N. LEINAU.

CARBURETER.

APPLICATION FILED FEB. 3, 1908.

915,684.

Patented Mar. 16, 1909.

FIG. 2.

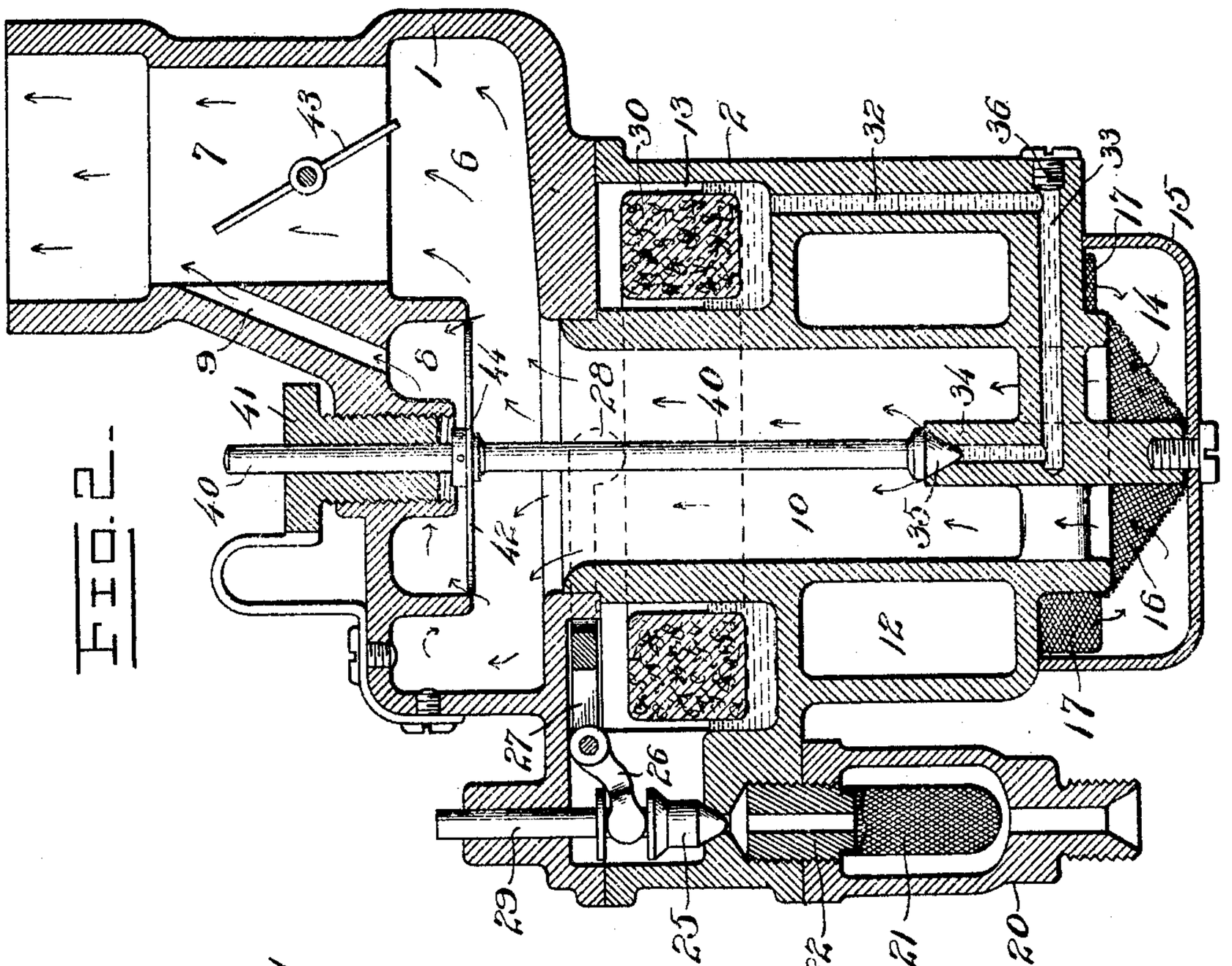


FIG. 1.

