W. O. CHASE.

CARBURETER.

APPLICATION FILED MAY 18, 1916.

1,394,536. Patented Oct. 25, 1921.

Fig. 1.

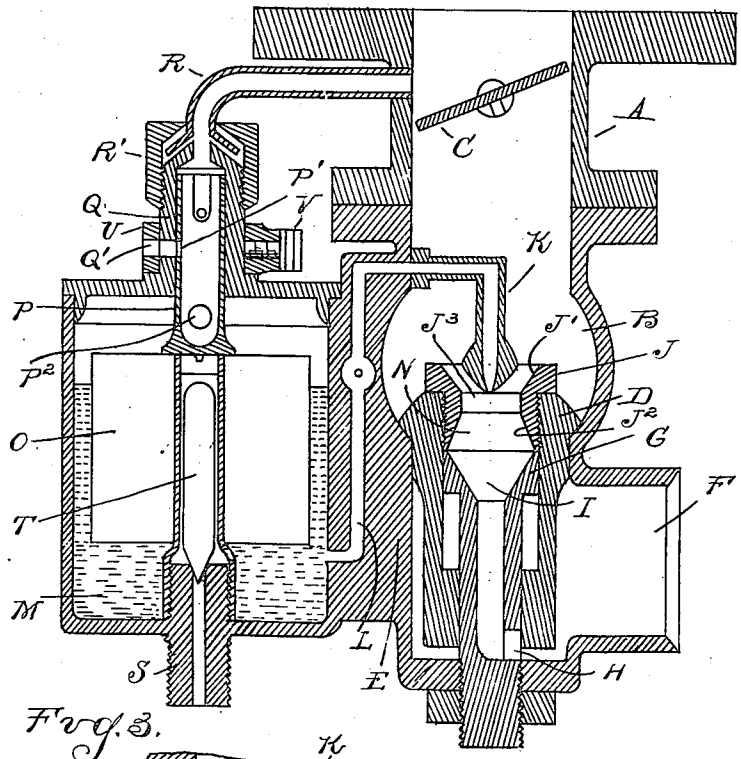


Fig. 2.

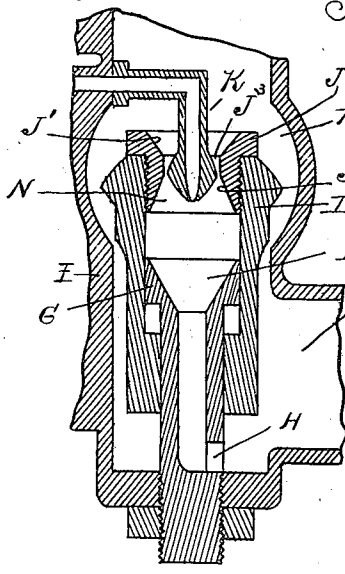
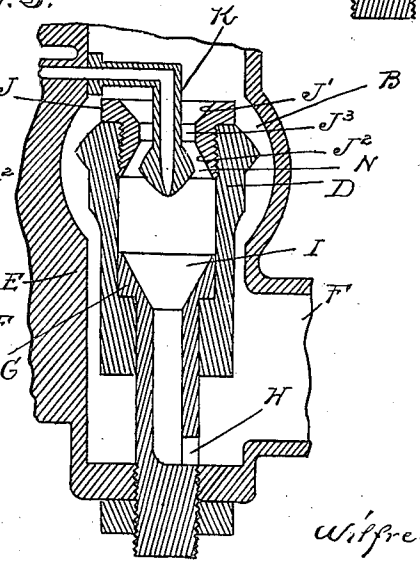


Fig. 3.



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CARBURETER.

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To all whom it may concern:

Be it known that I, WILFRED O. CHASE, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Carbureters, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to carbureters and comprises various novel features as hereinafter set forth.

In the drawings:

Figure 1 is a vertical central section through the carbureter; and

Figs. 2 and 3 are similar views showing different positions of adjustment.

