L. H. RHOADS.

CARBURETER.

APPLICATION FILED JUNE 9, 1916.

1,305,744.

Patented June 3, 1919.

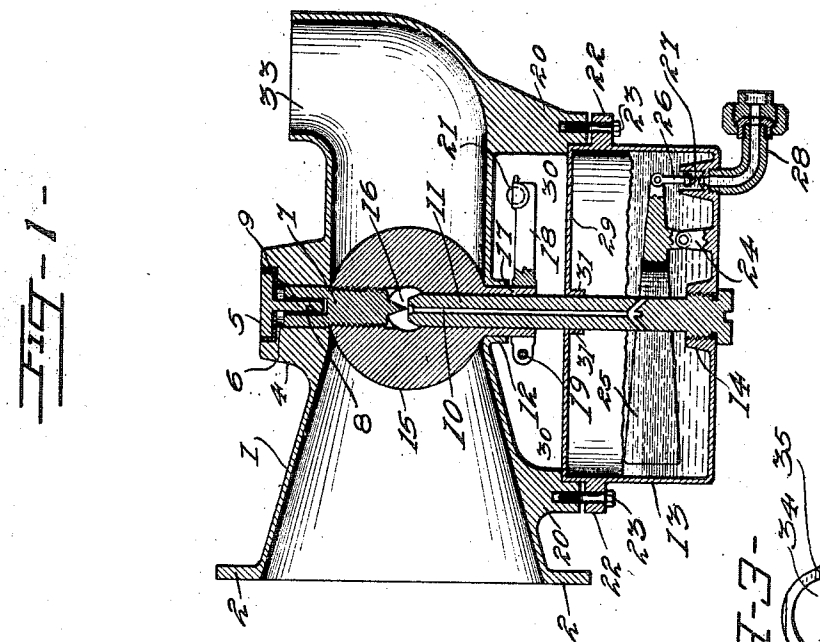

Fig. 1.

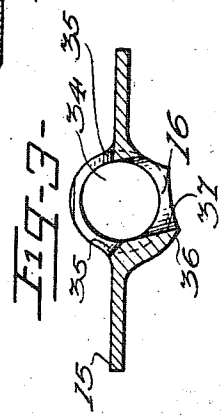

Fig. 3.

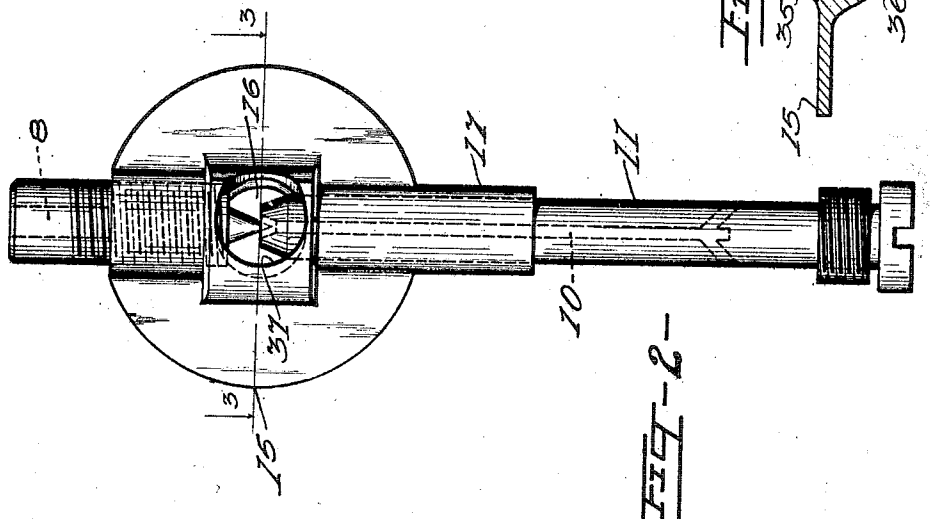

Fig. 2.

WITNESSES:

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CARBURETER.

1,305,744. Specification of Letters Patent. Patented June 3, 1919.

Application filed June 9, 1916. Serial No. 102,670.

To all whom it may concern:

Be it known that I, LEONARD H. RHOADS, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

This invention relates to carbureters for use in connection with internal combustion engines.