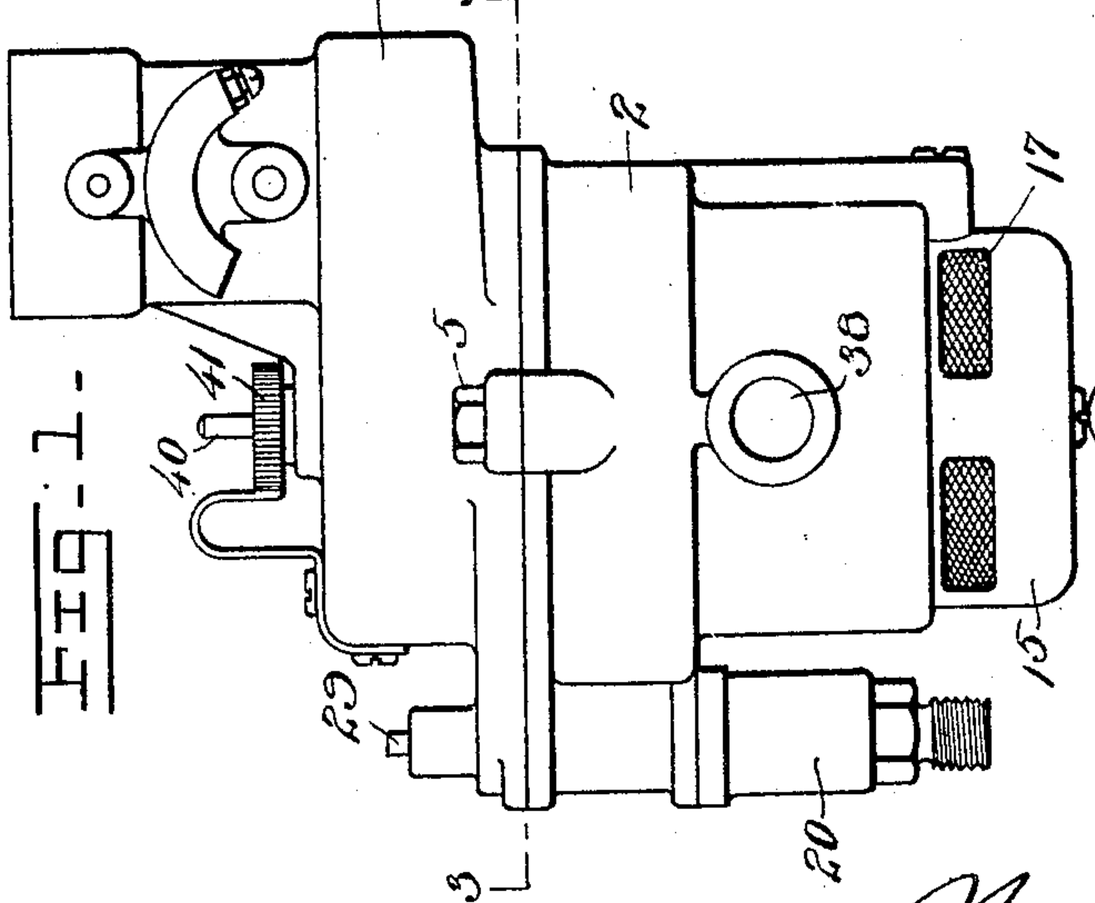
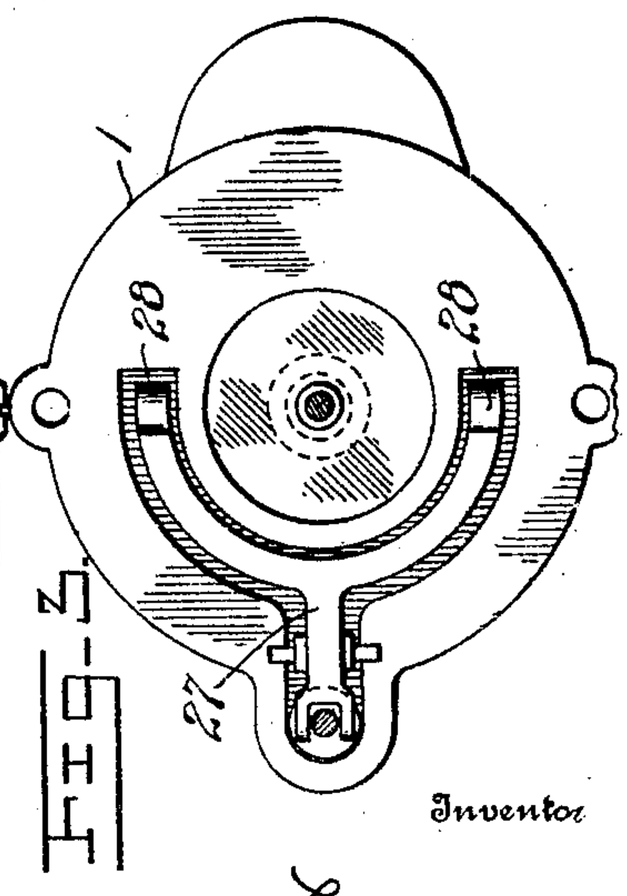


