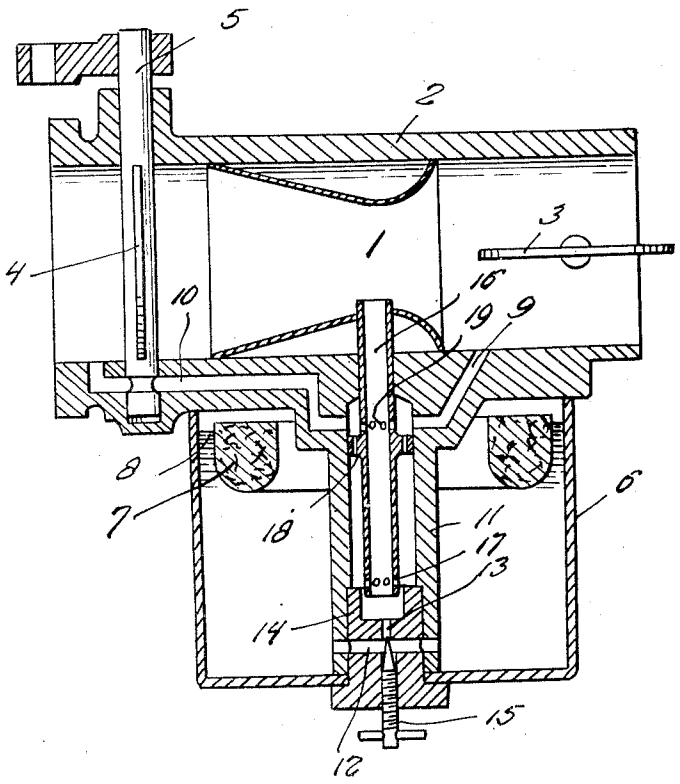
Oct. 29, 1929. O. W. HALING 1,733,730

CARBURETOR

Original Filed Jan. 26, 1926




*Inventor*
Otto W. Haling,

*By* Clarence A. O'Brien

*Attorney*

Patented Oct. 29, 1929 1,733,730

# UNITED STATES PATENT OFFICE

OTTO W. HALING, OF ROCHESTER, MINNESOTA

## CARBURETOR

Application filed January 26, 1926, Serial No. 83,854. Renewed September 10, 1929.

My present invention pertains to carburetors, and contemplates the provision of a carburetor which while simple, compact and inexpensive in construction is possessed of the practical advantages hereinafter explicitly ascribed to it.

With the foregoing in mind, the invention in all of its details will be fully understood from the following description and claim when the same are read in connection with the drawing, accompanying and forming part of this specification, in which:—

The figure is a view in section illustrative of the carburetor constituting the best practical embodiment of my invention of which I am cognizant.

By reference to the drawing, it will be noted that my novel carburetor comprises among other elements a Venturi tube 1 located in a conduit 2 at an intermediate point in the length of the conduit, the said conduit being provided adjacent to its inlet end with a butterfly valve 3, and adjacent to its outlet end with a butterfly valve 4, the latter being carried by a stem 5, and being adapted to be operated in the ordinary well known manner or in any other manner compatible with the purpose of my invention.

Located below the conduit 2 is a fuel bowl 6, and in conjunction with said fuel bowl 6, I employ a float 7 and other means (not shown) for maintaining the height indicated by 8 in the bowl.

The lower portion of the wall of the conduit 2 is comparatively thick and in said wall are formed conduits 9 and 10, the outer portions of which are in communication with the interior of the conduit 2 at opposite sides of the Venturi tube 1. It will also be noticed that the outer end of the conduit 10 is disposed at the engine side of the butterfly valve 4. The inner ends of the said conduits 9 and 10 are in communication with the interior of a well portion 11 disposed in the bowl 6 and pendent from the said comparatively thick portion of the wall of the conduit 2. Communication is effected between the interior of the bowl 6 and the interior of the lower portion of the well 11 through ducts 12 and a central aperture 13 in a chambered plug 14, the said central aperture 13 being subject to regulation in size by a needle valve 15 adapted for manual adjustment at a point below the lower end of the well 11.

Arranged centrally in the well 11 and also arranged in the Venturi tube 1 is a jet tube 16, open at its upper and lower ends, and provided adjacent to its lower end with lateral apertures 17, and also provided slightly below the inner ends of the conduits 9 and 10 with a foraminous circumferential flange 18, and in a plane slightly above the flange 18 with a plurality of minute lateral apertures 19.

In the practical operation of my novel carburetor characterized as described, the throttle valve 4 is almost completely closed when the engine is started, this being resorted to in order to cause a high pressure to build up the engine side of the valve 4, and in the conduit leading to the jet tube 16. At this time air is free to flow through the passage or conduit 9, and hence the air will flow through the tube 16 and apertures 19 to the well. Manifestly sufficient fuel will flow through the conduit 10 which passes the butterfly valve 4 to maintain the engine in operation. And when the elements are properly proportioned a balance of vacuum may be maintained in the well 11 below the flange 18 and in the jet tube 16. This balance of vacuum will assure the well 11 filling when the motor or engine is running light.

