B. IVOR.

CARBURETER.

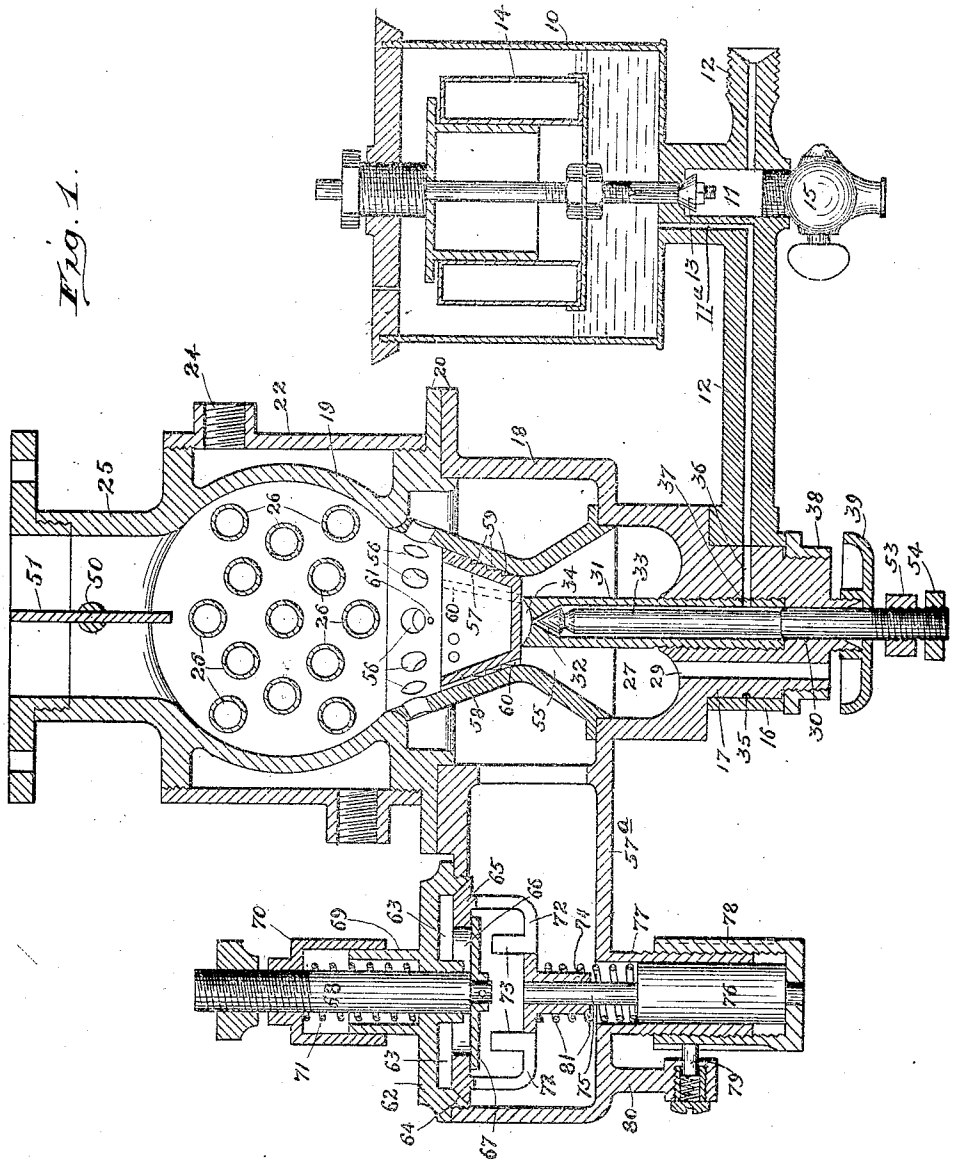
APPLICATION FILED MAY 15, 1911.

1,042,004.

Patented Oct. 22, 1912.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

Chas. E. Gorton

E. Newstrom

Inventor:

Barry Ivor.