FIG. 3.



Witnesses

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CARBURETER.

No. 915,684. Specification of Letters Patent. Patented March 16, 1909.

Application filed February 3, 1908. Serial No. 414,073.

To all whom it may concern:

Be it known that I, NORMAN LEINAU, a citizen of the United States, residing at Fort Washington, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

My invention relates to the construction of carbureters or generators suitable for use in connection with the operation of automobile, marine or other engines of the internal-combustion type and designed to furnish to the cylinder of the engine a quantity of combustible mixture formed at each stroke thereof by commingling a definite quantity of gasolene or other liquid fuel with air or other gas.

My invention is intended to furnish a reliable and compact mixing-valve which shall be absolutely reliable in furnishing the proper proportions of air and fuel at all speeds of the engine and which shall be exceedingly sensitive in responding to the varying changes in suction produced by the piston of the engine.

Another object is to construct a carbureter which shall be entirely automatic in its operation, requiring no manipulation after the initial adjustment, and which shall have the minimum number of movable parts and so arranged as to cause little friction and wear.

My invention also provides a mixing-valve free from the possibility of "flooding" and in which the parts are readily accessible for purposes of inspection or repair.

A further object is to provide a means for warming the incoming air and mixture and for warming the float chamber and thus preventing the freezing of any accumulated water.

These and other objects which will be apparent from the following description are accomplished by means of the construction shown in the accompanying drawings, in which—

Figure 1 is a side elevation of the casing of my carbureter; Fig. 2 is a vertical section thereof; and Fig. 3 is a plan view of the upper portion of the casing containing the mixing-chamber, looking from below on the line 3—3 of Fig. 1.

The casing is generally cylindrical and comprises the upper part 1, and the lower part 2, the meeting edges being carefully machined or ground to form a tight joint and the parts being secured together by means of bolts 5 on opposite sides. The upper portion of the casing contains the mixing-chamber 6, the discharge-passage 7, which is connected with the inlet port or passage of the explosive engine or motor, and the suction-chamber 8, connected with the discharge-passage by means of the suction-passage or port 9. The lower portion of the casing contains the tubular vaporizing air-passage 10, surrounded by the heating chamber 12 and the float-chamber 13. The bottom of the air-passage 10 opens into the screening passage 14, formed by the inverted cap 15, which contains the sieve 16 and is provided with screened intakes or air-inlets 17. The inverted cap 15 protects the air-inlets from flying mud or spray and may be removed to be partially filled with fuel and replaced to serve as a cup to hold a small quantity of gasolene with which to prime the engine in case this is necessary.

