

G. M. HOLLEY.

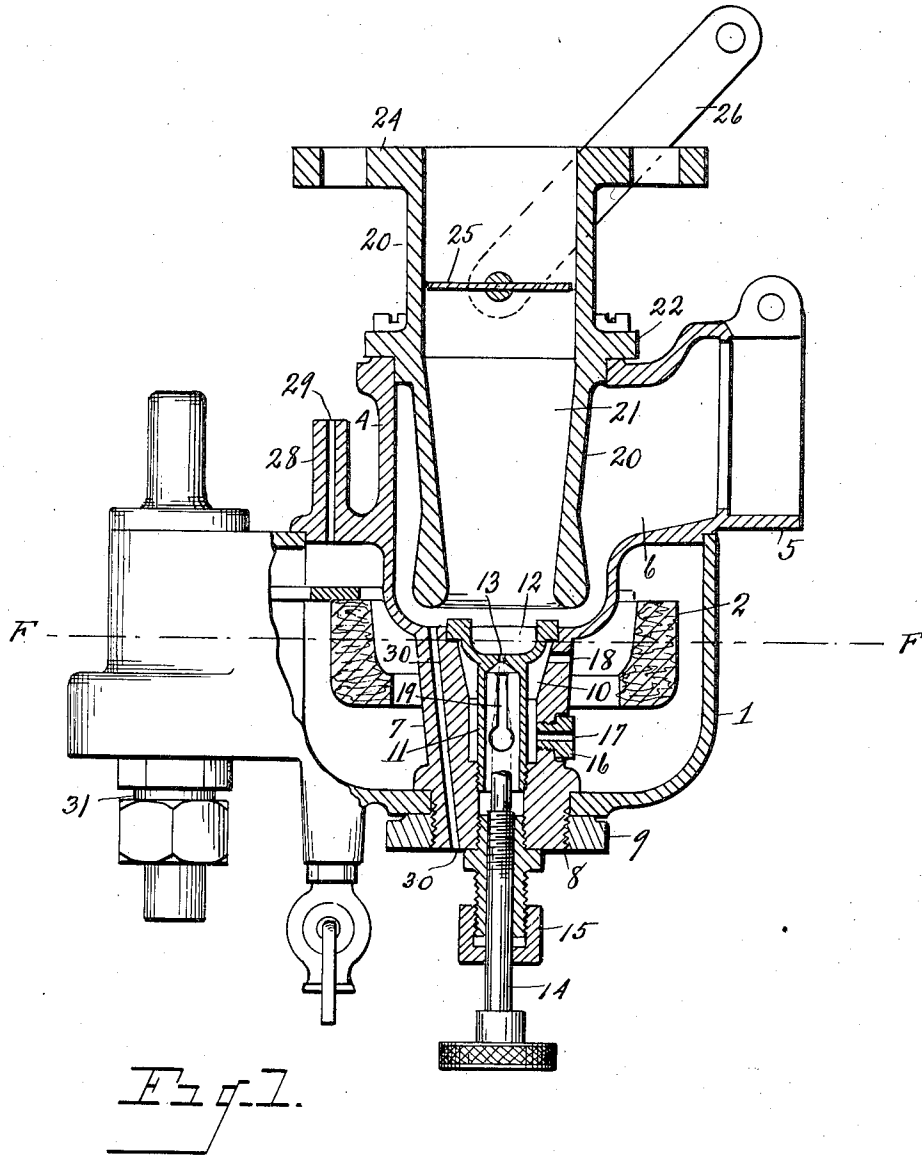
CARBURETER.

APPLICATION FILED JULY 22, 1911.

1,121,630.

Patented Dec. 22, 1914.

2 SHEETS-SHEET 1.



Witnesses

O. B. Baenziger.
J. Otto Baenziger

George M. Holley

E. S. Wheeler
Attorney.

G. M. HOLLEY.
CARBURETER.
APPLICATION FILED JULY 22, 1911.

1,121,630.

Patented Dec. 22, 1914.
2 SHEETS—SHEET 2.

