending up into the wall of the Venturi tube to locate it with reference to the body and the fuel feed tube.

3. In a carburetor, the combination of a body having an air and mixture passage therethrough, a Venturi tube in the passage, a fuel supply means above the body, and a fuel feed tube and a suction tube extending across the Venturi tube between the fuel supply means and the lower wall of the Venturi tube, the Venturi tube having an opening in its lower wall into which the lower end of the fuel feed tube extends, the suction tube being within the fuel feed tube and extending down through the lower Venturi wall, the body wall having an opening therethrough below the Venturi wall opening, a conduit extending between said suction tube and the mixture passage, and a removable plug in said body wall opening and in which the suction tube is mounted at its lower end, the plug extending up through the Venturi tube wall opening and having in its upper end a cup formation surrounding the lower end of the fuel feed tube.

4. In a carburetor, the combination of a body having an air and mixture passage therethrough, a Venturi tube in the passage, a fuel supply means above the body, and a fuel feed tube and a suction tube extending across the Venturi tube between the fuel supply means and the lower wall of the Venturi tube, the Venturi tube having an opening in its lower wall into which the lower end of the fuel feed tube extends, the suction tube being within the fuel feed tube and extending

down through the lower Venturi wall, the body wall having an opening therethrough below the Venturi wall opening, a conduit extending between said suction tube and the mixture passage, and a removable plug in said body wall opening and in which the suction tube is mounted at its lower end, the plug extending up through the Venturi tube wall opening and having in its upper end a cup formation surrounding the lower end of the fuel feed tube, the Venturi tube being non-integral with the body and the upper end of the plug fitting the Venturi wall opening to definitely position the Venturi tube with reference to the body and the fuel feed tube.

In witness that I claim the foregoing I have hereunto subscribed my name this 28th day of January, 1927.

HARRY F. BRYAN.