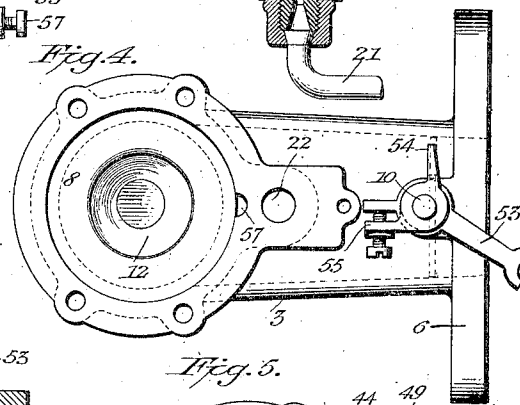
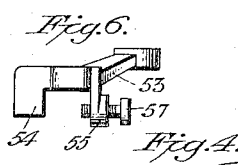
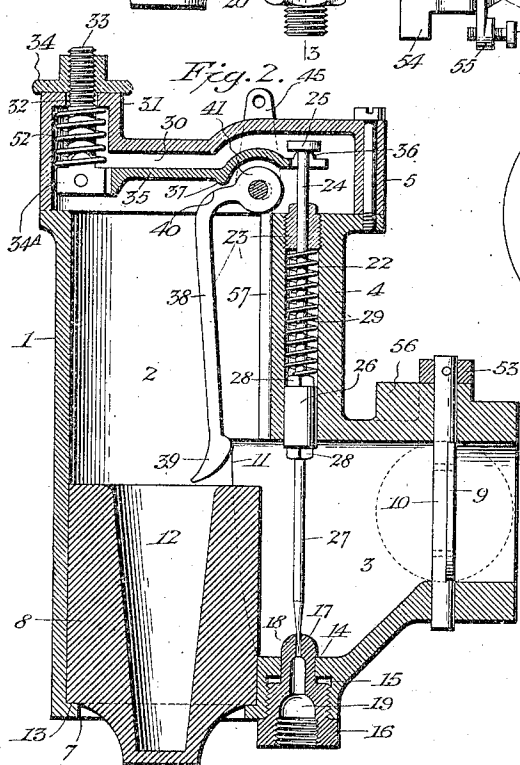
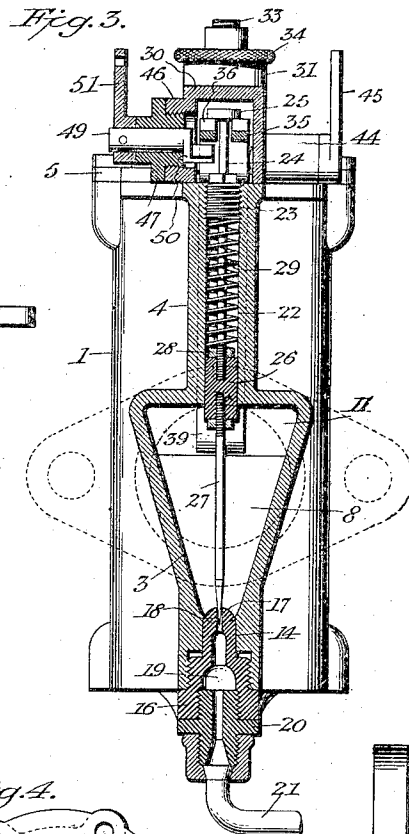
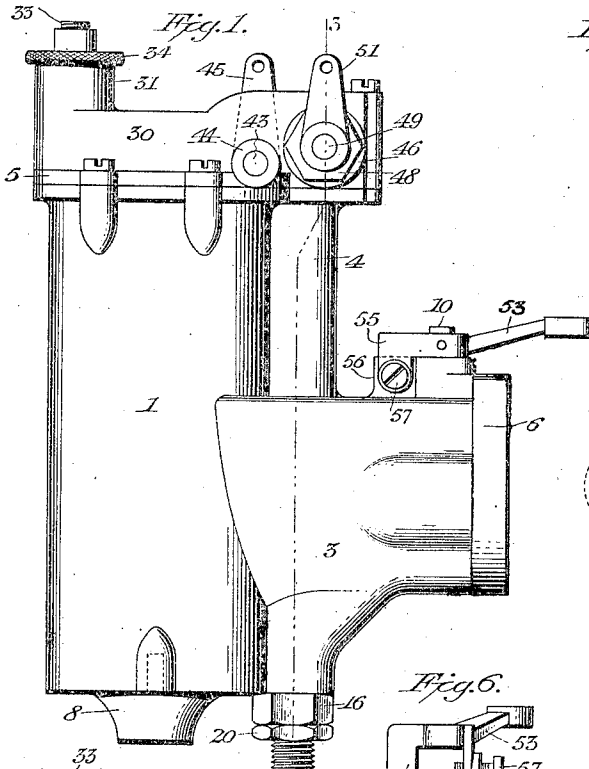


C. E. JOHNSON.
CARBURETER.

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1,363,421.

