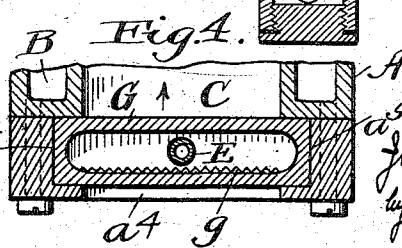
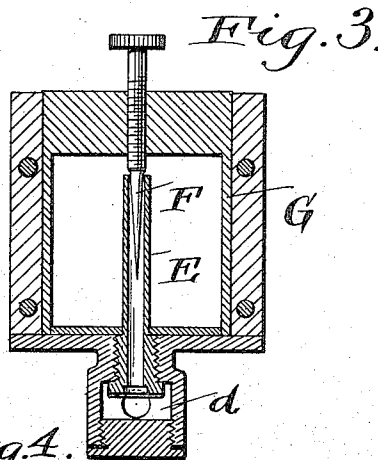
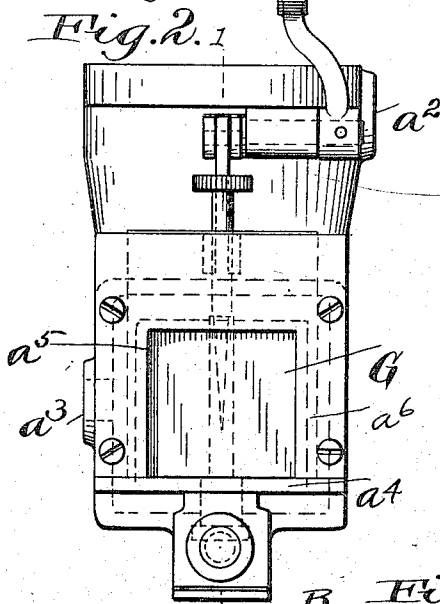
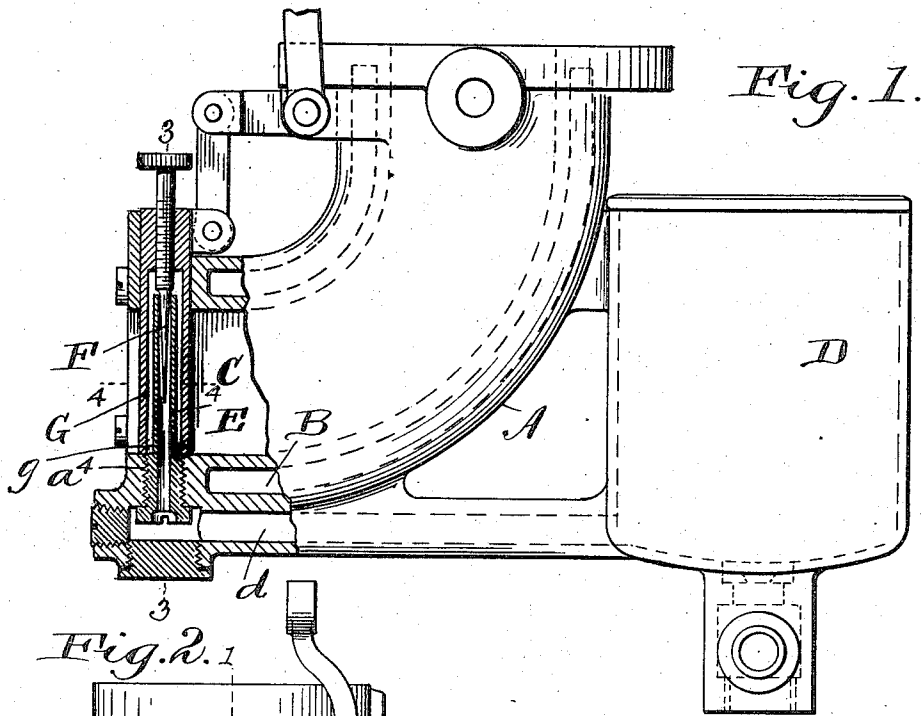


J. B. ENTZ.
CARBURETER.
APPLICATION FILED JUNE 2, 1913.

1,151,578.

Patented Aug. 31, 1915.



