W. R. PARK.

CARBURETER.

APPLICATION FILED JULY 31, 1909.

955,353. Patented Apr. 19, 1910.

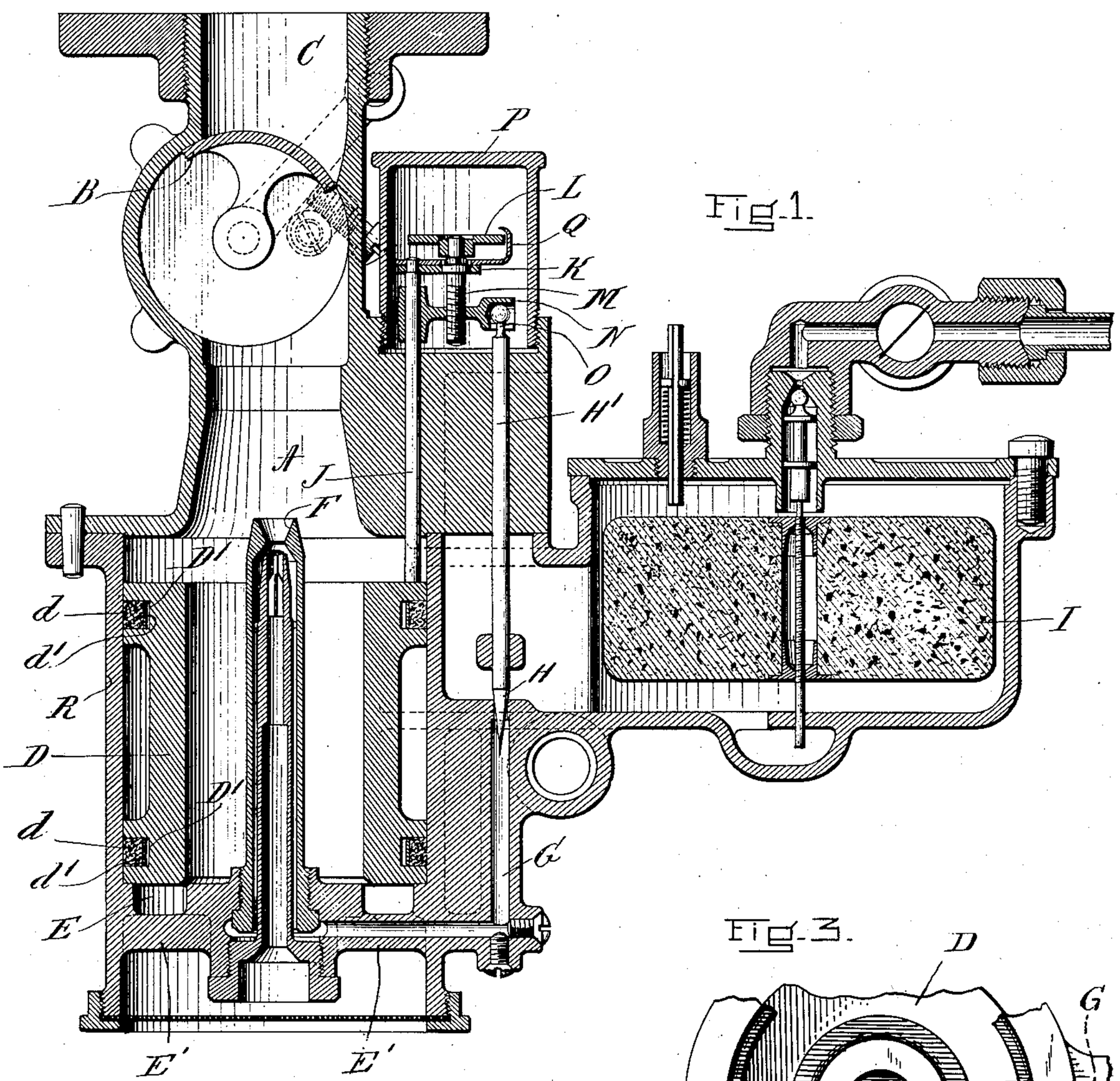

Fig. 1.