A is the casing containing a mixing chamber B, preferably of spherical form, with the throttle valve C located thereabove. D is an automatic air valve located in a portion E of the casing below the mixing chamber and adapted to be lifted from its seat by the pressure of air entering through the opening F. The valve D is hollow and is sleeved upon a guide member G, which also forms an aspirating tube, having the lateral opening H at its lower end communicating with the air inlet F. At its upper end the member G has a flared opening I, while the valve D is provided at its upper end with a bushing member J flared at its opposite ends, as shown at J′ and J². H is a liquid fuel discharge nozzle, which extends downward centrally of the casing A in alinement with the valve member D and guide member G. This nozzle is connected by a passage L with a liquid fuel reservoir M, the level of the fuel in said reservoir being maintained in substantially the same plane as the discharge end of the nozzle K.

With the parts as thus far described, the normal position when not in operation is as shown in Fig. 1,—where the nozzle K is in the flaring mouth J′ of the bushing J, leaving a conical air passage surrounding said nozzle, connecting the hollow space within the valve with the mixing chamber, through which air may be drawn in when the engine is started. Thus the velocity of air passing through the valve D and about the tapering nozzle K upon the initial suction stroke of the engine will operate as an ejector to draw liquid fuel from the reservoir M and discharge it downwardly in the air current. The opposition of the downward discharge of the liquid and the upwardly-moving air current will cause a thorough commingling, and as the air passage surrounding the nozzle is comparatively free from restriction a relatively large volume of oil will be initially drawn, operating as an automatic primer. As soon as the suction is established the air pressure operating upon the valve D will raise it from its seat, lifting it to a point where the nozzle K is in the restricted portion J³ intermediate the flaring portions J′ and J² of the bushing J. When the valve is in this position it will be lifted from its seat to a point where a portion of smaller diameter is opposite the seat, thereby opening a peripheral air passage and admitting auxiliary air into the chamber B. This in turn will lessen the upward pressure upon the valve, so that it will float in this position as long as the throttle C is in closed or idling position,—with a consequence that the air passage through the valve and hollow guide G will be restricted to the minimum. The parts will remain in this position until the throttle is opened, whereupon the increased suction will lift the valve D still higher to a point where the nozzle K is below the point of greatest restriction and is an enlarged chamber N therebeneath. The velocity of the air through this passage is not, however, lessened,—as the opening of the throttle produces a greater demand, so that the effect is to increase the discharge of the liquid and to proportionately increase the volume of air passing through the mixing chamber. Furthermore, the air which passes through the hollow guide will be deflected by the oppositely-flaring walls J′ and J², while the shape of the nozzle K which tapers oppositely from its point of greatest diameter will also deflect the air. This will produce a thorough commingling of the liquid with the air passing through the valve, while the air passing around the valve into the spherical chamber B will be deflected and commingled with the rich mixture from within the valve, making a mixture of the proper richness for entering the explosion chamber.

It has been stated that the level of the liquid within the chamber N is maintained

substantially constant. This may be accomplished by an ordinary float-valve, but preferably as shown the liquid is periodically drawn into the chamber by suction and the level is maintained by controlling the suction. As specifically shown, O is a float within the chamber N, which has an upwardly extending tubular stem P fitting within a tubular casing Q. R is a suction conduit, preferably connected to the casing A above the throttle valve C and coupled at its opposite end to the casing Q, as by means of the coupling R'. The casing Q and tubular stem P are provided with ports Q' and P' adapted to come into registration in one position of adjustment of the float O, and when thus registered an external air vent is opened to the interior of the tubular stem of sufficient area to neutralize the suction produced by the conduit R. On the other hand, if the float O is lowered by the dropping of the liquid level in the chamber N, this will throw the ports Q' and P' out of registration, which will increase the vacuum within the hollow stem P and through the port P^2 therein will communicate the suction to the chamber N. As a consequence additional liquid will be drawn up into said chamber through the supply conduit S which is connected to a supply tank (not shown) located at a lower level. A check-valve T, preferably arranged centrally within the float O, serves to close the passage S to prevent return of the liquid when the suction is relieved.

