No. 876,287. PATENTED JAN. 7, 1908

M. L. WILLIAMS.

CARBURETER.

APPLICATION FILED AUG. 11, 1905.

Fig. 1.

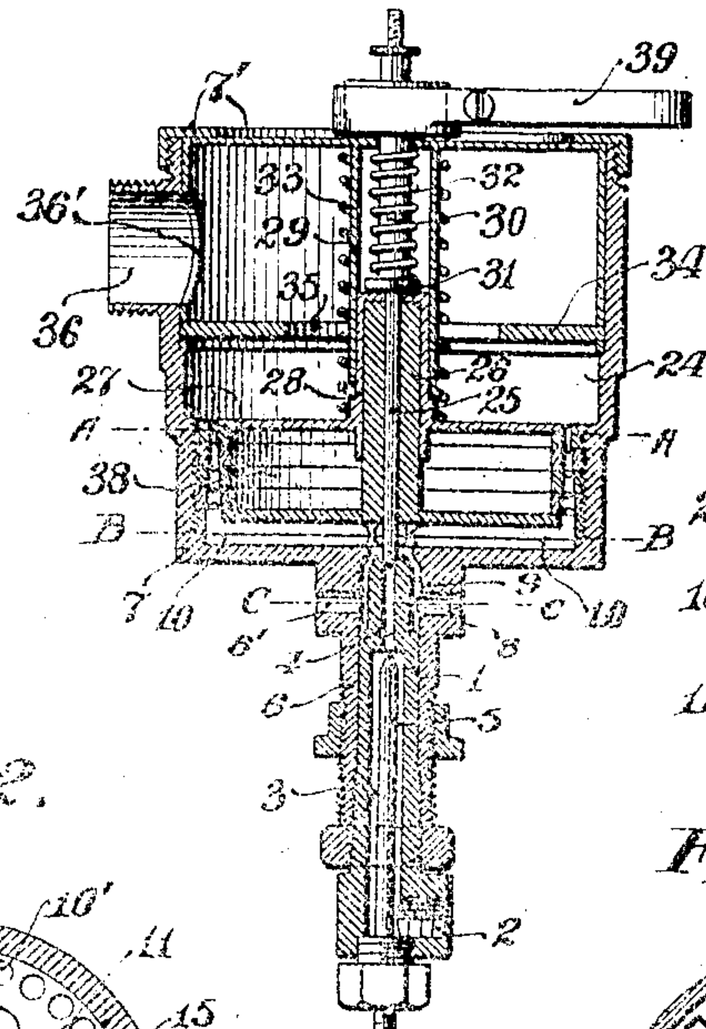



Fig. 4.

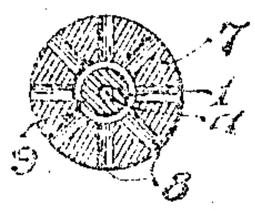



Fig. 5.

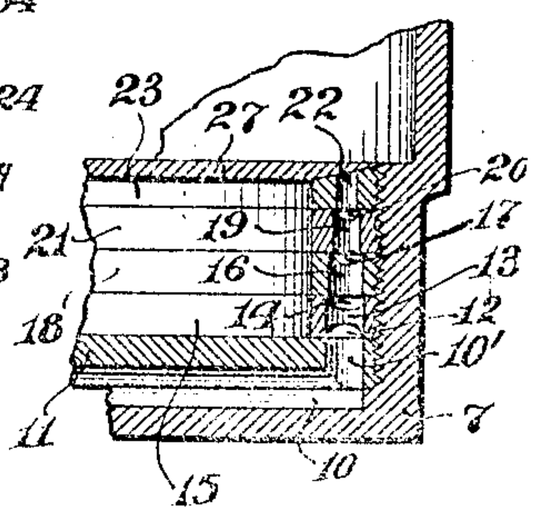



Fig. 2.

