B. IVOR.

CARBURETER.

APPLICATION FILED FEB. 25, 1910.

986,572.

Patented Mar. 14, 1911.

3 SHEETS—SHEET 1.

Fig. 2.

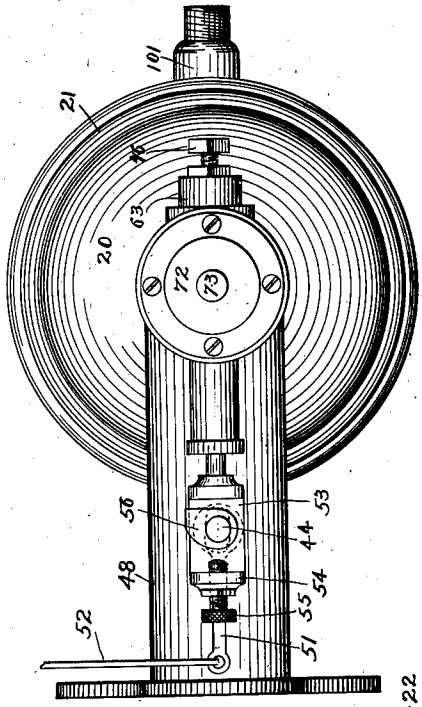
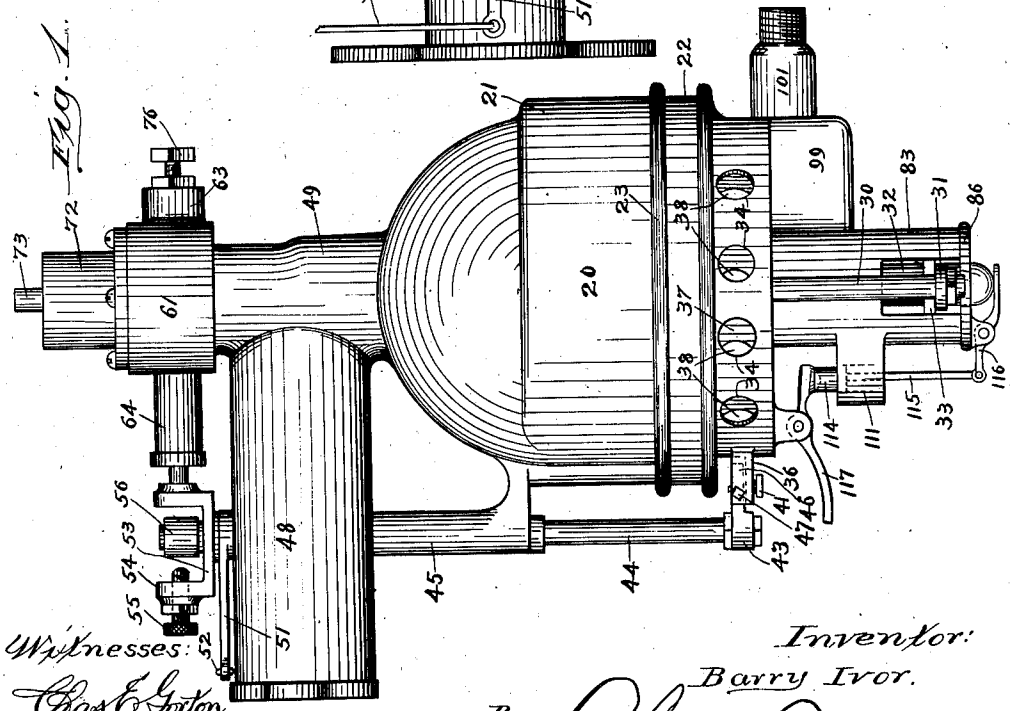


Fig. 1.



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3 SHEETS—SHEET 2.

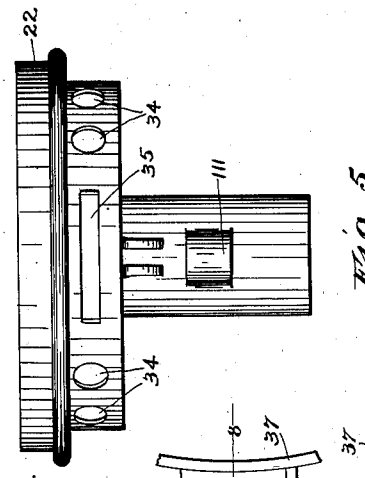

Fig. 4.