To one side of the casing is secured the nipple 20, having a screw threaded lower end for connection with a gasolene supply pipe. The cavity of the nipple contains the gasolene strainer 21 of large area which may be carried on the bolt 22 by which the nipple is secured to the casing and may be readily removed for the purpose of cleaning. The gasolene inlet is controlled by a valve 25 engaged by the short arm 26 of a forked lever 27, which is pivoted close to the valve stem on the under side of the upper casing, constituting the cap for the float chamber, and the outer ends of which may be turned downwardly at 28 and are pressed upwardly by a cork or other float 30. By this construction, the valve 25 is positively held to its seat until the gasolene in the float chamber sinks to a certain level, when it will be positively opened by the weight of the forked arms of the lever. In case a particle of dust or grit should lodge on the valve-seat, permitting the inflow of more than the usual amount of gasolene, the increased upward pressure of the float caused thereby, will insure the closing of the valve.

By employing an annular float-chamber and a ring-float surrounding the air passage 10, I am enabled to construct an exceedingly compact carbureter which requires a very small containing space.

The gasolene or other hydro-carbon fuel is conducted from the float-chamber through

channels 32, 33, into the spray tube 34 which terminates in the seat for the valve 35. The horizontal channel 33 may be cleaned of any sediment through the opening closed by the screw 36. The spray tube 34 projects up into the air passage 10 so that it will be surrounded by the inrushing air. The heater jacket or chamber 12 may be supplied, through the opening 38, with hot water or with hot gases from the engine exhaust pipe and serves to heat the incoming air in the passage 10, at that portion where the vaporization of the gasolene takes place. The heat can be regulated in a manner to insure the thorough and complete vaporization of the gasolene, while at the same time not raising the temperature to such an extent as to rarefy the gas and thus impair the efficiency of the engine. The location of the heater jacket adjacent to the lower wall of the float-chamber insures sufficient warmth in said chamber to prevent the freezing of any water that may have accumulated therein. Moreover by placing the channels 32 and 33 between the heater jacket and the outside walls of the casing, the temperature of the gasolene is raised as it is conducted to the spray tube, but without being heated too much owing to the contact of the liquid with the outside walls of the casing.

The single valve 35 which controls the opening of the spray tube 34 is carried by a stem 40 which passes through and is guided by the micrometer adjustment screw 41. The valve stem is moved and controlled by the varying pressure upon the baffle-plate 42, carried by the valve stem 40, and which constitutes a disk piston or diaphragm between the mixing-chamber and the suction-chamber 8. In its lowermost position the diaphragm 42 projects slightly below the annular wall of the suction-chamber and extends slightly therein. It will be observed that there is a minute space between the periphery of the diaphragm and the inner walls of the suction-chamber, so that a small amount of the mixed gases may be drawn therethrough. A main hand-controlled throttle valve 43 is located in the discharge-passage 7, between the mixing-chamber and the exhaust opening of the suction-passage 9. By this arrangement, it will be observed that the suction in the chamber 8 and passage 9 caused by the suction action of the engine, will be increased in proportion to the closing or throttling of the discharge-passage 7 by the throttle valve 43. On the contrary, when the throttle valve is entirely open, the suction in the chamber 8 is materially decreased, so that the diaphragm 42 is mainly under the control of the impact of the inrushing of the carbureted air into the mixing-chamber. The amount of the opening of the valve may be accurately determined by the adjustment of the micrometer screw 41, which serves as a stop for the upward movement of the fixed ring or boss 44 on the valve stem. After this adjustment is initially determined, no further adjustment will be necessary, as it has been found with this apparatus that the suction action of the engine will withdraw the required volume of fuel to furnish with the influx of air a properly-proportioned explosive mixture at all speeds from a minimum to a maximum and at any load upon the engine. The valve is returned to its lowermost closed position by the weight of the parts, but it is obvious that, if desired, an assisting spring may be placed on the stem between the boss 44 and the screw 41. If it is necessary, at any time, to regrind the valves 35 and 25 to their seats, this may be done by merely twirling the projecting ends of the stems 40 and 29, respectively, in the fingers.