One object of the invention is the provision of a carbureter of simple and rugged construction and capable of being produced at relatively low cost which is at the same time positive and efficient in operation.

Another object is the provision of a carbureter adapted to insure a homogeneous mixture of the charge at all engine speeds.

Other objects more or less incidental to the foregoing will appear in the following description in which is set forth, in connection with the accompanying drawings, a preferred form of construction for the purpose of explaining the nature of my improvements. In the drawing—

Figure 1 is a vertical sectional view through my improved carbureter.

Fig. 2 is an enlarged elevation of the butterfly throttle valve and coöperating parts.

Fig. 3 is a section on the line 3—3, Fig. 2.

Like reference characters denote corresponding parts in both views.

The reference numeral 1 denotes a casing, which is preferably a casting, formed with a mixing passage that has a flaring outlet section with a flange 2 to be fastened to the intake manifold of the engine, the opposite end 33 of said casting serving as a hot air intake. The casting 1 is formed with a raised portion or boss 4 which is recessed to form a seat for the head of a plug or key 5 and formed with an opening 6 communicating with said recessed portion and with the interior of the casting. A spray needle 7 has its non-pointed end slidably disposed in the said opening 6 and formed with a square recess 8 to receive the shank 9 of the key or plug which shank is square in cross section to prevent rotation of said needle 7. The needle 7 is threaded exteriorly and projects into the interior of the casting and its pointed termination is capable of entering the mouth of the channel 10 formed in a nozzle 11 to form a closure therefor, the said nozzle extending through an aperture 12 in the casting 1 and into the large opening 30 and then through the bearing aperture 31 and into the float chamber 13 and being threaded into engagement with the boss 14 formed in the base thereof.

The nozzle 11 and needle valve 7 are operatively connected by an oscillating butterfly throttle valve 15. This throttle valve is formed with an axial passage 34 the upper part of which is screw threaded for engagement with the threads of needle valve 7, while the lower part of said passage receives the upper part of the nozzle 11. The valve 15 is also provided at its lower side with a tubular stem 17 which surrounds the nozzle 11 and projects through the aperture 12 in the lower side of the casing 1. An operating lever 18 is secured by clamping screw 19 to the lower end of the stem 17 and is provided with a ball and socket connection 21 through which it can be connected with a suitable control lever at a distant point.

The throttle valve 15 is formed, preferably centrally with an air passage 16 which extends directly through the valve transversely to the plane thereof, the arrangement being such that the nozzle 11 has its upper discharge end and the needle valve 7 its coöperating lower end, in said passage. Also, as is indicated in Fig. 3, the axial, enlarged part of the valve 15 is cut away on the outlet or rear face of the valve to form a passage 34 at points adjacent to the opening 16 so that when the valve 15 is in its fully open position the air has a free passage along the said rear side thereof and across the passage 34, so that the air current sweeps over the upper, discharge end of the nozzle 11. On the inlet or front face of valve 15 the axial tubular part thereof is cut away at the outwardly opening side of the valve axis in a manner somewhat similar to the outlet side of the valve, but at the other or inwardly opening side of the axis it is not so cut away, being on the contrary formed with a slight extension 36 which provides a baffle face 37 for the air when the valve 15 is in open position. As will readily be seen, the action of the baffle 36 is to direct the air through the passage 16 and over the discharge end of the nozzle 11, especially when

the throttle valve is in intermediate positions between its closed and fully open positions.

The float chamber 13 aforesaid is formed with lugs 22 which are connected by screws 23 with the lugs 20 of the casting 1 whereby said float chamber is retained in position. An open space 30 through which the fingers can be passed is between the casting 1 and the top 29 of the float chamber. Within the float chamber is a standard 24 to which a horse-shoe shaped cork float 25 is fulcrumed off center, said float carrying the needle valve 26 adapted for engagement with the seat 27 whereby the flow of the liquid fuel through the elbow connection 28 is regulated in a well known manner.