Witnesses
E. B. Gilchrist
L. J. Porter

Inventor
Justus B. Entz
by Shurston & Lewis
Attorneys

UNITED STATES PATENT OFFICE.

JUSTUS B. ENTZ, OF CLEVELAND, OHIO, ASSIGNOR TO THE WHITE COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

CARBURETER.

1,151,578.

Specification of Letters Patent. Patented Aug. 31, 1915.

Application filed June 2, 1913. Serial No. 771,130.

To all whom it may concern:

Be it known that I, JUSTUS B. ENTZ, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Carbureters, of which the following is a full, clear, and exact description.

This invention relates to the kind of carbureters whose function is to vaporize liquid fuel and form a mixture of the produced vapor and air for use in internal combustion engines,—especially such as are employed on automobiles.

The particular advantages sought and realized by the present invention are to produce a thorough vaporization of the fuel, and a thorough mixture of the produced vapor and air, and the maintenance of the proportion of air and vapor during all of the varying conditions of use, due to changes in load or speed; and to do this with a structure which is simple and cheap, and capable of easy and accurate adjustment to suit different temperature conditions.

The invention consists in the construction and combination of parts shown in the drawing and hereinafter described and definitely pointed out in the appended claims.

In the drawing, Figure 1 is a side elevation partly sectioned in the plane indicated by line 1—1 on Fig. 2. Fig. 2 is a front elevation of the carbureter. Fig. 3 is a sectional view in the plane indicated by line 3—3 on Fig. 1; and Fig. 4 is a sectional plan view in the plane indicated by line 4—4 on Fig. 1.

Referring to the parts by letters, A represents the mixing chamber which is preferably curved through an arc of about ninety degrees, so that its lower inlet end is horizontal and its upper discharge end is vertical. The upper end of this chamber is to be attached to the inlet manifold of the engine. In the walls of the mixing chamber is the cored out water jacket space B through which water heated by the engine may circulate in order to heat said walls. The water may be admitted through the opening a^2 and discharged through the opening a^3 .

It will be observed that the construction is such that the lower end of this water jacket is in close juxtaposition to the fuel inlet duct d and helps to heat the liquid fuel, as well as the vapor in the mixing chamber; and is also so close to the throttled inlet at the front end of the mixing chamber that the boundary walls of said inlet will be well heated.

D represents the constant level fuel reservoir, of ordinary construction; and d a fuel duct leading therefrom to the fuel nozzle E. This nozzle stands in a vertical position and its lower end is screwed through an extension a^4 of the lower wall of the front end of the mixing chamber tube A, so as to communicate with this duct.

A hollow gate like throttle valve G is vertically movable in suitable guide-ways a^5 across the front end of the tube A, so that when the lower end of said throttle valve is in engagement with the extension a^4 it entirely closes the inlet end of said tube A. By raising this slide valve the area of the throttled air inlet opening is increased, and by lowering it it is decreased. The boundary walls of the throttled air inlet are formed by the extension a^4 , the throttle valve and the vertical guide gibbs a^6 . The nozzle E projects into this hollow throttle valve through a hole in the bottom thereof. In the bottom of this hollow throttle valve are a plurality of small fuel discharging holes g , whose combined area must always be equal to or greater than the area of the discharge from the fuel nozzle E.

A taper valve rod F is screwed through the upper end of the throttle valve and projects into the nozzle E and serves as a valve therefor. When the throttle valve G is raised to enlarge the throttled air inlet, this valve rod F is likewise raised so as to proportionately enlarge the area of the fuel delivery outlet of said nozzle. The size of the nozzle opening and the size and shape of this fuel valve rod is such that at all times the effective area of the fuel discharge opening should be about one four-hundredth of the area of the throttled air inlet opening,—that is to say, the opening created by the

raising of the throttle valve. It will be understood that this proportion is not absolute. Different grades of fuel require different proportions. But with the grade of gasoline now in common use the stated proportions are about right. Moreover, the valve F is adjustable because it may be screwed in or out, and therefore the described construction may easily be adjusted to give the best results for different fuels and for different temperature and other weather conditions. When the fuel valve is properly adjusted and properly tapered the ratio between the effective area of the fuel discharge from the nozzle and the effective area of the throttle air inlet will remain substantially the same, whether the throttle valve be opened much or little.