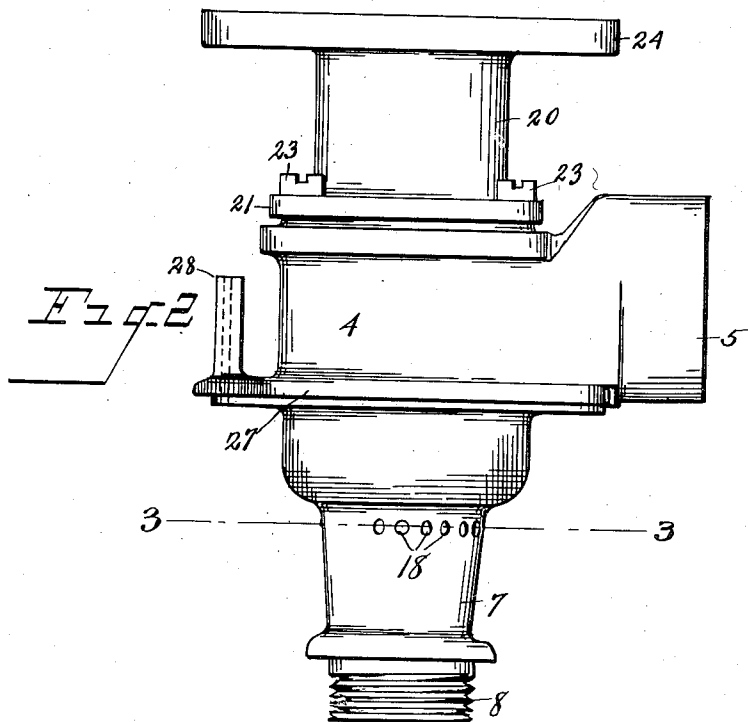
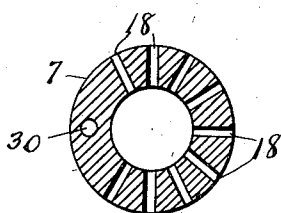


Fig. 2.

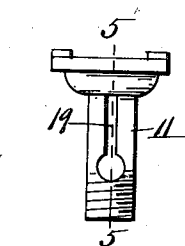


Fig. 3.

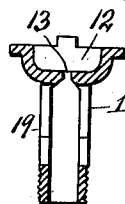


Fig. 4.

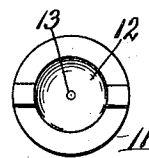


Fig. 5.

Witnesses

O. B. Baenziger
J. Otto Baenziger

George M. Holley
E. S. Wheeler
Attorney.

UNITED STATES PATENT OFFICE.

GEORGE M. HOLLEY, OF DETROIT, MICHIGAN.

CARBURETER.

1,121,630.

Specification of Letters Patent.

Patented Dec. 22, 1914.

Application filed July 22, 1911. Serial No. 639,989.

To all whom it may concern:

Be it known that I, GEORGE M. HOLLEY, a citizen of the United States, residing at Detroit, in the county of Wayne, State of Michigan, have invented certain new and useful Improvements in Carbureters; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in carbureters for internal combustion engines, and consists in the construction and arrangement of parts herein-after more fully set forth and pointed out in the claims.

The object of the invention is to provide a carbureter of such construction as to enable it to automatically adjust itself according to speed and load so as to afford a rich mixture for starting and at slow speeds, to insure reliability; and a weaker mixture at high speeds, to assure higher efficiency and prevent overheating the motor when speeding, such automatic regulation of the carbureter being effected without the employment of moving parts which are liable to become worn from use and disarranged because of non-expert manipulation.

The invention further contemplates such an arrangement of parts as will compel all of the air entering the carbureter at all speeds of the motor to pass the source of fuel supply, resulting in a better balanced and more uniform mixture.

The above object is attained by the structure illustrated in the accompanying drawings, in which:—

Figure 1 is a vertical section through a carbureter showing one embodiment of my invention, some parts appearing in elevation. Fig. 2 is an elevation of the carbureter with the fuel reservoir detached. Fig. 3 is a transverse section as on line 3—3 of Fig. 2. Fig. 4 is an elevation of the fuel nozzle. Fig. 5 is a view of said nozzle in longitudinal section, as on line 5—5 of Fig. 4. Fig. 6 is a plan view of said nozzle.