In the operation of my improved carbureter the throttle valve preferably is set in its fully closed position for starting the engine, the needle valve being adjusted so that it is at this time slightly open but is near enough its seat in the end of nozzle 11 to have a substantial checking action on the discharge of gasolene from the nozzle. As the engine starts the throttle valve may be opened with consequent increase in the engine speed. As the throttle valve is opened more and more of the air passes at the sides of the valve and less through the central air passage 16. However, the air moving adjacent the inlet face of the throttle valve impinges against the baffle 36 and is deflected by it through the air passage 16 and over the fuel nozzle, thus picking up and vaporizing the liquid fuel. This carbureted current or jet of air is projected into the current of air entering past the outlet face of the valve so that the two are thoroughly mixed, as will readily be understood. When the throttle is then moved to its full open position, while the baffle 36 acts somewhat less effectively to deflect air over the fuel nozzle, this deficiency is counter-balanced by the effect of the air current along the outlet face of the valve which sweeps across the opening 34 (Fig. 3) directly over one side of the fuel nozzle 11 so as to have a substantial suction and entraining effect on the fuel. Thus, whether the throttle valve be closed, partially opened or fully opened, my improved construction provides for the passage of entering air over the fuel nozzle at a velocity great enough to insure entraining of the fuel and effective carburation of the air. In the operation of the carbureter the throttle valve most of the time will be in intermediate or partially opened positions in which the baffle 36 operates, as above described, to produce a thorough mixing of the entering charge.

While the velocity of the air passing through the mixing tube, when the throttle valve is partially or fully open, may be as great or even greater than the velocity of the air through the passage 16 when the throttle valve is in its closed position, yet because the suction action of the air on the gasolene nozzle is less efficient when the throttle valve is partially or fully opened than when it is closed, it is necessary as the throttle valve is opened, to open further the needle valve and permit a more free entry of the gasolene in order to maintain a properly proportioned mixture; and this is accomplished by the adjustment of the needle valve which is incident to the turning of the throttle valve.

It will be seen while the construction of my improved carbureter is simple and rugged, it nevertheless provides for maintaining a uniform mixture under the various conditions of operation. It will be observed, too, that the arrangement of the valve operating lever 18 and its connections in the open space between the mixing tube casting and the detachable valve chamber contributes both to compactness and to the protection of the said lever and connections from injury or disarrangement.

What is claimed is:—

1. In a carbureter, the combination of a mixing tube, a butterfly throttle valve mounted in said tube to control the passage therethrough, said valve being formed with an air passage extending transversely to its plane from its inlet face to its outlet face and with an air baffle adjacent said passage on the inwardly opening side of the inlet face of the valve, a liquid fuel conduit extending upward through the throttle valve and opening into the air passage thereof, and means for turning the valve.

2. In a carbureter, the combination of a mixing tube, an oscillating butterfly throttle valve mounted in the mixing tube to control the passage thereof and substantially immovable axially, the said throttle valve being formed with an air passage from its inlet to its outlet face, a liquid fuel conduit extending upward through the throttle valve and opening into its said air passage, a needle valve above said fuel conduit to control the outlet thereof, said valve having a threaded engagement with the throttle valve and non-rotatable connection with the mixing tube, and means for turning the throttle valve, the said threaded engagement of the needle and throttle valves being adapted to open and close the needle valve as the throttle valve is opened and closed, respectively.

3. In a carbureter, the combination of a mixing tube, an oscillating butterfly throttle valve mounted in said tube on an upright axis to control the passage thereof, said valve having an air passage from its inlet to its outlet face, a liquid fuel float chamber attached to the under side of the mixing tube with an intervening open space, a fuel conduit leading from the float chamber into

the mixing tube and axially of the throttle valve to the air passage thereof, and means arranged in the said space between the mixing tube and the float chamber for actuating the throttle valve.

4. In a carbureter, the combination of a mixing tube, a butterfly throttle valve mounted in said tube to control the passage therethrough, said valve being formed with a tubular axial enlargement and with an air passage extending through said enlargement of the valve transversely to its plane from its inlet face to its outlet face and with an air baffle adjacent said passage on the inwardly opening side of the inlet face of the valve and the said enlargement being cut away adjacent said air passage on the outlet face of the valve, a liquid fuel conduit extending through the axial enlargement of the throttle valve and opening into the air passage thereof, and means for turning the valve.

In testimony whereof, I have hereunto set my hand and affixed my seal, in the county of Cook, State of Illinois, this 29th day of May, A. D. 1916.

LEONARD H. RHOADS. [L. S.]

In presence of—
ANNA C. MEEGAN,
J. F. PARKS.