The operation of the carbureter will be evident from the above description. The required amount of hydro-carbon fuel will be maintained in the chamber 13 by the valve 25, under the control of the ring float 30, and will be supplied to the spray tube 34 through the channels 32 and 33. Each induction or inspiration of the engine will draw the proper amount of air through the inlets 17 and into the vaporizing channel 10, the impact of the inrushing air against the diaphragm 42 operating to raise the valve 35. As the indrawn air rushes across the inclined discharge opening of the channel 9, a suction action is produced which rarefies the air or gases in the chamber 8, and causes a suction upon the diaphragm 42. The combined action of the impact of the inrushing air and of the suction in the chamber 8 upon the diaphragm in the chamber 42 raises the valve 35 permitting the gasolene or other liquid to discharge from the spray tube in all directions into the path of the inrushing air. The liquid fuel is thoroughly vaporized in passing through the heated vaporizing channel 10, and is thoroughly intermixed as it strikes the diaphragm 42 and circulates through the mixing chamber 6 in its travel to the discharge passage 7. As the throttle 43 is brought nearer to the horizontal or closed position across the discharge passage, the suction in the chamber 6 will be more and more cut off and the impact of the inrushing air against the diaphragm 42 correspondingly decreased; but the suction of the engine will more directly affect the chamber 8 through the channel or port 9 and thus will assist to maintain the diaphragm raised to a sufficient extent to allow the proper amount of liquid fuel to pass the valve, and in this manner the proper proportions for maintaining an accurate explosive mixture will be regulated. By making the valve actuating diaphragm concentric with the vaporizing passage and arranging a suction-chamber above the diaphragm, which

is under a varying control of the suction of the engine by means of the position of the throttle valve, an exceedingly sensitive adjustment and operation of the fuel valve is obtained. If desired, I may place a valve in the suction-channel 9 and connect it with the manually operated lever of the main throttle valve.

The construction of my carbureter is exceedingly simple, as well as compact, and is composed of a minimum number of parts. The movable parts are so arranged that there is practically no wear, and consequently the parts are not liable to require adjustment or to get out of order. The upper and lower portions of the casing may be readily separated and all of the parts exposed for inspection.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is—

1. A carbureter for combustion engines comprising a casing having a passage for the flow of air or other fluid, a fuel-supply channel communicating therewith, a valve controlling said channel, a suction-chamber having a channel communicating with said passage, and a diaphragm connected with said valve and controlling its movement, said diaphragm operating within the suction-chamber and so arranged as to be subjected to the impact of the fluid flowing through said passage.

2. A carbureter for combustion engines comprising a fuel-supply channel having a controlling valve, an air or fluid passage, a suction-chamber, and means for actuating said valve comprising a diaphragm so arranged as to be subjected to the combined action of the impact of air or fluid in said passage and the suction in said suction-chamber.

3. A carbureter for combustion engines comprising a casing for the flow of air or other fluid, a fuel channel communicating therewith, a valve for said channel, a throttle valve in said air passage, a suction-chamber communicating with said air passage at a point beyond said throttle valve, and a diaphragm connected with said fuel-valve operating within said suction-chamber and so arranged as to be subjected to the impact of the air or fluid within said passage.

4. In a carbureter for combustion engines, a casing having a passage for air or other fluid extending through the carbureter and comprising a vaporizing chamber and a mixing-chamber, an inlet and an outlet thereto, a fuel-supply channel communicating with said vaporizing chamber and provided with a valve, a suction-chamber, a channel or port connecting said air-passage and said suction chamber, operating means connected with said valve and subjected to the action of the air or other fluid in said passage and to the suction in said chamber, and means for inversely varying the flow of the fluid through said passage and the suction in said suction-chamber.

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

NORMAN LEINAU.

Witnesses:

VIVIAN FRANK GABLE,

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