Referring to the characters of reference, 1 designates the fuel reservoir in which is located a float 2 connected in the usual manner with the gasoline supply valve, not

shown, to normally maintain the gasoline in said reservoir at a predetermined level, as indicated by dotted line F—F in Fig. 1.

Seated upon and closing the top of the gasoline reservoir is a tubular fitting 4 carrying the air intake pipe 5, which communicates with the air passage 6 within said fitting. Depending from the lower end of the fitting 4 is a stem 7 which passes freely through the float 2 and through the bottom of the gasoline reservoir, the projecting lower end of said stem being threaded as at 8 to receive the nut 9 which screws thereon against the bottom of said reservoir to detachably couple said parts together. The stem 7 is hollow, forming therein a fuel chamber 10. Seated in said fuel chamber is a gasoline feed nozzle 11, said nozzle being spaced from the wall of said chamber throughout the greater portion of its length. Formed at the upper end of the nozzle 11 is a cup 12 for the hydrocarbon fuel. Connecting the body portion of the nozzle with said cup through the bottom thereof is a fuel supply port 13 in which the controlling needle valve 14 is adapted to seat, said valve passing upwardly through a suitable stuffing box 15 and through said nozzle. As illustrated herein the point of the valve which seats in the port 13 is broken away but its function will be well understood.

Connecting the fuel space of the reservoir with the fuel chamber 10, in which the nozzle is seated, is a plug 16 having a limiting supply port 17 therethrough which allows only a predetermined flow of fuel. An additional source of fuel supply to the chamber 10 is provided for by a plurality of radiately disposed holes 18 formed in the tubular stem 7 near its upper end, which are normally submerged or below the fuel level of the reservoir as clearly shown in Fig. 1. To allow fuel to flow into the nozzle 11 it is slotted on opposite sides as shown at 19.

Depending into the air passage 6 and extending downwardly into proximity with the fuel cup of the feed nozzle is a carbureting tube 20 having a passage 21 there-through for the explosive mixture. The tube 20 near its longitudinal center is provided with a laterally projecting exterior flange 22 which rests upon the margin of the opening in the fitting 4, through which said tube passes, said flange being secured to the marginal portion of said opening by means

of screws 23. At the upper end of the tube 20 is a flanged coupling 24 for attachment to a manifold or over the intake port of an engine to place the mixing passage 21 through said tube in communication with said port. Within the tube 20 is a throttle valve 25 adapted to be controlled by the lever 26.

Formed upon the flange 27 of the fitting 4 is a vent tube 28, having a passage 29 therethrough which communicates with the fuel reservoir above the gasoline lever therein. Formed through the stem 7 is an overflow passage 30 which communicates with the bottom of the air passage 6 to allow any excessive accumulation of gasoline to escape from the carbureter. Attached to the carbureter is the usual fitting 31 for connection of the fuel supply pipe.

When the motor is at rest the level of the fuel in the reservoir is at the point indicated by dotted line F—F in Fig. 1, at which point of fuel level a quantity of fuel is maintained in the cup 12 of the fuel nozzle so that when starting the engine a rich mixture is provided for, the rush of air induced by the inspirations of the engine picking up the fuel from said cup and carrying it into the engine cylinder where it is exploded in the usual manner to drive the motor. Because of the fact that the fuel may flow freely through the ports 18 into the chamber 10 such a volume of fuel is supplied to said chamber as to maintain a constant supply of fuel in the cup of the nozzle when starting the engine, or when it is turning at a slow speed, insuring a rich mixture which has been found best for starting or when running slowly under a heavy load. As the motor increases its speed the vacuum created by its inspirations rapidly increases so that under ordinary conditions the mixture which is supplied to the engine increases in richness as the speed of the motor is accelerated, resulting in overheating and low efficiency. This objection is overcome in the construction herein shown because of the fact that when the motor is turning at a high speed the fuel is drawn so rapidly through the nozzle as to quickly cause the fuel level in the reservoir to fall to a point on a line with or below said holes or ports 18, at which time instead of drawing gasoline only therethrough, the inspirations of the engine will draw air also which is supplied through the vent opening 29, when both air and gasoline will pass from the nozzle into the mixing tube 21, thereby cutting down the fuel supply and increasing the volume of air, resulting in a lighter mixture in which the fuel is thoroughly vaporized because of the commingling of air therewith within the nozzle. When the fuel level of the reservoir shall have dropped to the point below or on a level with the ports