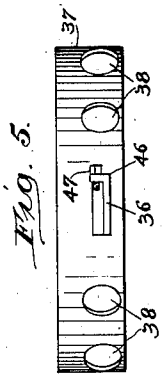

Fig. 5.

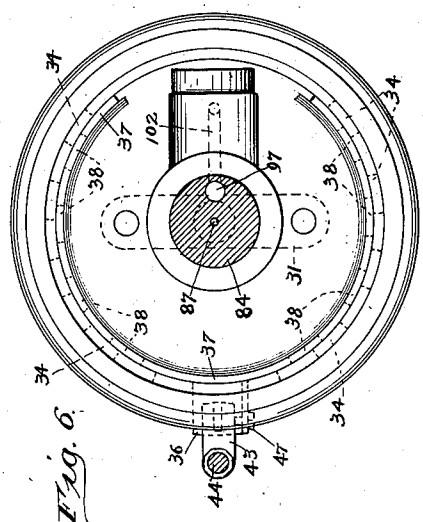

Fig. 6.

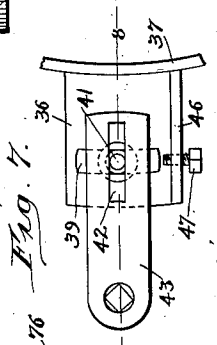

Fig. 7.

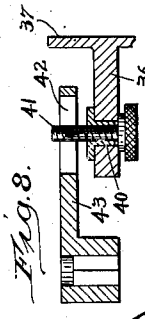

Fig. 8.

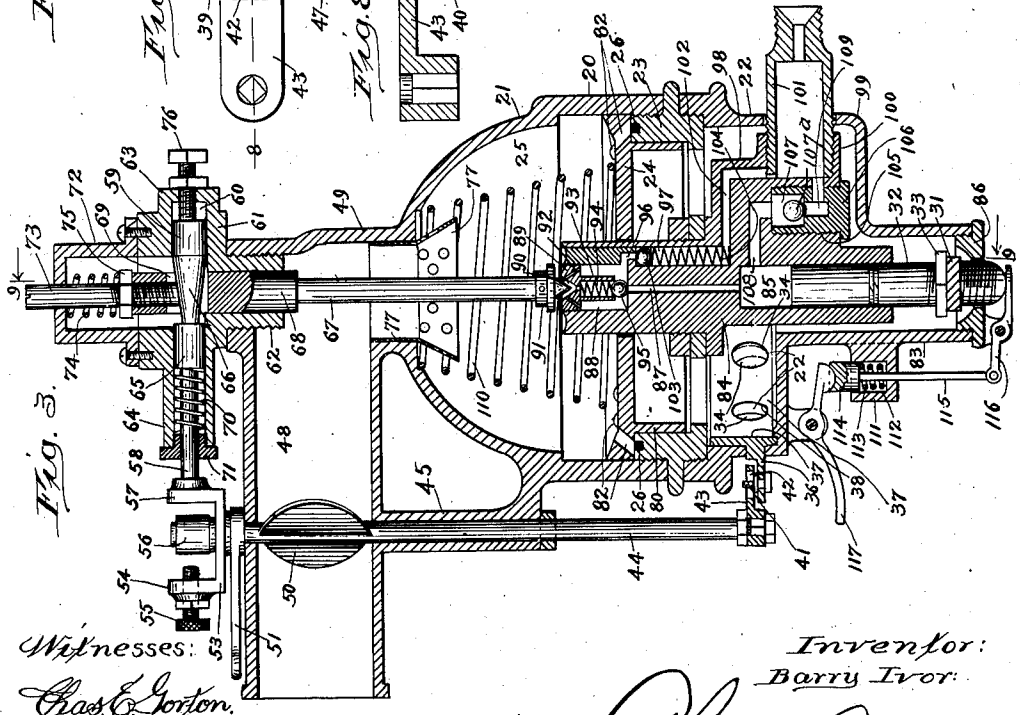

Fig. 3.

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3 SHEETS—SHEET 3.

Fig. 13.

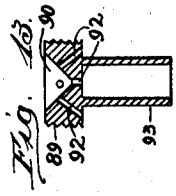


Fig. 10.