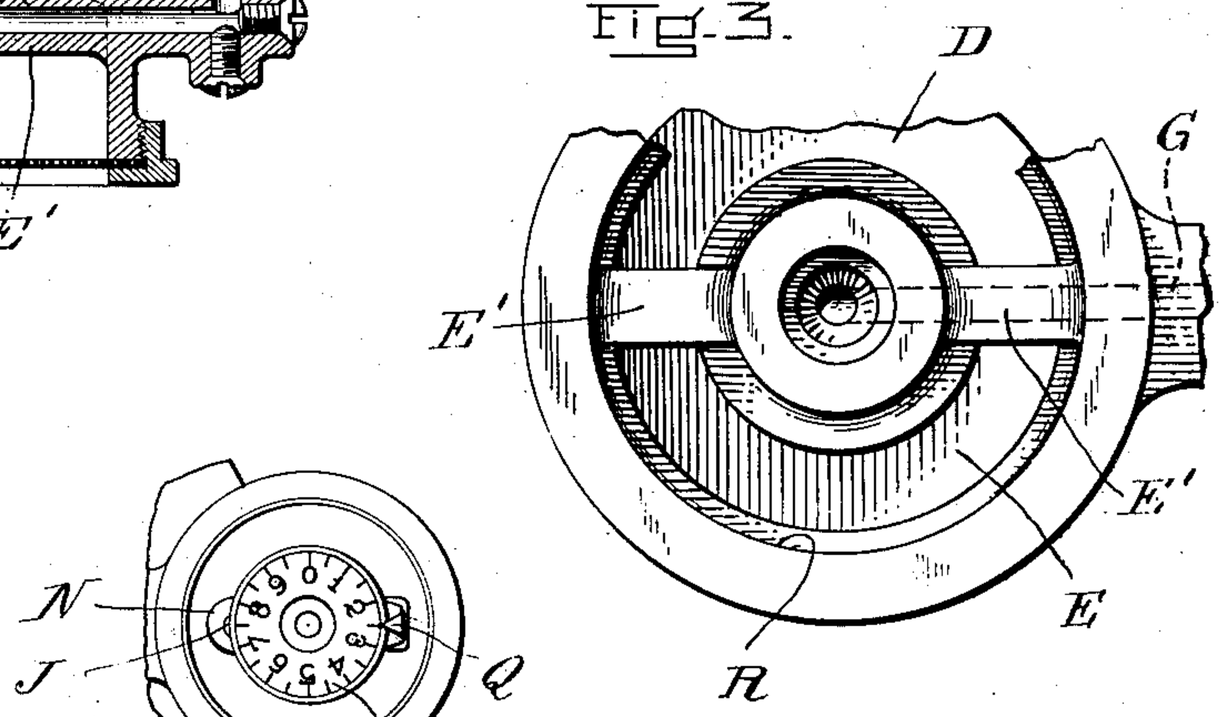

Fig. 3.

Fig. 2.

Witnesses
Josephine A. Ryan
Charles D. Woodbury

Inventor
William R. Park
by Edmund Wetmore & Hartman
Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM R. PARK, OF TAUNTON, MASSACHUSETTS, ASSIGNOR TO THE UNITED INJECTOR COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

CARBURETER.

955,353. Specification of Letters Patent. Patented Apr. 19, 1910.

Application filed July 31, 1909. Serial No. 510,563.

To all whom it may concern:

Be it known that I, WILLIAM R. PARK, a citizen of the United States, and resident of Taunton, in the county of Bristol and State of Massachusetts, have invented new and useful Improvements in Carbureters, of which the following is a specification.

My invention relates to carbureters for supplying combustible mixtures to internal combustion engines and has for its object the automatic regulation of the proportions of the combustible material and air in the mixture delivered by the carbureter to the engine.

The principle upon which my invention and improvements operate inheres in the maintenance under all conditions of throttle opening of substantially constant pressure (as measured by manometer) in the mixing conduit of the carbureter, and in the increase and decrease of the rate of supply of fuel proportionately to the increase and decrease in the rate of the supply of air. Instead, as has generally been the case in instruments of this character, of providing a normal initial fixed opening for air to be supplemented by the operation of valves controlling an auxiliary air port, I provide a single main air inlet which when the carbureter is not in operation is substantially closed by a check valve which, moving in response to reduction in pressure on the side toward the engine admits air to the mixing conduit of the carbureter as required, and which when fully lifted exposes an air entry port which should preferably be of ample dimensions to supply all the air which can possibly pass through the mixing conduit under any condition of operation. In order that the proportion of fuel to air shall be maintained at a predetermined ratio, whatever the condition of rate of supply of mixture to the engine, I provide further a regulating valve in the fuel supply pipe through which the combustible material passes to the usual nozzle in or near the mixing chamber, and control the operation of this fuel valve by means of connections to the above mentioned air supply check valve so that as the latter opens to supply air more or less the fuel regulating valve will open to supply fuel in larger or smaller quantity as required to maintain the desired predetermined ratio in the combustible mixture. This ratio may, if desired, be constant or it may progress according to some predetermined differential so that for instance the mixture admitted to the engine for combustion therein may be slightly richer in fuel when only a small amount of the mixture is admitted but become less and less rich in fuel as the throttle is opened. Furthermore, adjustments may be provided in the connections between the air supply valve and the fuel supply valve so that the lead of the latter in respect to the normal position of the former may be altered.

In the drawings hereto annexed which illustrate my invention and the principle of its operation; Figure 1 is a vertical cross section of a carbureter; Fig. 2 is a view of a detail thereof showing the top of the fuel valve adjusting device in plan, and Fig. 3 is a bottom plan view of the cylindrical portion of the carbureter shown in Fig. 1.