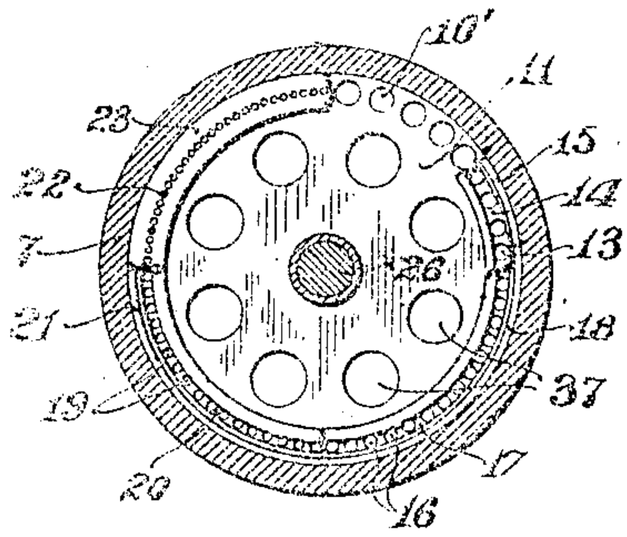



Fig. 3.

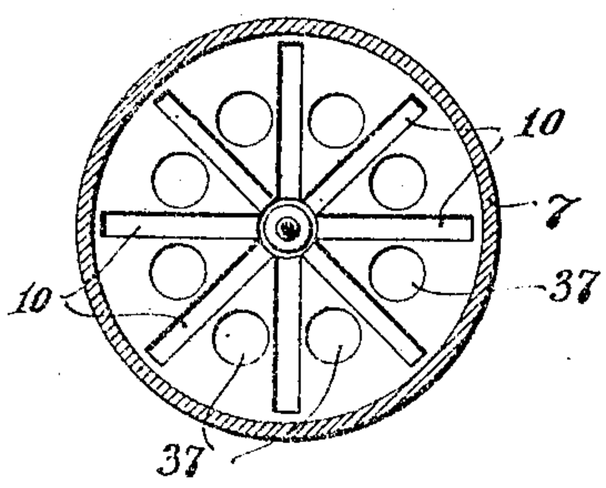
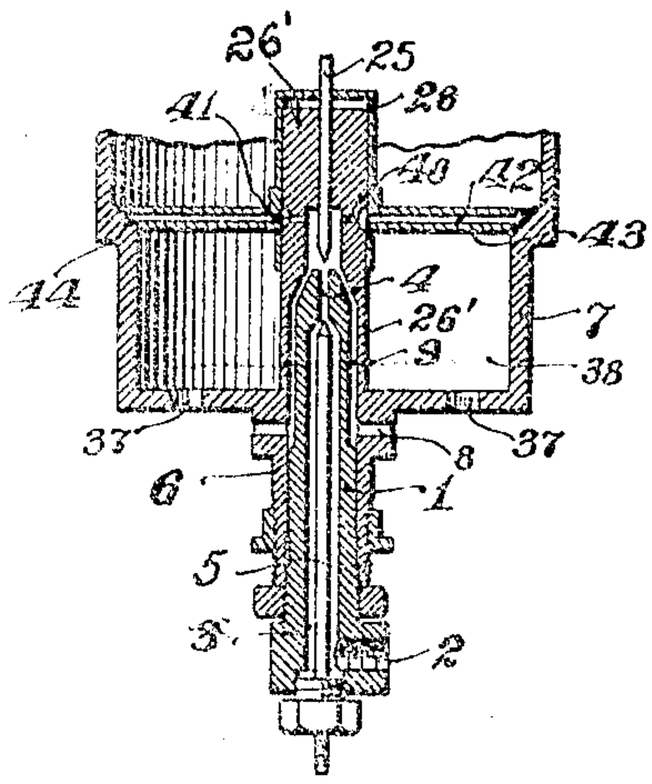



Fig. 6.

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# UNITED STATES PATENT OFFICE.

MORRIS L. WILLIAMS, OF PHILADELPHIA, PENNSYLVANIA.

## CARBURETER.

No. 876,287. Specification of Letters Patent. Patented Jan. 7, 1908.

Application filed August 11, 1905. Serial No. 273,332.