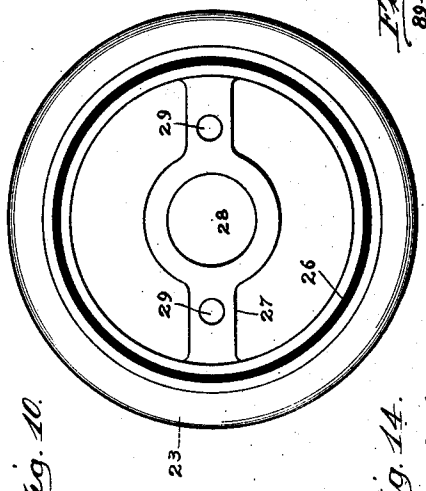


Fig. 11.

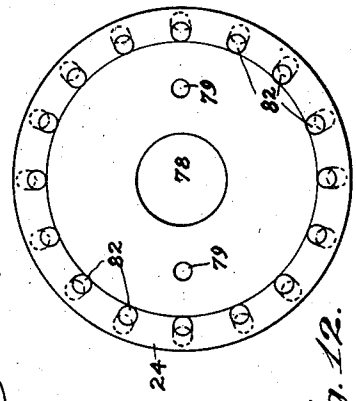


Fig. 12.

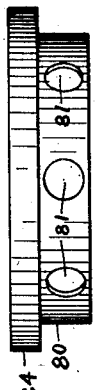
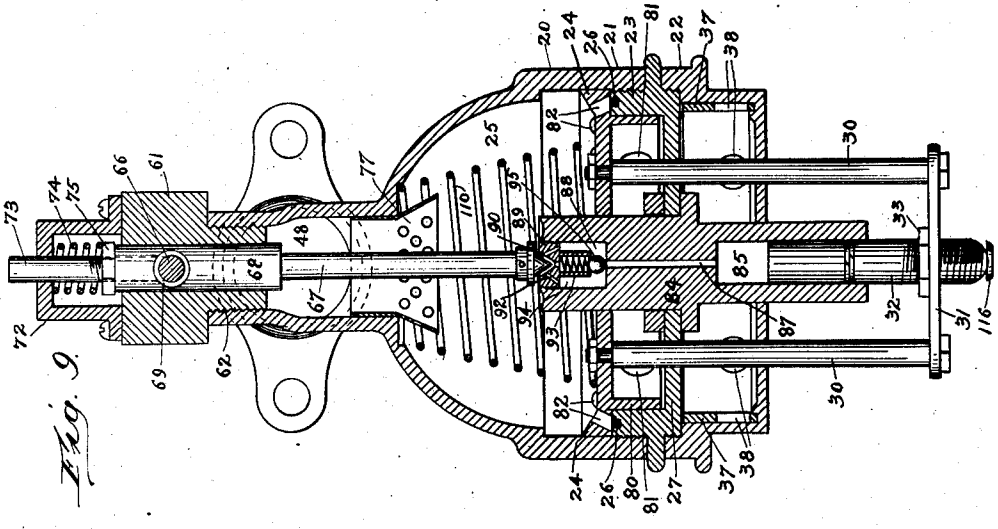


Fig. 14.

Fig. 9.



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UNITED STATES PATENT OFFICE.

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CARBURETER.

986,572. Specification of Letters Patent. Patented Mar. 14, 1911.

Application filed February 25, 1910. Serial No. 545,868.

To all whom it may concern:

Be it known that I, BARRY IVOR, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

This invention relates to certain improvements in a device of a somewhat similar character and construction to that shown and described in an application for Letters-Patent, filed by me, on the 13th day of January, 1910, for improvements in carbureters, which application bears Serial Number 537,872, and some of the objects of my present invention are similar to those set forth in the above-mentioned application, but other objects and results will be attained thereby, and the objects, in part, are as follows; to provide a simple, inexpensive and efficient carbureter for hydrocarbon engines of various types and for different uses, but more particularly for gasolene engines for operating automobiles; to dispense with the use of the ordinary float valves which are commonly employed in carbureters heretofore in general use, the use of which valves is objectionable for the reason said float valves are liable to clog, to be misplaced by the vibrations of the machine, and to permit of flooding or undercharging the engine.

Another object is to provide a carbureter in which the quantities of air and gasolene or hydrocarbon admitted to the mixing chamber can be readily and nicely regulated, and the same more thoroughly commingled than is ordinarily done, and will be of such construction and operation as to prevent waste of gasolene or hydrocarbons.

A further object is to provide a pump of an improved construction and operation, which, while more especially intended for use in connection with the other elements of a carbureter, yet is applicable and may be used for other purposes.