Patented Dec. 28, 1920.



Inventor:
By Charles E. Johnson.
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UNITED STATES PATENT OFFICE.

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CARBURETER.

1,363,421.

Specification of Letters Patent.

Patented Dec. 28, 1920.

Application filed March 22, 1919. Serial No. 284,291.

To all whom it may concern:

Be it known that I, CHARLES E. JOHNSON, a citizen of the United States of America, residing at the city and county of Denver and State of Colorado, have invented new and useful Carbureters, of which the following is a specification.

This invention relates to improvements in automatically operating carbureters for internal combustion engines, and more particularly, to internal combustion automobile engines.

The object of the invention is to provide a carbureter which automatically controls the supply of explosive mixture to the cylinders under varying speed conditions, by increasing the air and gasoline supply simultaneously as the throttle is opened, and the speed of the engine thereby increased, or by diminishing the supply of air and gasoline simultaneously as the throttle is moved toward the closing point. Further, to provide a carbureter having adjustable means by which the supply of gasoline can be increased or diminished relatively to the supply of air, thus enabling the attendant to vary the richness of the mixture as conditions may require, means being also provided for manually increasing the gasoline supply at any time, when conditions may require it. Further, to provide a carbureter having an automatically operating gasoline controlling valve, and means whereby said valve may be manually opened to flood the carbureting chamber before starting the engine, thereby providing an initial charge of very rich mixture to facilitate the starting action. Further, to provide a carbureter combining simplicity of construction and the maximum of efficiency in operation, and in which the gasoline supply can be manually controlled by the attendant while the engine is running.

These objects are accomplished by the device illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the improved carbureter:

Fig. 2 is a vertical, sectional view of the same:

Fig. 3 is a vertical sectional view on the line 3—3 of Fig. 1:

Fig. 4 is a plan view of the carbureter,

the cap on the upper end of the same being removed:

Fig. 5 is a bottom plan view of the cap, and parts carried thereby; and

Fig. 6 is a front view of the throttle valve-operating lever.

Referring to the accompanying drawings, the numeral 1 indicates the carbureter casing, which comprises a cylindrical air inlet valve chamber, 2, a carbureting chamber 3, projecting at right angles to, and communicating with the chamber 2, a vertical tubular guideway 4 for the gasoline valve, which extends from the carbureting chamber out through the top of the casing, and a cap 5, which is bolted to the top of the casing and supports mechanism to be hereinafter described.

The outer end of the carbureting chamber has formed thereon a flange 6, having bolt holes in its opposite ends, through which bolts are passed to secure the carbureter to the end of the intake manifold, in the usual manner. The air valve chamber 2 extends the length of the casing, and its lower end terminates in an interior annular flange 7, which forms a support for a cylindrical valve 8, which is adapted to be lifted in the chamber 2 by suction force, as air is drawn through the carbureting chamber by the pistons in the engine cylinders, as will be understood. The hollow casting which forms the carbureting chamber 3 is V-shaped in cross section where it adjoins the cylinder 2, as shown in Fig. 3, but this V-shaped cross section merges into a circular opening at the outer end of the chamber to allow for the movement of a circular throttle valve 9, of the usual type, which is secured centrally of its width, upon a vertical stem 10, which is mounted in the outer portion of the wall of the carbureting chamber, and extends through its circular portion, above mentioned. The junction of the carbureting chamber 3 with the valve chamber 2, forms a V-shaped opening 11 through the wall of the valve chamber, and this opening is tall enough to extend a short distance above the top of the valve 8, when the same is resting on the annular flange 7, for a purpose to be hereinafter explained.