By. Chas. E. Pickman

Atty

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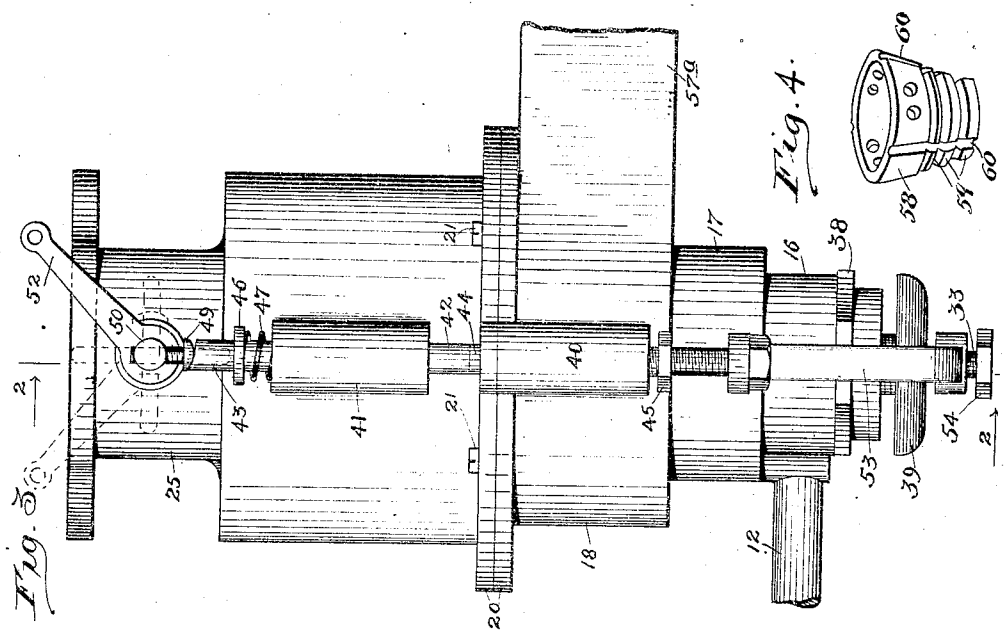

Fig. 3.

Fig. 4.

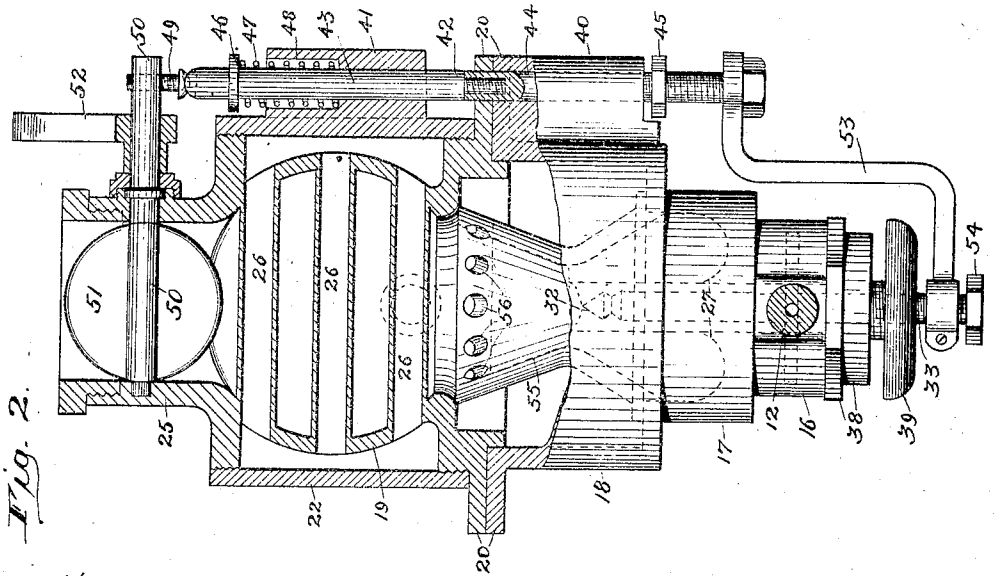

Fig. 2.

Witnesses:

Chas. E. Gorton

E. Newstrom

Inventor:

Barry Ivor:

By Chas. C. Tillman

Atty.

UNITED STATES PATENT OFFICE.