Other objects and advantages of the invention will be disclosed in the subjoined description and explanation.

In the accompanying drawings which serve to illustrate the invention:—Figure 1, is a view in side elevation of a carbureter embodying the invention; Fig. 2, is a plan view thereof; Fig. 3, is a central vertical sectional view; Fig. 4, is a detached view in elevation of the lower portion of the casing; Fig. 5, is a view in side elevation of the air regulator; Fig. 6, is a plan view partly in section of the lower portion of the casing showing the air regulator and the pump therein; Fig. 7, is an enlarged plan view of a portion of the air regulator and the means for adjusting and operating the same; Fig. 8, is a sectional view taken on line 8—8 of Fig. 7; Fig. 9, is a vertical sectional view taken on line 9—9 of Fig. 3, looking in the direction indicated by the arrows; Fig. 10, is a plan view of the valve seat for the valve of the mixing chamber; Fig. 11, is a plan view of said valve; Fig. 12, is a view in side elevation; Fig. 13, is a sectional view of the valve seat located in the upper end of the pump; and Fig. 14, is a plan view of the same.

Like numerals of reference, refer to corresponding parts throughout the different views of the drawings.

The reference numeral 20, designates the casing or body of the carbureter, as a whole, and as shown, it consists of upper and lower portions 21, and 22, respectively, which are hollow and partially cylindrical in shape. The lower portion of the part 21, of the casing is internally screw-threaded and the upper portion of the lower part 22, is likewise internally screw-threaded for the purpose of engaging screw-threads on the annular valve seat 23, for the valve 24, of the mixing chamber 25, with which the upper portion of the part 21, of the casing is provided. The valve seat 23, is provided on its upper surface with a packing ring 26, of any suitable material to coact with the valve 24, so as to form a close joint and also to prevent noise. Extended diametrically across the valve seat 23, is a bar or member 27, which is provided with a central opening 28, for the reception of the pump body or cylinder and on each side of said central opening with an opening 29, for the upper portions of rods 30, which are connected at their lower ends by means of a bar 31, through a central opening in which is extended the lower portion of the pump plunger 32, which portion is screw-threaded and has in engagement therewith above the bar 31, a nut 33, which may be used for more securely holding the bar 31, in place on the plunger.

As is clearly shown in Fig. 4, of the drawings, the lower portion 22, of the casing is provided with a series of openings 34, for the passage of air and also with a slot 35, through which is extended an arm or exten-

sion 36, on the periphery of the air regulator 37, which is provided with a series of openings 38, to register with the openings 34, in the part 22, of the casing. The regulator 37, is preferably segmental in shape as shown in Fig. 6, and is located within the part 22, below the portion thereof which engages the aforesaid valve seat. The arm 36, on the regulator 37, is provided with a transverse slot 39, in which is located the sleeve nut 40, which receives and engages a screw 41, which is extended upwardly from the arm 36, through a slot 42, in an arm 43, mounted on the lower portion of a rod 44, which is journaled on a suitable extension 45, with which the upper portion of the casing is provided.

As shown in Figs. 5, and 7, the arm 36, is provided on one of its side edges with an upwardly extended portion 46, in which is located a screw 47, projected in the path of the arm 43, and used to limit the movement thereof in one direction. This arm is fixed on the lower portion of the rod 44, which rod is extended through a hollow extension 45, on the casing 21, and also through a conduit 48, which communicates at one of its ends with a neck or reduced portion 49, extended upwardly from the upper part of the casing and having communication with the mixing chamber thereof. The other end of the conduit or extension 48, may be suitably connected to the engine (not shown) and is provided on the rod 44, with a damper 50, of any well known type to regulate the passage of the mixture of air and gasolene from the mixing chamber to the engine. Secured at one of its ends on the upper portion of the rod 44, just above the extension 48, is a lever 51, which has secured to its other end a connection 52, which may lead to a lever (not shown) used for regulating the supply of the mixture of air and gasolene to the engine. Mounted on the rod 44, above the lever 51, is a yoke 53, which has in one of its upturned ends 54, a regulating screw 55, the inner end of which is adapted to coact with a cam 56, mounted on the upper end of the rod 44, as is clearly shown in Fig. 2, of the drawings. Horizontally mounted on the other upturned end 57, of the yoke and movable therewith, is one end of a shaft or rod 58, the other end of which is enlarged as at 59, and located in a horizontally disposed cavity 60, of a fitting 61, which has a screw threaded extension 62, engaging an opening in the upper portion of the neck or reduced portion 49, of the casing. The fitting 61, is provided opposite the extension 63, thereon in which the cavity 60, is found, with a horizontal extension 64, in the hollow of which is located an enlarged portion 65, of the rod or shaft 58, which rod or shaft is formed with a tapered portion 66, located between the enlargements 59, and 65, as is clearly shown in Fig. 3, of the drawings. The fitting 61, has extended vertically therethrough a needle valve 67, the lower end of which is pointed or conical in shape and is adapted to control the flow of gasolene through the valve seat located in the upper portion of the pump, as will be presently explained. The upper portion of the needle valve 67, is preferably enlarged as at 68, and has a transverse opening 69, for the passage of the tapered portion 66, of the valve regulating rod 58, which is normally held in its projected position by means of a spring 70, encircling the same between the enlargement 65, thereon and the cap 71, on the end of the extension 64, within the cavity of which extension said spring is located.

