W. E. ROBY.

CARBURETER.

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1,027,768.

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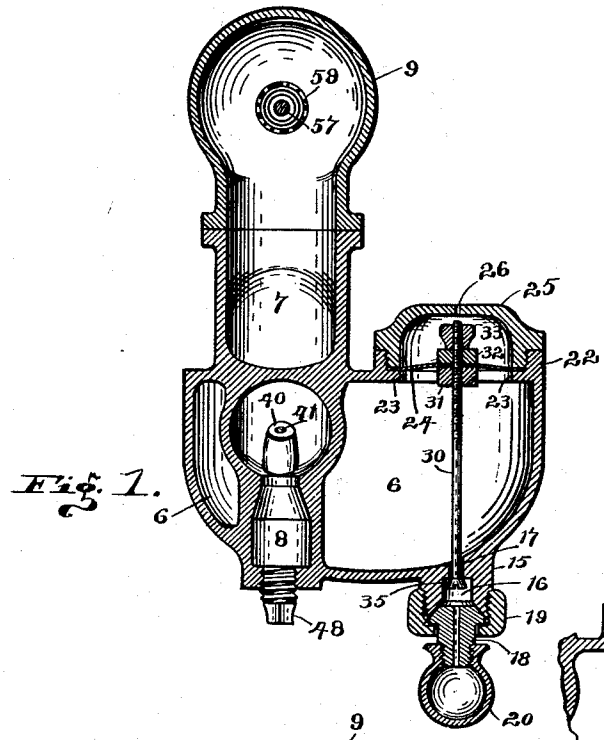

Fig. 1.

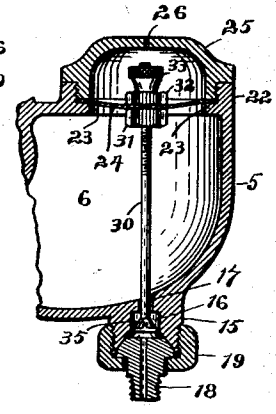

Fig. 3.

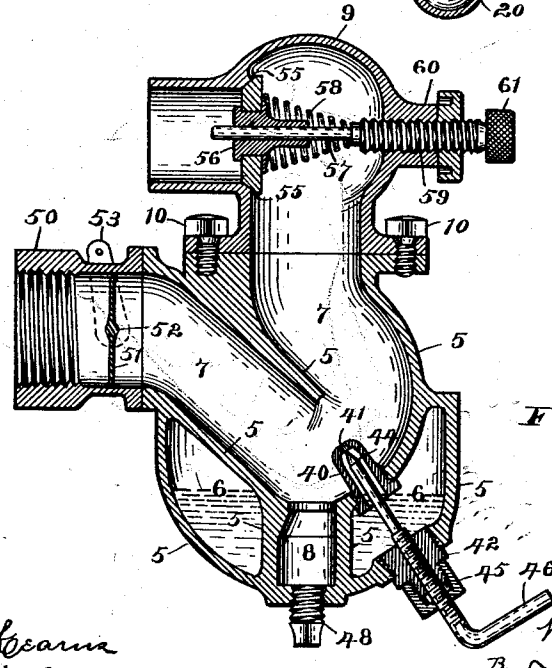

Fig. 2.

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UNITED STATES PATENT OFFICE.

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CARBURETER.

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To all whom it may concern:

Be it known that I, WILLIAM E. ROBY, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

My invention relates to carbureters particularly adapted for use with explosive engines, and its object is to provide a carbureter comprising a plurality of chambers integrally formed from a single casting, in which the admission of fuel is controlled by suction from the engine cylinders, and embodying a positively acting valve structure which will not become disarranged when the carbureter is shaken or suddenly brought to different positions by the tossing or irregular movements of the vehicle upon which it is mounted.

Figure 1 is a longitudinal sectional view of my improved carbureter. Fig. 2 is a similar section taken on a plane at right angles to Fig. 1; and Fig. 3 is a detail sectional view of that portion of the carbureter in which my improved fuel regulating valve is located.

In said drawings the portions marked 5 represent the body portions of my improved carbureter, formed of a single casting, and having its inner walls so disposed as to divide the structure into a fuel chamber, 6, a carbureting chamber, 7, comprising inclined and substantially vertically arranged communicating ducts, and a drip chamber, 8. In thus forming the body from a single piece of metal I am enabled to provide a comparatively inexpensive, durable and efficient structure for the purpose, and one which will not be subject to leakage between the chambers, which arrangement is highly essential in a device of this character, as where such chambers are formed separately and clamped together the fuel commonly used oozes through the jointed portions thereof, which is not only objectionable but seriously impairs the proper operation of the device as a whole.

The upper member, 9, forming the air supplying inlet to carbureting chamber 7 is also preferably made from a single casting, and is so arranged as to be placed in reverse positions thereon and secured thereto by screws, 10, or otherwise, so that a continuous passage is formed therethrough from said carbureting chamber, as indicated most plainly in Fig. 2.