18 the main supply of fuel to the nozzle is through port 17, the capacity of which is such as to afford a sufficient supply of fuel but not to render the mixture over-rich. When the speed of the engine decreases the gasoline level will rise so as to partially submerge the holes or ports 18, thereby increasing the richness of the mixture, and at a still lower speed the ports will become entirely submerged at which time only fuel will pass therethrough giving a mixture greatly increased in richness as desired for the slower speed at which the motor is turning.

It has been demonstrated by actual practice that for motorcar work a rich mixture is more reliable for starting, slow running, and when pulling a heavy load, and that at speeds above 10 miles an hour a weaker mixture is more economical in the matter of fuel consumption, heats the motor less, and causes less carbonization in the cylinders. The carbureter herein described automatically adjusts itself to the varying conditions above stated without the necessity of manual adjustment or the employment of any movable parts which require manual or automatic adjustment so that when the carbureter is once properly adjusted it will remain in perfect working condition under all circumstances.

The fuel supply at low speeds is regulated and controlled by the needle valve 14, at high speeds by the limiting plug 16, and at intermediate speeds is automatically controlled by the fuel level rising above or falling below the holes or ports 18 and thus rendering the mixture richer or weaker accordingly, as the speed of the motor varies.

Having thus fully set forth my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A carbureter having a mixture passage, a fuel nozzle communicating with said passage through a port of limited capacity, auxiliary ports communicating laterally with the interior of the said nozzle, a fuel reservoir surrounding the said nozzle, a fuel supply, and means for normally causing the fuel to maintain a level above the said first named port when the engine is at rest.

2. A carbureter having a mixture passage, a fuel nozzle communicating with the said passage through a port of limited capacity, auxiliary ports communicating with the interior of the said nozzle, a second port communicating with the interior of the said nozzle and located below the first named auxiliary ports, a fuel reservoir surrounding the said nozzle, a fuel supply, and means for causing the fuel in the said fuel reservoir to normally maintain a level above the first named port.

3. A carbureter having a mixture passage, a fuel nozzle communicating with the

said passage and having a port of limited capacity, a sleeve forming a chamber about the said nozzle, ports extending the length of the said nozzle permitting communication between the said chamber and the interior of the said nozzle, a fuel reservoir surrounding the said sleeve, ports located in said sleeve near the upper end of the said nozzle and communicating with the said chamber, ports in said sleeve communicating with the said chamber at a point near the base of the said nozzle, and a fuel reservoir surrounding the said sleeve.

4. A carbureter having a mixture passage, a fuel reservoir, a hollow member centrally disposed within the reservoir, a fuel nozzle disposed within said hollow member, said nozzle having a central discharge opening and having a longitudinal opening in the vertical wall thereof, the wall of the hollow member having two ports therein communicating with the nozzle, one port being of fixed capacity and the other port being located at a point to be covered by the fuel when at the normal level but uncovered

when the fuel is at a lower level, and means for regulating the flow of fuel through the nozzle.

5. A carbureter having a mixture passage, a fuel nozzle communicating with said passage, said nozzle having a recessed enlarged end and having a port of limited capacity communicating with said recess, a sleeve surrounding said nozzle forming a chamber thereabout, a communicating opening between said chamber and the interior of said nozzle, a longitudinal overflow passage in said sleeve and laterally extending ports located in said sleeve and communicating with said chamber, a fuel reservoir surrounding said sleeve, and means for normally causing the fuel to maintain a level within the recessed enlarged end of said nozzle.

In testimony whereof, I sign this specification in the presence of two witnesses.

GEORGE M. HOLLEY.

Witnesses:

MARIE BROESAMLE,
J. OTTO BAENZIGER.