As is clearly shown in Fig. 3, the fitting 61, is provided on its top with a removable cap 72, through which is extended a screw rod 73, in screw engagement with the upper portion of the enlargement 68, of the needle valve and extended into the transverse opening 69, thereof so as to contact with the tapered portion 66, of the valve regulating rod. Around the screw rod 73, is a spring 74, which has one of its ends seated against the cap 72, and its other end against a nut 75, on said rod above the enlargement 68, of the needle valve. Located in the end of the extension 63, is a set screw 76, the inner end of which is adapted to contact with the outer end of the enlargement 59, so as to restrict its movement in one direction. By reference to Figs. 3, and 9, of the drawings, it will be seen that the upper part 21, of the casing 20, is cylindrical in its lower portion while its upper part is dome-shaped or contracted upwardly, and has in its upper portion a downwardly flared baffle 77, which is preferably provided with perforations as shown. Located in the cylindrical or lower portion of the part 21, of the casing, is the valve 24, for the mixing chamber, which valve is provided with a central opening 78, for the reception of the pump cylinder, and on each side of said opening with an opening 79, in which the upper ends of the rods 30, are secured, thus uniting the pump plunger 32, with said valve. The valve 24, is provided near its periphery with a downwardly extended annular flange 80, in which is formed a series of openings 81, for the passage of air. Above the flange 80, the valve 24, is provided with a series of inwardly inclined openings 82, which, when the valve is raised, will afford communication between the lower portion of the casing and the mixing chamber 25, for the passage of air into the latter. Extended vertically through the bottom of the lower part 22, of the casing and into a downward extension 83, thereon, is the pump cylinder 84, which is provided with a cavity 85, extended from its lower

end upwardly to a suitable point, and has movably fitted therein a plunger 32, which is extended through an opening in a screw plug or cap 86, on the lower portion of the extension 83, of the casing. Leading from the upper end of the cavity 85, in the pump cylinder is a channel 87, which terminates at its upper end in an enlarged opening 88, formed in the upper end of the cylinder 84, and provided with internal screw-threads to engage screw threads on the valve seat 89, which is formed in its upper portion with a conical shaped cavity 90, to receive the lower end of the needle valve 67, which preferably has on its lower portion a collar 91, to deflect the gasolene as it is discharged from the pump. The valve seat 89, is provided with a series of channels 92, which communicate with the enlarged opening 88, and said seat also has a tubular extension 93, in which is located a spring 94, to rest against a ball valve 95, which normally closes the channel 87, of the pump cylinder. Communicating with the opening 88, and extended to one side thereof is a channel 96, which communicates with a channel 97, formed in the upper portion of the pump cylinder and extended downwardly therein to a point near the upper end of the cavity 85. The pump cylinder 84, is provided below the valve seat 23, with a lateral extension 98, which is located in a hollow lateral extension 99, on the lower portion 22, of the casing and at one side of the extension 83, thereon. The extension 98, on the pump cylinder, is provided with a screw threaded opening 100, in which is fitted a tubular piece 101, which is extended through an opening in the extension 99, and may be connected to a supply of gasolene or hydrocarbon not shown. Leading from the lower end of the channel 97, through the extension 98, and into the opening in which the tube 101, is fitted, is a channel 102.