From the description just given, it will be understood that a substantially constant level of liquid is maintained in the chamber N, while at the same time the supply tank is located at a lower level. Thus the one device, which takes the place of the ordinary float valve, performs the double function of maintaining a constant level of the liquid and of periodically renewing the liquid from a source of supply at a lower level.

In order to adjust the restriction of the registering ports Q' and P' a ported sleeve U may be placed around the casing Q and adjustably secured by a set-screw V. Thus by shifting the position of this sleeve a greater or lesser restriction of the air vent passage is obtained.

What I claim as my invention is:—

1. In a carbureter, the combination with an air suction conduit, of a downturned liquid fuel discharge nozzle therein, and a hollow air valve below said nozzle adapted to be lifted by the air pressure and coacting with the nozzle to vary the restriction of the air passage about said nozzle.

2. In a carbureter, the combination with an air suction conduit, of a downturned liquid fuel discharge nozzle therein, an air valve in said conduit beneath said nozzle adapted to be lifted by the air pressure, said valve being hollow and having a variable open cross section at different points to vary the restriction of air passing around said nozzle according to the lifting of the valve.

3. In a carbureter, the combination with an air suction conduit, of a downturned nozzle therein for discharging the liquid fuel, a hollow air valve beneath said nozzle having an enlarged chamber therein with a point of restriction between the same and the open upper end, said valve being adapted to be lifted by air pressure to first register said nozzle with the point of greatest restriction and upon further lifting to insert the nozzle within said enlarged chamber.

4. In a carbureter, the combination with an air suction conduit, of a liquid fuel discharge nozzle arranged to extend downward in said conduit, a hollow air valve having a passage therethrough enlarged at one point and restricted adjacent to its upper end, said valve being adapted to be lifted by air pressure to first register the nozzle with the restricted portion and upon further lifting to insert the nozzle within the enlarged chamber, and a throttle valve for controlling air pressure on said automatic valve.

5. In a carbureter, the combination with an air suction conduit having a bulbular enlargement therein and a throttle valve above said enlargement, of a liquid fuel discharge nozzle extending centrally downward in said conduit with its discharge end arranged centrally of said bulbular enlargement, an air-valve seated at the lower end of said bulbular enlargement and controlling the entrance of air thereto, said valve having a passage therethrough forming an enlarged chamber at one point and restricted adjacent to its mouth, the valve when seated being below said liquid discharge nozzle and being adapted to be lifted by air pressure to register said nozzle with the restricted portion of the passage when said engine is idling and to insert the nozzle within the enlarged chamber when the throttle is opened.

6. In a carbureter, the combination with an air suction conduit having a bulbular enlargement, of a throttle valve in said conduit above said enlargement, a liquid discharge nozzle extending centrally downward in said conduit with its discharge end centrally arranged in said bulbular enlargement, an air valve seated at the lower end of said bulbular enlargement, a guide stem on which said valve is sleeved having a passage therethrough communicating with an enlarged chamber in said valve, said valve having also a restriction above said enlarged chamber and being adapted to be lifted by air pressure to register said nozzle with said restriction when the engine is idling and insert the nozzle within the enlarged chamber when the throttle is further opened.

7. In a carbureter, the combination with an air suction conduit, of a liquid fuel nozzle discharging within said conduit toward the inlet thereof and a valve seated in said conduit and adapted to be unseated by air pressure, said valve having a passage therethrough into which said nozzle discharges and coacting with its seat to control a flow of air around said valve and coacting with said nozzle to variably restrict the passage through the valve.

8. In a carbureter, the combination with an air suction conduit, of a liquid fuel nozzle discharging within said conduit toward the inlet thereof, a valve seated in said conduit having a passage therethrough into which said nozzle discharges, said valve coacting with its seat to control a flow of air around said valve and with said nozzle to variably restrict the passage therein, and a guide member for the valve formed with a passage having an opening thereinto from the air conduit and having communication with the passage through said valve.