BARRY IVOR, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-SIXTH TO JOHN D. GAZZOLO, ONE-SIXTH TO HARRY Q. TURNER, ONE-SIXTH TO JOHN D. HARTFORD, ONE-SIXTH TO FRED FREER, AND ONE-SIXTH TO HERBERT R. McPHERSON, ALL OF CHICAGO, ILLINOIS.

CARBURETER.

1,042,004. Specification of Letters Patent. Patented Oct. 22, 1912.

Application filed May 15, 1911. Serial No. 627,109.

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 improvements in carbureters of the gravity-feed or float-valve type, for hydrocarbon or explosion engines of various kinds, but more particularly for gasolene engines used for operating automobiles and motor boats, and it consists in certain peculiarities of the construction, novel arrangement and operation of the various parts thereof as will be hereinafter more fully set forth and specifically claimed.

The main object of this invention is to provide a carbureter of simple, efficient, and desirable construction in which the mixture of air and hydrocarbon is effected in a most thorough and satisfactory manner, and co-acting supplemental air-supply valves automatically controlled by the passage of air through the carbureter to the engine, are used, to regulate the supply of air so that it and the hydrocarbon will be commingled in the proper proportions constantly and under different suctions, and varying speeds of the engine, to the end, that a practically constant explosive mixture will be furnished at all times, unless it is desired to decrease or increase the richness of the mixture, means for which is provided.

Another object is to provide means for atomizing the hydrocarbon, and break up the volume of air, as they pass into the carbureting chamber, as well as, to furnish means to heat and expand said elements while within said chamber.

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

In order to enable others skilled in the art to which the invention pertains, to make and use the same I will now proceed to describe it referring to the accompanying drawings in which—

Figure 1, is a central vertical sectional view through a carbureter embodying the invention. Fig. 2, is a view partly in section and partly in elevation taken on line 2—2 of Fig. 3, looking in the direction indicated by the arrows. Fig. 3, is a view in side elevation of the carbureter casing showing the mechanism for regulating the discharge of hydrocarbon into the carbureting chamber and the outlet of the mixture therefrom, and Fig. 4, is a detached perspective view of the hydrocarbon distributer or atomizer.

Corresponding numerals of reference refer to like parts throughout the different views of the drawings.

The reference numeral 10, designates a reservoir for the liquid hydrocarbon, such as gasolene, which reservoir is mounted on and has communication through an inlet 11^a, with a conduit 12, leading from a source of supply, not shown, to the carbureter casing. The outlet 11, is controlled by a valve 13, on the vertical stem of which is mounted a float 14, within the receptacle 10, the arrangement being designed to maintain substantially constant level of the liquid hydrocarbon in the reservoir. The lower portion of the conduit 12, is provided with a drain cock 15, which communicates with the passage 11, of the reservoir, and the discharging end of said conduit is furnished with a band or ring 16, which may be rotatably but snugly fitted on a cylindrical extension 17, on the lower portion of the casing of the carbureter. This casing is composed of lower and upper parts 18 and 19, respectively, each of which is hollow and have on their adjacent surfaces flanges 20, through suitable openings in which are inserted bolts 21, used for securing the two parts of the casing together. As shown, the upper part 19, is surrounded by a jacket 22, which is preferably in screw engagement at its upper and lower ends with the upper and lower portions of the part 19, of the carbureter casing. This jacket is provided in its lower portion with an inlet 23, to which a conduit, not shown, leading from a supply of hot water may be connected, and has in its upper portion an outlet 24, for the discharge of water.

The part 19, of the casing is provided with an extension or conduit 25, for the outlet of the mixture of air and hydrocarbon, which conduit has communication with the engine, not shown, and may be connected thereto in any suitable manner. Extended across the upper part 19, of the carbureter casing, the interior of which part forms the

carbureting chamber, are a series of passageways 26, which are arranged in staggered relation to one another and spaced apart so as to permit of the passage of the explosive mixture therebetween. These tubes or passages 26, communicate at each of their ends with the cavity between the jacket 22, and the part 19, of the casing and furnish means for the free circulation of hot water or any other desirable heating agent therethrough.