Located in the upper end of the channel 97, is a ball valve 103, which is normally held so as to close the port 96, by means of a spring 104, located in the channel 97, and resting at its lower end on the lower surface of the channel 102, which as before stated communicates with the supply of gasolene. The lower portion of the extension 98, on the pump cylinder is provided with a screw-threaded opening 105, in which is located a screw plug 106, which has in its upper portion a cavity 107, which has communication through a channel 108, in the extension 98, with the cavity 85, of the pump cylinder. The cavity 107, of the screw plug 106, also has communication with the cavity of the tube 101, through a channel 109, formed in said plug and the lower portion of the extension 98, of the pump cylinder. A ball valve 107^a, located in the cavity 107, is employed to open and close the port or channel 109, in the operation of the pump.

Resting at one of its ends on the upper surface of the valve 24, for the air chamber, is a spring 110, the other end of which is seated against the upper portion of the part 21, of the casing and normally holds said valve in its closed position. The extension 83, on the lower portion of the casing may be provided with a projection 111, having a cavity 112, in which is seated a spring 113, interposed between the head 114, on the upper end of a connecting rod 115, which is extended through said projection and is pivotally secured at its lower end to a lever 116, fulcrumed on the cap 86, and extended under the lower end of the pump plunger 32, as is clearly shown in Figs. 1, and 3, of the drawings. Fulcrumed on the lower portion of the part 21, of the casing, is a lever 117, the inner end of which contacts with the upper portion of the head 114, so that by raising the outer end of the lever 117, the lever 116, will be operated so as to impart motion to the plunger 32, and thus force gasolene into the mixing chamber, which arrangement is designed to be used as an auxiliary means or for starting the operation of the carbureter.

From the foregoing and by reference to the drawings, it will be clearly understood and readily seen that gasolene or other hydrocarbons may be supplied to the pump through the member 101, which as before stated may have communication with a supply of gasolene or other hydrocarbon, and through the suction or operation of the engine the valve 24, of the mixing chamber will be raised until the openings 81, are placed in communication with the lower portion of said chamber, at which time air will pass through the openings or ports 82, and be discharged toward the upper end of the pump cylinder. In the upward movement of the valve 24, it is apparent that the plunger 32, being united thereto by means of the rods 30, and bar 31, will be caused to rise in its cavity and thus force gasolene therefrom through the channel 87, opening 88, and the channels 92, in the valve seat 89, for the needle valve. As soon as the suction in the mixing chamber ceases or is overcome, the spring 110, will force said valve and plunger downwardly, in which operation gasolene will be drawn through the ports or openings 108, 107, and 109, into the cavity 85, of the pump cylinder after which the above named operation will be repeated. To prevent the pump discharging excessive quantities of gasolene into the mixing chamber, the channels 96, 97, and 102, are employed for it is apparent that the surplus gasolene will be forced downwardly through said channels and back into the inlet tube 101, from which it will again be drawn into the pump. In order to regulate the quantities of air and gasolene admitted to the

mixing chamber, the lever 51, through its connection 52, with a suitable lever (not shown) on the machine may be thrown so as to bring the cam 56, into contact with the screw 55, on the yoke 53, in which operation the yoke will be moved from the needle valve 67, for it will be understood that said yoke is slidably mounted on the rod 44, thus causing the tapered portion 66, of the valve regulating rod 58, to be advanced under the lower end of the screw rod 73, which operation will raise the pin valve from its valve seat and permit an increased amount of gasolene to be discharged into the mixing chamber. In the above described operation, it is apparent that as the arm 43, is rigidly connected to the rod 44, and said arm is adjustably connected to the arm 36, of the air regulator, that said regulator will be turned so as to cause its openings 38, to register with the openings 34, in the lower portion of the casing, thus permitting air to pass into the mixing chamber. As soon as pressure has been removed from the lever 51, it is evident that the spring 70, acting on the enlargement 65, of the valve regulating rod 58, will force the same to its projected position, the limit of which may be regulated by means of the adjusting screw 76, in the extension 63, on the fitting 61, of the casing. By loosening the screw 41, and adjusting the sleeve nut 40, to the proper position within the slot 39, of the arm 36, and then tightening said screw, it is obvious that the position of the air regulator 37, may be adjusted so that the openings 38, therein may completely or partially register with the openings 34, in the lower portion of the casing so as to admit a larger or smaller quantity of air as desired.