Referring to Fig. 1, A is the mixing conduit of the carbureter, C the duct leading to the internal combustion engine, B the throttle valve to control the admission of combustible mixture to the engine. Below the mixing conduit A, I provide a cylinder R, in the lower part of which air ports E are located on either side of the bridge bars E′ E′ (Fig. 3) and in which the check valve D slides. This check valve in the example herein shown is a piston valve centrally bored to form an air passage at least equal in capacity to the throat of the mixing conduit A; and the lower annular surface of the valve seats over the ports E so as wholly or substantially to close the same.

Adjacent to the mixing chamber A a supply nozzle F is located; this nozzle connects with the fuel pipe G which receives its supply from the chamber, within which is located the float I whereof the functions are of the usual order; a tapered needle valve H in the fuel pipe G controls the admission of fuel thereto. This tapered needle valve is mounted upon a rod H′ which slides in a suitable bearing in the carbureter casing. At its upper end the rod or stem H′ at O makes connection with the arm N, the latter having a sliding support upon the stem or rod J which lies parallel to the rod H′ and has likewise a suitable sliding bearing in the carbureter casing. The lower end of the rod J rests upon the top of the valve D and the upper end of the said rod has secured to it a short arm K through which passes the screw

M whereof the head L is suitably graduated as shown in Fig. 2; these graduations in conjunction with the pointer Q serve to indicate the adjustment of the inlet valve H. The screw M is threaded into the sliding arm N so that by turning the screw, the stem or rod H′ with the inlet valve H may be raised or lowered.

In order to protect the above described adjusting devices I provide a screw cap P which is screwed into the side of the carbureter casing and covers the said regulating devices.

The valve D is loaded, that is to say, it is of such proportions and weight that the valve will not rise until a stated predetermined difference in pressure as between the mixing conduit A and the outer atmosphere is established. This weight or load is moreover constant so that within the range of operation of the valve D the pressure in the mixing conduit A (as shown by manometer) must necessarily remain constant also. As this pressure is constant the pressure under which fuel is delivered at the nozzle F is also constant and therefore the quantity of fuel delivered is exactly proportionate to the cross sectional area in the fuel pipe exposed by the movement of the regulating valve H, the delivery capacity of the nozzle itself being ample for all conditions of supply. The valve H′ is made with a regular taper so that the area exposed from time to time is proportionate to the degree of lift of the said valve; as this lift depends directly upon the connection with the air check valve D it follows: that the quantity of fuel admitted to the instrument is directly proportionate to the lift of the air check valve which again is directly proportionate to the amount of air admitted, and consequently with a given calculated taper of the valve H the proportion of air to fuel may be constant or may increase according to some regular rate of increase or may diminish in accordance with some regular predetermined rate of diminution.

A smoothly and regularly operating air valve is highly desirable in a combination such as above described. The air valve constructed and arranged as shown in the drawings possesses these qualifications; it is a piston valve having a straight vertical lift in the cylinder chamber, the valve ports which lie on either side of the bridge which supports the spray nozzle F and thus are symmetrically distributed about the axis of the cylinder so that the passage of air through and past the valve has a minimum tendency to produce vibrations or flutterings in the valve itself. Furthermore the situation demands a freely moving air valve in a situation where the employment of lubricants is practically out of the question. The piston valve D is turned to a size which affords a slight clearance between the body of the valve and the sides of its cylindrical bearing. Near each end of the valve D an annular groove D′ is turned and in each of these grooves there is seated a packing ring *d* of porous spongy material which is interiorly reinforced by a light spring *d′*. The best material for the packing rings *d* I have found to be a close wool felt. The spring rings *d′* press the felt packing *d* lightly against the sides of the cylindrical chamber R so that the joint between the valve D and the chamber walls is to all intents and purposes air tight and yet permits free movement of the valve D. The felt moreover corrects any tendency to chattering which may be developed when the carbureter and the engine to which it is attached are in operation.

What I claim and desire to secure by Letters Patent:

In a carbureter the combination of casing having a vertical straight-way gas passage, a fuel inlet pipe surmounted by a spray nozzle centrally located in the gas passage, a throttle valve above the fuel inlet, the gas passage provided with air ports at its bottom, a tubular sliding gravity valve of weight to correspond with desired manometric pressure at the delivery end of the fuel nozzle and controlling the air ports, parallel rods slidingly mounted in the casing, adjustably connected outside the casing, one resting on and actuated by the air valve, the other provided with a needle valve controlling the fuel inlet, to increase and decrease the fuel inlet opening as the air-opening increases and decreases.

Signed by me at Boston, Massachusetts. this twelfth day of July 1909.

WILLIAM R. PARK.

Witnesses:
ODIN ROBERTS,
CHARLES D. WOODBERRY.