The valve 8 is formed with an axial hole or chamber 12 which extends from the upper

end of the same to within a slight distance of its lower end, and this chamber tapers from its upper end. A shoulder 13 is formed on the valve near its lower end, which rests
 5 on the annular flange 7, and the valve is flared from the shoulder 13 to its lower end, which projects beyond the lower end of the chamber 2, when the valve is resting on the
 10 flange 7. In this position of the valve 8 it closes the lower end of the V-shaped opening 11, by which the valve chamber 2 communicates with the carbureting chamber 3, and it also closes the lower end of the chamber 2 against the admission of air. When, how-
 15 ever, the valve is raised by the suction force through the carbureting chamber, due to the intake strokes of the pistons of the engine cylinders, its shoulder 13 rises above the lowest point of the V-shaped opening 11,
 20 thus forming communication between the valve chamber and the carbureting chamber, and the air drawn into the lower end of the valve chamber passes through the opening thus uncovered by the valve, and through
 25 the carbureting chamber, where it is mixed with inflowing gasolene in a manner to be presently described, and whence the commingled air and gasolene passes to the engine cylinders. As the throttle is more widely
 30 opened, the suction action is correspondingly increased, and the valve 8 rises higher in the chamber 2, thus increasing the area of the opening between the valve chamber and the carbureting chamber, and thereby permit-
 35 ting a greater inflow of air to the carbureting chamber, the increased air supply being coincident with an increase in the gasolene supply, through the medium of automati-
 40 cally operating mechanism which will now be described:

At the lowest point of the carbureting chamber, and adjacent the valve chamber 2, is a circular aperture 14, which opens into an internally threaded counterbore 15, in
 45 which is screwed a nipple 16. This nipple has a tip 17 which projects through the hole 14 and extends a slight distance into the carbureting chamber, and also a threaded portion which screws into the threaded counter-
 50 bore 15, the outer end of the nipple being hexagonal in form to receive a wrench. The tip 17 of the nipple has a small aperture 18 which communicates with an opening 19 in the nipple, the lower portion of which is of
 55 greater diameter than the upper portion, and is internally threaded. A coupling 20, of any preferred type, is screwed into the lower end of the nipple, and this coupling supports one end of a pipe 21, the other end
 60 of which connects with a gasolene tank, in the usual manner. The guideway 4 consists of a vertical enlargement on one side of the casting 1, having a circular guideway hole or passage 22, therein, which extends from
 65 the top of the casting and opens into the

carbureting chamber at its lower end; the said passage being in axial line with the hole 18 in the tip of the nipple 16. In the upper end of the passage 22 is screwed a
 70 plug 23, having an axial hole therein, in which is slidably mounted a stem 24, the upper end of which terminates in a head 25; the lower end of this stem is threaded, and enters a threaded hole in a circular block or
 75 coupler 26 which fits snugly but slidably in the lower portion of the passage 22. A needle valve 27 is threaded into the lower end of the coupler 26, and the lower end portion of the valve tapers to a point, and is projected into the hole 18 in the tip of the
 80 nipple 16. The threaded connection of the stem 24 and needle valve 27 with the coupler 26 permits of either the stem or valve being lengthened or shortened with respect to the coupler 26, and when the stem and valve are
 85 adjusted to the proper length, they are held against accidental turning movement by jam nuts 28 on the stem and valve respectively, which are screwed tightly against the end of the said coupler 26. An expansion coil
 90 spring 29 surrounds the stem 24, and is interposed between the plug 23 and the coupler 26, and this spring exerts a downward pressure on the coupler 26 whereby the tapered end of the needle valve is projected into the
 95 hole 18 in the tip of the nipple 16, and the valve is closed when the engine is shut down. The needle is raised to permit an inflow of gasolene to the carbureting chamber through hole 18 in the following manner: The cap 5
 100 which closes the top of the carbureter defines an interior recess 30. This recess 30 terminates at one end in a chamber 31, preferably of circular cross section, which extends at an angle to the recess 30. A bolt 33 extends
 105 through the hole 32 and receives a thumb nut 34, having a knurled flange portion, as shown in Figs. 1 and 3, to facilitate the manipulation of the nut, which is screwed against the end of the projecting member
 110 31. The lower end of the bolt 33 terminates in a thin, flat-sided head 34^A, and to which is pivotally secured the bifurcated end of an arm 35, which lies in the recess 30, as shown. The opposite end of this arm is also bifur-
 115 cated, and straddles the upper end of the stem 24, below the head 25 thereof, which is engaged by and rests upon semicircular projections 36, on opposite sides of the said bifurcated end. The arm 35 is formed with a
 120 substantially semi-circular curve, adjacent its free end, and a depending rib 37 is formed at the junction of the curved and straight portions of the arm, which is adapted to be engaged by an actuating lever 38,
 125 to rock the arm 35 and thereby lift the needle. The lever 38 comprises a vertically disposed portion which terminates at its lower end in a curved foot 39, which is positioned directly above the rim of the chamber 130