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

1. A carbureter consisting of a casing having a mixing chamber therein, means to admit air thereto, a pump extended into the casing and having a valve-controlled intake port and a valve-controlled discharge channel communicating with the mixing chamber, a valve for the mixing chamber having a perforated annular flange on one of its surfaces and connected to the pump plunger within the casing, and means to reciprocate said valve and plunger.

2. A carbureter consisting of a casing having a mixing chamber therein, means to admit air thereto, a pump extended into the casing and having a valve-controlled intake port and a valve-controlled discharge channel communicating with the mixing chamber, and also having a valve-controlled by-pass communicating at one of its ends with the upper portion of the discharge channel and at its other end with the intake port, a valve for the mixing chamber connected to the pump plunger, and means to reciprocate said valve and plunger.

3. A carbureter consisting of a main casing having a mixing chamber therein, a pump extended into the casing and having a valve-controlled intake port and a valve-controlled discharge channel communicating with the mixing chamber, a valve for the mixing chamber having a series of inwardly inclined openings near its periphery and connected to the pump plunger within the casing, means to reciprocate said valve and plunger, and means to regulate the admission of air to the casing.

4. A carbureter consisting of a main casing having a mixing chamber therein, a pump extended into the casing and having a valve-controlled intake port and a valve-controlled discharge channel communicating with the mixing chamber, a valve for the mixing chamber having an apertured annular flange on one of its surfaces and provided near its periphery with a series of openings and connected to the pump plunger within the casing, means to reciprocate said valve and plunger, and means to regulate the admisison of both air and hydrocarbon to the mixing chamber.

5. A carbureter consisting of a casing having a mixing chamber therein, a pump extended into the casing and having a valve-controlled intake port and a valve controlled discharge channel communicating with the mixing chamber, and also having a valve-controlled by-pass communicating at one of its ends with the upper portion of the discharge channel and at its other end with the intake port, a valve for the mixing chamber connected to the pump plunger, means to reciprocate said valve and plunger, and means to regulate the admission of both air and hydrocarbon to the mixing chamber.

6. A carbureter consisting of a casing having a mixing chamber therein, a pump extended into the casing and having a valve controlled intake port and a valve-controlled discharge channel communicating with the mixing chamber, an apertured valve for the mixing chamber connected to the pump plunger within the casing, means to operate said valve and plunger, and means to simultaneously regulate the admission of both air and hydrocarbon to the mixing chamber and the mixture of air and hydrocarbon to the engine.

7. A carbureter consisting of a casing having a mixing chamber therein, a pump extended into the casing and having a valve-controlled intake port and a valve-controlled discharge channel communicating with the mixing chamber, and also having a valve-controlled by-pass communicating at one of its ends with the upper portion of the discharge channel and at its other end with the intake port, a valve for the mixing chamber

connected to the pump plunger, means to operate said valve and plunger, and means to simultaneously regulate both the admission of air and hydrocarbon to the mixing chamber and the mixture of air and hydrocarbon to the engine.

8. A carbureter consisting of a casing having a mixing chamber therein, means to admit air thereto, a pump extended into the casing and mixing chamber and having at its end within the mixing chamber a valve seat, a valve for the mixing chamber connected to the pump plunger, means to operate said valve and plunger, a spring pressed needle valve mounted above said valve in the pump and having a transverse opening in its upper portion, a spring actuated valve regulating rod having a tapered portion extended through said opening in the needle valve, and means to move said rod against the tension of its spring.

9. A carbureter consisting of a casing having a mixing chamber therein, means to admit air thereto, a pump extended into the casing and mixing chamber and having a valve seat in its end within the said chamber, a valve for the mixing chamber connected to the pump plunger, means to operate said valve and plunger, a needle valve mounted above the said valve seat in the pump and having a transverse opening in its upper portion, a spring actuated valve operating rod suitably mounted above the casing and having a tapered portion located in the said opening of the neede valve, a yoke slidably mounted and connected at one of its ends to said rod, a conduit communicating with the casing, a damper-rod journaled in the conduit and supporting the said yoke, a damper on said rod within the conduit, a lever fixed to said rod, a cam rigidly secured on the damper rod, and an adjusting screw located in one end of the yoke to coact with said cam.

10. A carbureter consisting of a casing having a mixing chamber therein, means to admit air thereto, a pump extended into the casing and having a valve-controlled intake port and a valve-controlled discharge channel communicating with the mixing chamber, an apertured valve for the mixing chamber connected to the pump plunger within the casing, and means to reciprocate said valve and plunger.

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