At the lower side of the body 5, and preferably formed integrally therewith, is a boss or projection, 15, embodying a valve-seat, 16, which communicates with an aperture, 17, in said body. Also communicating with said boss is an apertured plug, 18, which is jointed to said boss by a union, 19, and with which plug a fuel supply pipe, 20, is connected and leads to any suitable source of fuel supply. At the opposite end of said chamber in a screw-threaded extension, 22, thereof, and which is provided with a shoulder, 23, I employ a flexible diaphragm, 24, preferably disk-like in form, which is supported upon said shoulder, and is securely held in place thereon by a screw cap, 25, having a vent opening, 26, as shown. Said diaphragm has a stem, 30, adjustably secured thereto by means of a nut, 31, on its under side, and a like nut, 32, and thumb-nut, 33, at its upper side, or in any other suitable manner, the upper end of said stem and connected parts being protected from injury and exposure by said cap 25. The lower end of said stem is provided with a valve, as 35, designed to travel in valve-seat 16, as indicated in Figs. 1 and 3. As will be readily understood, the nuts at the upper end of valve-stem 30 may be adjusted to increase or lessen the distance between diaphragm 24 and valve 35 in order to regulate the tension of said diaphragm, which, as indicated in the drawing, is of such character that slight strain thereon will cause its ready deflection.

In a wall between the fuel and carbureting chambers I provide a needle-valve seat, 40, having an opening, 41, therein, and in the outer wall of said body 5 opposite said needle-valve seat I place a screw-threaded plug, 42, forming a fuel-tight joint, in which is secured an adjustable needle-valve, 44, adapted to register with said opening 41, and which is screw threaded into said plug and provided with a packing gland, 45, the exposed end, 46, of said valve being bent or otherwise provided with a handle for the ready manipulation thereof.

In the drip chamber 8 I provide a plug, 48, or other suitable device, to permit the drainage of excess fuel and impurities which may collect in said chamber. The carbureting chamber 7 is provided with a suitable discharging end, as 50, designed to commu-

nicate with the engine cylinders, and in which I place a throttle-valve, 51, of a simple and well known design, pivotally mounted therein on a shaft, 52, which projects through the body of the material and is provided with a lever, 53, or other suitable device for the convenient manipulation thereof, said valve, as usual, being provided for regulating the flow of gas from said chamber to the engine cylinders.

In the air supplying member 9 I provide an internal valve-seat, 55, to which is fitted a valve, 56, which is slidably mounted on valve-stem, 57, and yieldingly maintained against said seat by a spring, 58, the outer end of said stem being screw-threaded, at 59, to fit into a boss, 60, on said member, and provided with a suitable head, as 61, for the operation thereof, so that by turning the latter said stem may be adjusted to increase or decrease the tension of said spring against said valve 56 to regulate the supply of air entering carbureting chamber 7. Said members 9 and 50 are so formed as to be interchangeably secured to carbureting chamber 7, as for example under conditions where it is desired to connect the engine cylinders to the vertically arranged duct of said chamber, member 50 can be applied thereto instead of the member 9, and the latter secured to the inclined duct of said chamber, by which arrangements I am enabled to reverse the directions of the flow of gas from said chamber. However, by utilizing said inclined duct for withdrawing gas from said carbureting chamber I am enabled to do so at all times positively and effectively as the gas can be withdrawn therethrough with less resistance than where a vertical outlet is employed, so that a free and steady flow of uniform volume is insured.

In operation, my improved carbureter is connected to the engine at 50, and to a source of fuel supply at 20, as usual, the diaphragm and valve controlled thereby being in the position indicated in Fig. 1, and the fuel chamber empty as when first attached to the engine and fuel supply pipe, or when the supply of fuel has become exhausted. A slight pressure is applied to the upper end of valve-stem 30 by means of a suitable instrument (as an ordinary pin or the like) projected through the vent opening 26 in cap 25, or by removing said cap and then applying pressure to said stem, which causes the stem and diaphragm to descend, removing valve 35 from the inlet 17 to fuel chamber 6, Fig. 3, during which operation fuel flows into said chamber, gradually rising in the same until a level slightly above the lower open mouth of valve casing 40, is reached, as indicated in Fig. 4, at which point further rise of the oil is prevented by the pressure of the air confined in the upper part of chamber 6. The stem may now be released, and said diaphragm by reason of its inherent spring force returns to its normal position, Fig. 1, so that said valve through its connection with said diaphragm is brought to closed position in valve-seat 16, thereby cutting off the supply of fuel from chamber 6, the vent in the diaphragm cap 25 permitting the escape of air in the chamber inclosed thereby and therefore the free movement of said diaphragm. The engine is then started in the usual way, the suction produced by the cylinders thereof reducing the pressure in the fuel chamber 6, and drawing a portion of the fuel from said chamber in the form of a spray through the needle-valve opening 41 and into carbureting chamber 7, which sprayed fuel, mingling with the air introduced through member 9, forms gas for the engine, as is well understood. If the oil level falls slightly below the open mouth of valve casing 40, the air in the upper part of chamber 6 passes out through the valve and any entrained air carried into chamber 6 with the oil is thus taken care of. As the fuel and air are withdrawn from fuel chamber 6 the suction from the engine cylinders causes the flexible diaphragm 24 to yield downwardly, which downward movement, as indicated, unseats valve 35, so that fuel is constantly being admitted to replenish that which is being drawn into the carbureting chamber, thus maintaining a substantially constant oil level at a height just sufficient to cover the mouth of the valve casing 40. As the explosions continue in the cylinders this process is repeated until the engine stops, when the diaphragm assumes its normal position, the fuel chamber at the same time remaining supplied with the proper amount of fuel and ready for the next operation of the engine. By this means, once the fuel chamber has been filled to a working level, I am enabled to constantly equalize the supply of fuel for the action of each and all of the cylinders, so that upon every stroke of the pistons the supply of fuel in the fuel chamber is uniformly maintained, as constant replenishment of fresh fuel is positively provided for by the diaphragm-controlled valve as herein described. It will therefore be seen that I am enabled to dispense with float or similarly actuated valves, which have been found objectionable and to some extent unreliable where carbureters embodying them have been applied to vehicles subject to tossing and irregular motion, for the reason that when the position of the carbureter has become suddenly changed the float is thrown out of level or becomes displaced in such manner as to prevent the proper control of the valve thereby, and the consequent irregular and improper supply of fuel to the carbureter, which supply if appreciably increased or decreased affects the mixture of