Following the subsequent opening of the valve 4, the velocity of the air supplied through the Venturi tube 1 increases, and fuel is caused to rise in the jet tube 16 to a point above the openings 19, and thus a highly adequate vaporizing action will be brought about inasmuch as the fuel will flow through

the apertures 19 into the high vacuum area in direct communication with the inner ends of the conduits 9 and 10. Further opening of the throttle valve 4 will be attended by a quicker rising of the fuel in the jet tube 16, due to the increased suction in the Venturi tube 1, and consequently more fuel will be supplied the portion of the well above the foraminous flange 18 and in immediate communication with the conduits 9 and 10. With the throttle valve 4 fully opened, the pressure in the Venturi tube 1 and the jet tube 16 will exceed that of the conduit 10, and the air passing through the conduit 9 will then enter the jet tube 16. At this time the apertures in the foraminous flange 18 will act as vents for the well 11 and any surplus fuel collected in the portion of the well 11 below flange 18 will be available for use for accelerating purposes when it is picked up by the jet tube 16.

It will be apparent from the foregoing that by virtue of my novel carburetor characterized as described, the jet provision is of such a character that the desired amount of fuel is fed to a motor to suit the demand from the motor under varying conditions, and to bring about atomization of the heavier fuel unit and attain greater fuel economy than is possible with jet constructions extant; and it will also be appreciated that my novel jet construction is well adapted to meet the requirement of general internal combustion engine operation, and that my novel construction is not liable to become clogged and is not liable to become deranged under usual working condition. It will further be noted that my improvement affords what may be properly denominated a balanced vacuum jet construction, calculated to assure adequate atomization of fuel with a view to increasing the power per unit of fuel.

Again it will be manifest that my novel carburetor is calculated to bring about a balance of the high vacuum usually found at the engine side of the throttle valve 4, and that which is usually present in the Venturi tube, whereby the fuel flow through the jet tube is properly influenced to meet the requirements of varying conditions.

Again it will be manifest that the elements in my novel carburetor can be so arranged as to create a stronger suction or higher vacuum in well 11 than in tube 16; or a balance of vacuum between the internal diameter of tube 16 and wall 11, or a fuel emitting from opening 13 at any throttle position, which would throw the accelerating well supply normally building up in well 11 when the high vacuum exists in bypass 10, out of operation.

The successful application of this jet construction depends upon the proper size of outlet to bypass 10, the size of passage 9, the diameter of jet 16 and hole 19 and those through shoulder 18. To decrease the diameter of tube 16 and not decrease the size of opening 19 will build up suction enough to overcome that through openings in shoulder 18 and well 11 will not fill and no desired acceleration supply exists when the throttle 4 changes from an obstructing position to a non-obstructing position. Therefore, I term my jet construction a balanced vacuum jet construction.

Fuel and air flow through openings 19 and opening through the shoulder 18 when a certain vacuum exists. As the suction in Venturi tube 1 increases the jet becomes unbalanced by degrees. An auxiliary air valve or other air resistance device may be placed in the main air inlet conduit without altering the basic action of jet outside of rearrangement of the various elements. The elements are arranged in the order shown, mainly for illustration and as this arrangement constitutes a practical manufacturing assembly. The various elements can be arranged to form two separate wells or other layouts. Observation and gauging the vacuum in the Venturi tube or main air inlet shows that the vacuum is so light in the main air passage in the average carburetor that no adequate vaporization of fuel exists, no matter how complicated or extensive a jetting system is employed, especially at partially open throttle or on light loads. To overcome this condition, I have developed this jet construction and other devices whereby the high vacuum found in front of the throttle on throttle governed motors is applied to secure the advantages and results listed.

I have entered into a detailed description of the construction and relative arrangement of the elements comprised in the present and preferred embodiment of my invention in order to impart a full, clear and exact understanding of the said embodiment. I do not desire, however, to be understood as confining myself to the specific construction and arrangement as disclosed, my invention being defined by my appended claim within the scope of which changes in structure and in arrangement may be made without departing from my invention.

Having thus described my invention, what I claim and desire to secure by Letters-Patent, is:—

A carburetor comprising a main conduit, a throttle valve, a Venturi tube in the main conduit and in front of said throttle valve, a mixing chamber located below and spaced from the main conduit, a well located below said mixing chamber, a conduit in the wall of the main conduit and extending between the interior of the main conduit at a point in front of the Venturi tube and the forward side of the mixing chamber, a second conduit in the wall of the main conduit and extending between the rear side of the mixing chamber and the main conduit and having its eduction end located at the engine side or in rear

of the throttle valve, means for conducting fuel from a source of supply to the lower end of the well, and a jet tube arranged in the mixing chamber and in the well and having apertures in direct communication with said mixing chamber and the lower portion of the well respectively; said tube extending through the lower portion of the wall of the main conduit and into the Venturi tube and having its upper end in communication with the interior of said Venturi tube.

In testimony whereof, I have affixed my signature.

OTTO W. HALING.