From the foregoing it will be seen that the fuel is delivered directly into the throttle air inlet,—that is to say, into the most restricted part of the conduit through which the air and mixture flows; and through a plurality of openings in one of the boundary walls of this restricted opening. The fuel delivered into this throttle air inlet opening is always properly proportioned to the air flowing in; and, because the fuel is delivered into said throttle air opening through a plurality of small openings the effect of the air is to substantially nebulize the fuel. That is to say while the carbureter is in operation the fuel can be seen going into the mixing chamber apparently in the form which resembles a dense fog, rather than a spray.

Having described my invention, I claim:

1. In a carbureter, the combination of a mixing chamber, a hollow throttle valve therefor having a plurality of small fuel delivery holes through the bottom wall of said hollow throttle valve, which wall is that which by its movement toward and from the opposed wall of the mixing chamber varies the size of the air inlet to said chamber, a constant level fuel reservoir, a nozzle connected with said fuel reservoir and extended into said hollow throttle valve and having its open upper end within the throttle valve and above the fuel level in said fuel reservoir, a valve operatively connected with said throttle for varying the discharge opening of said nozzle, and manually operable mechanism for opening and closing said throttle valve.

2. In a carbureter, the combination of a mixing chamber having a substantially horizontal inlet end, a vertically movable hollow throttle valve movably mounted at the inlet end of said mixing chamber and moving downward toward its seat, said throttle valve having through its very bottom wall a plurality of small fuel discharge openings, a constant level fuel reservoir, a nozzle connected with said fuel reservoir and pro-

jecting vertically into said hollow throttle valve through a hole in its lower end, which said nozzle has its upper discharge end in a plane above the fuel level in said reservoir, a tapered valve connected with said throttle and projecting into said nozzle, and manually operable mechanism for opening and closing said throttle valve.

3. In a carbureter, the combination of a mixing chamber having in its sides and adjacent to its inlet end, two parallel vertical guideways, and having a substantially horizontal bottom wall at said inlet end, a hollow rectangular throttle valve movable in said guideways and adapted at its lower end to contact with the horizontal bottom wall of said mixing chamber, the said horizontal lower edge of said valve having through it a plurality of small fuel discharge openings, a nozzle fixed to the bottom wall of said mixing chamber and projecting therefrom upward through a hole in the bottom of the throttle valve, a constant level fuel chamber with which said nozzle communicates, a tapered valve adjustably fixed to the upper end of said throttle and projected into the open upper end of the nozzle, and manually operable means for raising and lowering said throttle.

4. In a carbureter, the combination of a mixing chamber having a rectangular inlet end whose lower boundary wall is horizontal, a vertically movable hollow slide valve mounted in said rectangular inlet end and having a horizontal lower edge which engages said horizontal boundary wall when the valve is closed, which lower edge has through it a plurality of fuel jet openings and a hole for the passage of a fuel nozzle, a fuel nozzle fixed to said lower boundary wall and projecting upward therefrom into said hollow valve through the said hole in its lower edge, means connecting said fuel nozzle with the fuel supply, a tapered needle valve adjustably secured to the top of said valve and projecting therefrom downward into the upper end of the fuel nozzle, and manually operated means for raising and lowering said valve.

5. In a carbureter, the combination of a tubular mixing chamber adapted to be secured at one end to the inlet manifold of an engine and having a rectangular opening of which two boundary walls are horizontal and two are vertical, a fuel nozzle fixed to and projecting upward from the lower horizontal wall of said opening, means connecting said nozzle with a source of fuel supply, a hollow rectangular valve slidably mounted in guide grooves in the side walls of said rectangular opening and having a lower horizontal end through which are a plurality of fuel jet openings and a hole through which the fuel nozzle passes and in which it substantially fits, a needle valve

which screws down through the upper member of said valve and projects into the open upper end of the fuel nozzle, manually operable means for raising and lowering
5 said valve, and removable guide gibbs for holding the valves in said guide grooves.
In testimony whereof, I hereunto affix

my signature in the presence of two witnesses.

JUSTUS B. ENTZ.

Witnesses:

E. B. GILCHRIST,
E. L. THURSTON.