12 in the air valve 8, as shown in Fig. 2. The lever is curved at its upper end to form a horizontally disposed portion 40, which is designed to engage the rib 37, and the portion 40 terminates in a hub 41 which is mounted on an eccentric portion 42, of a pin 43, which extends through the housing 30, and is supported in circular bearings 44 formed on the said housing. The part 42 of the pin 43 is circular in cross section, but eccentric to the axis of the pin, so that the position and pivotal relation of the lever 38 to the valve may be varied, and this latter operation is accomplished by means of a lever arm 45, which is rigidly secured on one end of the pin 43, and which is operated by a rod (not shown) which is secured at one end to the arm 45, and extends through the dashboard of the car to within convenient reach of the attendant. A circular enlargement 46 is formed on one side of the housing 30, and at the opposite end thereof from the hollow projecting member 31, and this enlargement is provided with a threaded aperture which opens into the housing. A plug 47, having a threaded portion, is screwed into the threaded aperture in the enlargement 46, the plug having a wrench receiving head 48. An axial bearing is formed in the plug 47 in which is mounted a pin 49, the inner end of which is formed with a short arm 50 which terminates in a toe at right angles to the arm, and this toe extends under the adjacent end of the arm 35. Upon the outer end of the pin 49 is rigidly secured a lever arm 51 which is adapted to be connected to one end of a rod (not shown) which extends to the front of the car, to within easy reach of the driver. When the pin 49 is rocked, the toe on its inner end raises the free end of the arm 35, which in turn lifts the needle valve and permits the gasolene to flow into and flood the lower portion of the carbureting chamber. This may be done prior to starting the engine, in order that the cylinders may be given an initial charge of mixture of much richer quality than is necessary when the engine is thoroughly under way. An expansion coil spring 52 surrounds the bolt 33 which supports the arm 35, and is interposed between the head of the bolt and the end wall of the hollow member 31. This spring exerts a continuous downward pressure on the bolt 33, by which the nut 34 is held tightly against the end of the member 31, and by screwing or unscrewing the nut upon the bolt, the bolt is moved up or down, and the position of the arm 35 varied in a corresponding manner. When the arm 35 is lowered until the rib 37 touches the part 40 of the lever 38, the lever 38 will begin to swing the arm 35 the instant the foot 39 at the lower end of the lever is engaged by the rim of the chamber 12 in the

ascending air valve 8, and the needle valve will thus begin to rise with the first movement of the lever 38. But when the thumb nut 34 is turned to draw the bolt 33 up against the action of the spring 52, the arm 35 is thereby raised and the rib 37 is thus spaced from the part 40 of the lever 38, and the lever 38 will be swung some distance before its upper portion 40 engages the rib 37 and lifts the arm 35, and consequently, the needle valve 37. In this manner a regulated mixture of uniform richness can be maintained, as, when the arm 35 is raised to space its rib 37, from the end 40, of the lever 38, the supply of air, relatively to the supply of gasolene, is greater than when the arm 35 is positioned low enough for its rib 37 to touch, or nearly touch the part 40 of the arm 38, for, in the first instance, the valve 8 may rise far enough to admit air to the carbureting chamber before the needle valve is raised to admit gasolene, while in the latter instance,—or when arm 35 is lowered so that the rib 37 touches, or nearly touches the part 40 of the lever 38—the needle valve begins to rise with the rising of the valve 8, and the gasolene supply is therefore greater, relatively, to the air supply. The movement of the needle valve can thus be regulated to give a mixture of any required richness. Upon the upper end of the throttle valve stem 10 is rigidly secured the hub of a lever arm 53, which is adapted to be connected in the usual manner with the throttle lever on the steering wheel. These connections are not illustrated as they are common to all automobiles, and form no part of the present invention. The hub of the lever arm 53 is formed with wings 54 and 55, which project from the hub at right angles to each other, and also extend down below the bottom face of the said hub. A stop 56 is formed on the top wall of the carbureting chamber centrally of its width, and the arm 55 carries a screw 57, the end of which engages the stop 56 when the throttle valve is closed, and the arm 54 engages the stop 56 when the throttle is all the way open, and prevents further opening movement of the said throttle.