*To all whom it may concern:*

Be it known that I, MORRIS L. WILLIAMS, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Carbureters, of which the following is a specification.

This invention relates to carbureters for gas engines and its leading purpose is to supply a mixture of proper proportions properly mixed without substantial variation in the size of the charge fed to the cylinder throughout the varying speeds of the motor, thereby producing conditions from which the maximum efficiency is attained.

To this end the improvements contemplate providing means for obtaining an evaporation of gasolene or other hydro-carbon that will provide a sufficient dissemination and exposure thereof for admixture with a volume of air regulated in proportion to the volume of the hydrocarbon so that a proper admixture is effected and a sufficient volume is supplied regardless of varying speeds of the motor, an approximately uniform proportion of air and hydro-carbon being maintained, a uniform admixture thereof being effected and a uniform volume of the mixture being supplied to the engine for each impulse or explosion regardless of the rate thereof.

In the accompanying drawings, Figure 1 is a vertical sectional view representing the improved carbureter, Fig. 2 is a sectional view taken on the line A—A of Fig. 1, part of the interior mechanism being broken away, Fig. 3 is a sectional view taken on the line B—B of Fig. 1, Fig. 4 is a sectional view taken on the line C—C of Fig. 1, Fig. 5 is a vertical sectional view of an enlarged detail of the mechanism for dissemlinating the evaporated hydro-carbon mixed with air and controlling the flow of the hydrocarbon and air, and Fig. 6 is a vertical sectional view showing modifications in the details of construction.

In the accompanying drawings, the nozzle 1 is connected by its orifice 2 with means for supplying a hydro-carbon, as gasolene, to the passage 3 therethrough, the latter discharging by the reduced passage 4 controlled by an adjustable needle valve 5 having a screw threaded engagement with the nozzle. The nozzle is set by an adjustable screw threaded connection in a tube 6, fixed to the bottom of the casing 7, and discharges through the top thereof, the tube having air inlets 8 which communicate with the annular tube space 9 around the top of the nozzle, forming a species of injector.

As shown in Figs. 1 to 5 inclusive, the nozzle passage 4 and the annular air passage 9 communicate with the radial passages 10 in the bottom of the casing, these passages discharging through ports 10′ of a disk 11, screwed into the casing. The passages 10′ discharge into a channel 12 and thence through holes 13 into a channel 14 of a ring 15, which is screwed into the casing upon the disk 11, the holes 13 being double the number of the holes 10′ and respectively half the size thereof. The channel 14 discharges through the holes 16 into a channel 17 of a ring 18 screwed into the casing upon the ring 15, the holes 16 being double the number and respectively half the size of the holes 13. The channel 17 discharges through the holes 19 into a channel 20 of a ring 21 screwed into the casing upon the ring 18, the holes 19 being double the number and respectively half the size of the holes 16. The channel 20 discharges through the holes 22 of a ring 23 screwed into the casing upon the ring 21, being double the number and respectively half the size of the holes 19. The streams of gas issuing from the ports 10′ are thus sub-divided repeatedly and broken up into small jets which issue from the holes or ports 22 into the lower part of the mixing chamber 24 in a cylindrical sheet.

The passage 4 is controlled by a needle valve 25 which reciprocates in the stem 26 rising from the bottom of the casing and the holes or ports 22 are controlled by a disk valve 27 having thereon a tubular extension 28 which reciprocates on the stem within the tube 29 depending from the hood 7′ in the top of the casing. A sleeve 30 having a collar 31 is fixed to the needle valve which is adjustable in relation thereto, the sleeve bearing on the top of the tube 28 and reciprocating through the hood and the top of the casing. A coiled spring 32, on the sleeve between the collar and the top of the hood, presses the connected needle and disk valves down, and a coiled spring 33 on the tube 29 between the top of the casing and the valve 27 presses the latter down.

Within the mixing chamber 24 is a baffle plate 34 having a hole 35 therethrough by which communication is established between the lower and upper parts of the chamber. Leading from the top of the mixing chamber

to the cylinder of the engine is the passage 36 with which registers the passage 36′ in the hood 7′, the latter being turned by an arm 39 to regulate the outlet from the chamber.