As before stated, the lower part 18, of the casing is provided with a downward extension 17, which is provided in its upper portion with a cavity 27, with which a number of openings 29, leading from the lower end of said extension communicate and are used for the admission of a constant supply of air to the casing. The extension 17, is provided with a central bore 30, the upper portion of which is enlarged and screw-threaded to receive a nozzle 31, which nozzle is formed internally at its upper end with a tapered valve seat 32, for a valve 33, which has its upper end tapered to correspond with its seat, and is located within the bore 30, of the extension 17, as well as within the nozzle 31, which forms a casing for said valve. The upper end of the nozzle or valve casing 31, is preferably formed with a concaved cavity 34, for the purpose to be presently explained.

By reference to Fig. 1, of the drawings, it will be clearly seen that the extension 17, is provided with a circumferential groove 35, and with a port or channel 36, which communicates at its inner end with a port 37, formed in the lower portion of the nozzle 31, or needle valve casing. The outer end of the port or channel 36, communicates with the groove 35, and when the ring 16, of the conduit 12, is in position on said extension it is evident that said port or channel will communicate with the channel of said conduit through the groove 35, no matter what direction said conduit may project from said extension. The band 16, of the conduit 12, is held in position on the extension 17, by means of a nut 38, which engages its lower portion, thus it will be seen that the conduit 12, may be turned on the extension 17, so that the reservoir 10, may be placed at any desired point. Mounted on the lower portion of the extension 17, is a cup 39, which can be used for catching and holding the drippings from the carbureter casing. Reciprocatingly mounted in suitable apertured projections 40 and 41, on the sides of the part 18, of the casing, and the jacket 22, respectively, is an operating rod 42, for the valve 33, which controls the supply of hydrocarbon to the carbureting chamber. This rod is preferably formed of two pieces 43 and 44, which are screwed together at their meeting ends and the latter has its lower portion screw-threaded and has mounted thereon a nut 45, to regulate the upward movement of said rod. The upper portion of the member 43, of the operating rod is provided with a flange or projection 46, against which one end of a spring 47, which encircles said member rests, the other end of the spring resting against the bottom of the cavity 48, formed in the projection 41, of the jacket of the casing. The upper end of the member 43, of the operating rod is beveled so as to co-act with an adjusting screw 49, which is seated in a shaft 50, journaled transversely in the extension 25, leading from the carbureting chamber. Mounted on the shaft 50, is a damper or valve 51, used for regulating the passage of explosive mixture from the carbureting chamber to the engine. Fixed on the shaft 50, is a lever 52, which may be suitably connected to a lever, not shown, on the machine used for regulating the carbureted air to the engine. Secured to the lower portion of the valve operating rod is one end of an arm 53, the other end of which is adjustably connected to the lower portion of the needle valve 33, which may have on its lower end a head 54, by means of which it may be turned so as to adjust it with respect to the arm 53, and its operating rod.

Located within the lower portion 18, of the carbureter casing and resting at one of its ends on the rim of the cavity 27, in the extension 17, is a conduit 55, which is preferably circular in shape and contracted between its ends, the upper end of which rests against the lower portion of the upper part 19, of the carbureter casing as is clearly shown in Figs. 1 and 2, of the drawings. The upper portion of the member or conduit 55, is provided with a series of openings 56, which furnish passageways for air from the supplemental supply-valve casing 57ª, which extends laterally from the part 18, of the carbureter casing and is in communication therewith. Loosely mounted in the upper tapered portion of the conduit 55, is a gasolene or hydrocarbon distributer and atomizer 58, which is in the form of a downwardly tapered cup having on its outer surface a series of circumferential steps 59, and a series of upwardly extended grooves 60, which latter, will allow fluids to pass from the lower portion of the conduit 55, into the carbureting chamber when the distributer is in its normal position as shown in Fig. 1, of the drawings, in which position it will be understood that the lower portion of said distributer will rest on the rim of the cavity 34, of the nozzle 31, or needle valve casing. In the operation of the engine the distributer 57, will be raised by reason of suction so as to permit gasolene or hydrocarbon as it is discharged from the valve casing 31, to strike the lower surface of the distributer