A groove 57 is formed in the wall of the valve chamber 2, and extends from the carbureting chamber to the top of the said chamber 2. This groove permits the air in the chamber 2 to exhaust into the carbureting chamber when the valve 8 rises above the top of the carbureting chamber.

In operation, the various mechanisms having been properly adjusted, the engine is started in the usual manner, and the suction action through the carbureting chamber first exhausts the air in the carbureter, whereby the valve 8 is raised by atmospheric pressure and uncovers the lower end of the opening 11, which forms the communication be-

tween the valve chamber and the carbureting chamber. The air then rushes through the chamber 2 and opening 11 and into and through the carbureting chamber, the volume being determined by the throttle valve 9. The air valve 8 is now lifted by the in-rushing air and the tapered face of its chamber 12 engages the shoe 39 of the lever 38 and swings the said lever outward, and the part 40 of the lever engages the rib 37 of the arm 35 and lifts the said arm, which in turn lifts the needle valve, thus admitting a supply of gasolene to the carbureting chamber, where it mixes with the in-rushing air, and the mixture thus formed is drawn into the engine cylinders. The valve 8 rises or falls as the volume of air passing through the carbureter is increased or diminished by the throttle valve, the admission of gasolene being at all times automatically controlled by the action of the valve 8, so that the gasolene supply shall bear a proper proportion to the air supply under the varying speed of the engine. The richness of the mixture can be increased at will, independently of the movement of the valve 8, by drawing on the lever 45, by which the pin 43 is rocked and the lever 38 swung, thereby raising the lever 35, and consequently the needle valve, whereby a greater amount of gasolene is admitted relatively to the air supply than would otherwise be possible.

The improved carbureter is simple in construction, and the parts are of such character that they can be easily removed or replaced and the various adjustments made, by an unskilled person.

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

1. In a carbureter, a casing comprising an air-intake chamber and a carbureting chamber disposed at an angle thereto, a suction-operated tubular slide valve having axial movement in the air inlet chamber for controlling the flow of air to the carbureting chamber, a cam element forming part of the slide valve, a movably mounted lever extending in axial direction in the air-intake chamber in the path of the said cam element, a fuel intake valve and means operatively related to the said lever for translating the motion of the slide valve to the fuel intake valve.

2. In a carbureter, a casing comprising an air-intake chamber and a carbureting chamber disposed at an angle thereto, a suction-operated tubular slide valve having axial movement in the air-inlet chamber for controlling the flow of air to the carbureting chamber, a cam element forming part of the slide valve, a pivotally mounted lever extending in axial direction in the air-inlet chamber in the path of the said cam element, a fuel-intake valve and means operatively

related to the said lever for translating the motion of the slide valve to the fuel intake valve, said means including a lever extending transversely of the air intake chamber, means for pivotally supporting the transverse lever at one end, the other end being connected to the fuel-intake valve, means for varying the position of the said supporting means and means on the axially disposed lever for engaging the transverse lever.

3. In a carbureter, a casing comprising an air-intake chamber and a carbureting chamber disposed at an angle thereto, a suction-operated tubular slide valve having axial movement in the air-inlet chamber for controlling the flow of air to the carbureting chamber, a cam element forming part of the slide valve, a pivotally mounted lever extending in axial direction in the air-inlet chamber in the path of the said cam element, a fuel-intake valve and means operatively related to the said lever for translating the motion of the slide valve to the fuel intake valve, said means including a lever extending transversely of the air intake chamber, means for pivotally supporting the transverse lever at one end, the other end being connected to the fuel-intake valve, means for varying the position of the said supporting means, means for varying the pivotal relation of the axially disposed lever to the transverse lever and means on the axially disposed lever for engaging the transverse lever.