When the valve 5 is set in the position required by the head or pressure of the hydrocarbon in the nozzle 1, the suction from the engine exhausts the chamber 24 permitting the valves 25 and 27 to rise together against the action of the springs 32 and 33, upon which the hydrocarbon issuing from the passage 4 and air introduced through the passages 8 and 9, are discharged through the radial passages 10 and the several branching passages leading therefrom being ejected from the ports 22 into the bottom of the chamber 24 in a cylindrical sheet composed of highly subdivided jets.

The adjustability of the nozzle and the needle valves regulate the proportions of hydrocarbon and air intermingled prior to its ejection from the ports and the suction regulates the quantity thereof. The lift of the valve 27 being proportional to the suction, a flow of air proportional thereto will take place through air passages 37 and the air chamber 38 to the mixing chamber 24. The gas issuing from the ports 22 and the air introduced by way of the chamber 8, in the desired proportions, are mingled in the baffle chamber 24 and drawn therefrom into the explosion chamber of the engine.

The structure may be modified, as shown in Fig. 6, in which the nozzle 1 and the needle valve 3 supported in the tube 6 of the casing 7 project into a passage 9 of a stem 26′ in the casing. This passage discharges by radial passages 40 and slots 41 of the stem into radial passages 42 of a valve 43, the valve having a sleeve 28 which reciprocates on the stem and the sleeve being connected with the needle valve 25 for controlling the nozzle passage 4. The valve 43 coacts with the seat 44 formed in the casing 7 which covers the ports 42 when the valve is down.

Having described my invention, I claim:—

1. A carbureter having a hydrocarbon passage, a valve for controlling said passage, a plurality of ducts into which said passage discharges, an air passage discharging through said ducts, and a valve for controlling said ducts and air passage.

2. A carbureter having a mixing chamber, a hydrocarbon passage, a valve for controlling said passage, a plurality of passages connected with and leading from said hydrocarbon passage, a plurality of passages connected with and leading from each of said first named plurality of passage to said mixing chamber, an air passages leading to said mixing chamber, and a valve for controlling said passages to said mixing chamber.

3. A carbureter having a mixing chamber, a hydrocarbon passage, a plurality of passages connected with and leading from said hydrocarbon passage to said mixing chamber, a passage for discharging air into said mixing chamber, and automatic valves connected so that one operates the other, said valves being adapted for maintaining a substantially constant ratio between the flow of hydrocarbon and air through said passages.

4. A carbureter having a passage, a nozzle for discharging hydrocarbon into said passage, a needle valve for controlling said nozzle, means for conveying air into said passage, branching passages connected with and leading from said first named passage, a further passage into which said branching passages discharge, and a valve for controlling said further passage.

5. A carbureter having a passage, a nozzle for discharging hydrocarbon into said passage, a valve for controlling said nozzle, means for conveying air into said passage, a plurality of sub-divided passages connected with and leading from said first passage, an air passage, and a valve for controlling said sub-divided passages and said air passage, said second valve being connected with and operating said first valve.

6. A carbureter having a casing with an air passage therein, a valve for controlling said air passage, a plurality of passages disposed around and discharging into said air passage, a valve for controlling the flow of hydrocarbon to said plurality of passages, and mechanism connecting said valves whereby they are operated together by the suction of the engine.

7. A carbureter having a casing with a series of passages therein and a series of superposed rings having passages therein communicating with said first passages, the passages in the rings increasing in number in succession from said first passages.

8. A carbureter having a casing with a series of radial passages therein, and a series of superposed rings having holes therein communicating with said passages, the holes in the successive rings communicating and increasing in number to provide highly subdivided branch passages.

In testimony whereof I have hereunto set my hand this 7th day of August, A. D. 1905, in the presence of the subscribing witnesses.

MORRIS L. WILLIAMS.

Witnesses:

ROBERT JAMES EARLEY,
C. N. BUTLER.