9. In a carbureter, the combination with an air suction conduit, of a liquid fuel nozzle discharging within said conduit toward the inlet thereof, a valve seated in said conduit having a passage therethrough into which said nozzle discharges and a guide member for the valve formed with a passage having an opening thereinto from said air conduit and having communication with the passage through said valve, said valve coacting with its seat to control a flow of air around said valve and coacting with said nozzle to variably restrict a passage through the valve and coacting with the guide member to restrict the inlet thereinto in a certain position of the valve.

10. In a carbureter, the combination with an air suction conduit, of a liquid fuel nozzle discharging within said conduit toward the inlet thereof, a member displaceable axially of said nozzle by air pressure, said member having an air passage therethrough, a guide member for the displaceable member having an air passage continuous with that in the displaceable member and having an air inlet, said displaceable member coacting with the nozzle to variably restrict the passage thereinto and coacting with the guide member in one of its positions to restrict the air inlet of the same.

11. In a carbureter, the combination with an air suction conduit, of a liquid fuel nozzle discharging thereinto toward the inlet thereof, said nozzle having an exterior enlargement, an air valve seated in said conduit having a passage therethrough into which the nozzle discharges, said passage having a point of restriction, the valve being adapted to be displaced by air pressure to first register the enlargement of the nozzle with the point of restriction of said passage and to subsequently shift the point of restriction beyond the enlargement of the nozzle.

12. In a carbureter, the combination with an air suction conduit, of a liquid fuel nozzle discharging within said conduit, a valve seated in said conduit having a passage therethrough co-axial with said nozzle, and a guide member for the valve formed with a passage communicating with the passage in the valve and having an inlet thereto from said air conduit, said valve having a portion controlling said inlet.

13. In a carbureter, the combination with an air suction conduit having a bulbular enlargement, of a throttle valve in said conduit above said enlargement, a liquid discharge nozzle extending centrally downward in said conduit with its discharge end centrally arranged in said bulbular enlargement, an air valve seated at the lower end of said enlargement, an air tube below said nozzle communicating with an enlarged chamber in said valve, said valve having also a restriction above said enlarged chamber and being adapted to be lifted by air pressure to register said nozzle with said restriction when the engine is idling and to insert the nozzle within the enlarged chamber when the throttle is further opened.

14. In a carbureter, the combination with an air suction conduit, of a liquid fuel nozzle discharging within said conduit toward the inlet thereof, a valve seated in said conduit having a passage therethrough into which said nozzle discharges, said valve coacting with its seat to control a flow of air around said valve and with said nozzle to variably restrict the passage therein, and an air tube below the nozzle having an opening thereinto from the air conduit and having communication with the passage through said valve.

15. In a carbureter, the combination with an air suction conduit, of a liquid fuel nozzle discharging within said conduit toward the inlet thereof, a valve seated in said conduit having a passage therethrough into which said nozzle discharges, and an air tube having an opening thereinto from said air conduit and having communication with the passage through said valve, said valve coacting with its seat to control a flow of air around said valve by passing said air tube and coacting with the air tube to restrict the inlet thereto in a certain position of the valve.

16. In a carbureter, the combination with an air suction conduit, of a liquid fuel nozzle discharging within said conduit toward the inlet thereof, a member displaceable axially of said nozzle by air pressure, said member having an air passage therethrough, an air tube disposed axially of the nozzle having its interior passage continuous with that in said displaceable member and having an air

inlet, said displaceable member coacting with the nozzle to variably restrict the passage around said nozzle, and coacting with said air tube in one of its positions to restrict the air inlet of the same.

17. In a carbureter, the combination with an air suction conduit and a nozzle discharging liquid fuel in said conduit, of an automatic valve, adapted to be unseated by air pressure, said valve having a passage therethrough providing for a flow of air to the suction conduit directly counter to the discharge of liquid fuel, and admitting a further supply of air to said conduit, when unseated, additional to the flow through said passage.

In testimony whereof I affix my signature in presence of two witnesses.

WILFRED O. CHASE.

Witnesses:
HENRIETTA E. BOWMAN,
JAMES P. BARRY.