4. In a carbureter, a casing comprising an air-intake chamber and a carbureting chamber disposed at an angle thereto, a suction-operated tubular slide valve having axial movement in the air-inlet chamber for controlling the flow of air to the carbureting chamber, a cam element forming part of the slide valve, a lever extending in axial direction in the air-inlet chamber in the path of movement of the said cam, means for pivotally supporting the lever, a second lever extending transversely of the air-inlet chamber, means for pivotally supporting one end of the transverse lever, means for varying the position of the pivotal support for the axially extending lever, means for varying the position of the pivotal support for the transverse lever, means on the axially extending lever for engaging the transverse lever and a fuel-intake valve connected to the other end of the transverse lever.

5. In a carbureter, a casing comprising an air-intake chamber and a carbureting chamber disposed at an angle thereto, a suction-operated tubular slide valve having axial movement in the air-inlet chamber for controlling the flow of air to the carbureting chamber, a cam element forming part of the slide valve, a lever extending in axial direction in the air-inlet chamber in the path of movement of the said cam, means for pivot-

ally supporting the lever at its upper end, a second lever disposed transversely of the air-inlet chamber, means for pivotally supporting one end of the transverse lever, means for shifting the said support axially of the chamber, the transverse lever being disposed in the path of movement of the axially disposed lever, means for varying the position of the pivotal support for the axially disposed lever and a fuel intake valve connected to the other end of the transverse lever.

6. In a carbureter, a casing comprising a carbureting chamber and an air intake chamber, an adjustable fuel inlet valve in the carbureting chamber, a suction-operated slide valve having motion in the air intake chamber and controlling the admission of air into the carbureting chamber, and means for translating the motion of the slide valve to control the said fuel inlet valve, said means including a lever extending lengthwise in the air intake chamber and means on the slide valve defining a cam surface to actuate the said lever.

7. In a carbureter, a casing comprising a carbureting chamber and an air intake chamber, an adjustable fuel inlet valve in the carbureting chamber, a suction operated slide valve controlling the admission of air into the carbureting chamber and having in axial direction a recess defining a cam surface and means for translating the motion of the slide valve to control the fuel inlet valve, said means including a lever extending lengthwise of the air intake chamber and acted upon by said cam surface.

8. In a carbureter, the combination with a casing comprising communicating air intake and fuel inlet chambers, an air-suction-operated piston valve in the air intake chamber for progressively opening communication between the chambers, a spring-controlled valve for the fuel inlet, an adjustable bolt, a fuel valve-lifting arm pivotally connected to said bolt, a pin having a portion eccentric to its axis, a lever arm mounted on the eccentric portion of said pin, and operated by said piston valve, for rocking said fuel valve-lifting arm, and means whereby said pin may be rocked on its axis to swing the piston valve-operated lever arm independently of the action of the

piston valve, to rock the said fuel valve-lifting arm.

9. In a carbureter, the combination with a casing comprising an air intake cylinder having a V-shaped opening in its wall, and a carbureting chamber communicating with the air cylinder through said opening, and having a fuel inlet; of a spring-controlled valve for said fuel inlet, an adjustable pivotally mounted lifting arm for said fuel valve, an air-suction-operated intake piston valve in the air intake cylinder for progressively uncovering the said V-shaped opening, said valve having an axial tapered chamber, a lever arm the lower end of which is engaged by the wall of said tapered chamber to rock the said arm, whereby the said lever arm engages and rocks the fuel valve-lifting arm.

10. In a carbureter, the combination with a fuel inlet valve, an air intake valve, a fuel valve-lifting arm, and means operated by the piston valve for rocking the said lifting arm, of a rock pin having a toe which engages said lifting arm, and a lever on said rock pin, whereby the lifting arm may be operated independently of the valve-operated means, when it is desired to lift the fuel valve from its seat to admit a flow of gasoline.

11. In a carbureter, the combination with a spring-controlled fuel valve, and a rock arm for lifting the same, of a pin having a portion eccentric to its axis, a lever arm mounted on the eccentric portion of said pin and having a portion adapted to engage the said fuel valve-lifting arm, a suction-operated air intake piston valve having an axial tapered hole, said lever arm being adapted to be engaged by the inclined wall of said tapered hole, whereby the arm is swung, the fuel valve-lifting arm is rocked, and the fuel valve raised, and a lever secured to said pin whereby the same may be turned on its axis to swing the lever arm independently of the action of the piston valve.

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

CHARLES E. JOHNSON.

Witnesses:

G. SARGENT ELLIOTT,
ADA DWELLE.