fuel and air in the carbureter to such extent at times as to cause the engine to fail to properly operate. With my improved valve arrangement, however, the constant suction of the cylinders through the carbureting and fuel chambers at all times positively actuates the sensitive diaphragm in the manner described so that no undue variation in the fuel supply can occur, and, therefore, a uniform volume of mixture is constantly produced in the carbureter during the operation of the engine.

I claim as my invention:

1. A carbureter comprising a fuel chamber and a carbureting chamber, a manually controlled valve connecting said chambers, an inlet valve controlling the flow of fuel to said fuel chamber, and a diaphragm connected with said inlet valve, said diaphragm being located in said fuel chamber, but out of contact with the fuel therein, and being exposed to atmospheric pressure on one side and on the other side to the gaseous pressure in said fuel chamber.

2. A carbureter comprising a fuel chamber and a carbureting chamber, an inlet valve for said fuel chamber, a diaphragm connected with said valve to operate the same, said diaphragm being exposed on one side to atmospheric pressure, and on the other side to the pressure in said fuel chamber, and a second valve, wholly independent of said diaphragm, for controlling the flow of fuel from said fuel chamber to said carbureting chamber.

3. A carbureter comprising a body having its inner walls disposed to form fuel, carbureting and drip chambers, a manually controlled valve establishing communication between said fuel and carbureting chambers, a fuel valve in said fuel chamber, and a flexible diaphragm connected with said valve, said diaphragm being located in said fuel chamber above the liquid level therein, and capable of deflection in one direction to open said valve by suction from said chambers and to assume normal position when said suction ceases.

4. In a carbureter, the combination, with the fuel chamber thereof, embodying a screw-threaded extension at its upper end, of suction controlled means for regulating the supply of fuel in said chamber comprising a diaphragm seated in said extension, a valve communicating therewith and controlled thereby for regulating the fuel supply to said chamber, and a screw-threaded vent cap secured to said extension and inclosing said diaphragm.

5. A carbureter comprising an integrally formed body portion inclosing a carbureting chamber and a fuel chamber, a needle valve connecting said carbureting chamber with said fuel chamber, a valve-controlled passage in said fuel chamber to control the admission of fuel to said chamber, and a flexible diaphragm secured in the walls of said fuel chamber above the liquid level therein and operatively connected with said fuel valve in a manner to open and close said fuel valve by means of suction through said needle valve and the fuel in said fuel chamber.

6. In a carbureter, the combination with a fuel chamber, of a fuel valve in said chamber to control the admission of fuel thereinto, a carbureting chamber communicating with said fuel chamber by a needle-valve opening, a needle-valve in said opening, a flexible diaphragm secured in said fuel chamber above the level of the liquid therein, and a rod operatively connecting said flexible diaphragm with said fuel valve to cause said diaphragm to control the operation of said fuel valve by the suction of engine cylinders upon said diaphragm through the fuel in said fuel chamber.

7. In a carbureter, the combination with a carbureting chamber, a fuel container, and a spray valve connecting said carbureting chamber with said fuel container, of a fuel valve in said fuel container adapted to control the flow of fuel through said fuel container, a flexible diaphragm secured to the walls of said fuel container above the fuel level therein and connected with said fuel valve in a manner to open and close said fuel valve by means of the partial vacuum produced in said fuel container between said spray valve and said fuel valve by the suction of engine cylinders through said spray valve, and a vent cap inclosing said diaphragm through which said diaphragm may be caused to be depressed to open said valve.

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

WILLIAM E. ROBY.

Witnesses:
LEE R. GARBER,
HOMER R. BARKER.