57, by means of which it will be spread, and as it ascends around the distributer it will be atomized by means of the steps or baffles 59, as is obvious. The distributer 57, is restricted in its upward movement by means of one or more pins 61, with which the inner surface of the upper portion of the conduit 55, is provided. Fitted in a suitable opening in the upper portion of the supplemental air-supply valve casing is a plug 62, which is provided with openings 63, for the admission of air to the said casing, and said plug has on its lower surface a seat 64, for a valve 65, which has a central opening 66, opened and closed by means of another valve 67, the stem 68, of which latter valve is extended through the plug 62, and a tubular projection 69, thereon. Adjustably mounted on the valve stem 68, is a sleeve 70, which surrounds the projection 69. Surrounding the stem 68, and resting at one of its ends against the upper inner surface of the sleeve 70, and at its other end against the bottom of the projection 69, is a coil spring 71, which will normally hold the valve 67, in its seated position, yet will permit said valve to open when the suction through the carbureter is sufficient therefor. The valve 65, is provided on its lower surface with a yoke 72, which is provided with upward projections 73, the ends of which are located a slight distance below the valve 67, which valve is adapted to contact with said projections and to cause the valve 65, to be pressed downwardly when the suction through the carbureter is increased to a sufficient extent. Extending downwardly from the yoke 72, is a sleeve 74, which is loosely fitted on a stem 75, having an enlargement 76, which is loosely fitted in a tubular projection 77, which projects downwardly from the valve casing 57^a, and is externally screw-threaded. Engaging the screw-threaded projection 77, is a cap 78, which is used for adjusting the stem 75, for it is apparent that by turning the cap in the proper direction said stem will be raised or lowered, in which position it may be held by means of a spring actuated pin 79, located in a depending arm 80, on the lower portion of the valve casing 57^a, for the supplemental air-supply valves. Surrounding the sleeve 74, and the stem 75, is a spring 81, which rests at one of its ends against the yoke 72, and at its other end against the upper portion of the enlargement 76, on said stem. The tension of this spring is regulated by turning the cap 78, in the proper direction.

The operation of the device is as follows. Hydrocarbon is supplied from the source of supply and through the reservoir or float-valve chamber 10, conduit 12, passages 36 and 37, and needle valve casing 31, to the entrance of the carbureting chamber, through the suction or operation of the engine, the distributer 57, will be slightly raised, thus permitting the hydrocarbon to be spread thereby and to pass around the same into the carbureting chamber formed by the upper part 19, of the carbureter casing. In this action the hydrocarbon will be broken up or atomized by means of the steps or baffles 59, of the distributer, and at the same time air will be drawn through the openings 29, in the extension 17, of the lower part of the carbureter casing, but as the suction increases a supplemental supply of air will be admitted to the valve casing 57^a, through the openings 63, in the plug 62, and the opening 66, in the valve 65, from which casing it will pass through the openings 56, in the conduit 55, and be mixed with the hydrocarbon in the carbureting chamber. When the suction of the engine is further increased the valve 67, acting on the projections 73, of the yoke 72, will force the valve 65, downwardly thus permitting a further supplemental supply of air to the valve casing 57^a, from whence it will pass from the openings 56, into the carbureting chamber. By employing the jacket 22, around the portion 19, of the carbureter casing and supplying the latter with the passageways or tubes 26, it is evident that hot water or other heating agent may be forced through said tubes or passageways and around the carbureting chamber, thus raising the temperature of the air and hydrocarbon, and thereby causing them to be intimately and most thoroughly mixed. By moving the lever 52, in the proper direction, it is evident that the valve 51, will be turned so as to regulate the quantity of explosive mixture to the engine, and also that the needle valve 33, will be adjusted through the instrumentality of the operating rod 42, adjusting screw 49, and arm 53, so as to regulate the quantity of hydrocarbon supplied to the entrance opening of the carbureting chamber.

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

1. In a carbureter, the combination with a casing having a mixing and a diluting chamber provided with a mixture outlet and a primary and a secondary air passage, of a conduit communicating with the mixing chamber and provided with apertures, a suction-control distributer movably mounted in said conduit, and means to supply hydrocarbon to said conduit below said distributer.

2. In a carbureter, the combination with a casing having a mixing and a diluting chamber provided with a mixture outlet and a primary and a secondary air passage, of a conduit communicating with said mixing chamber and having a downwardly tapered portion provided in its upper part with apertures, a downwardly tapered suction-

control distributer movably located within the said tapered portion of the conduit, and means to supply hydrocarbon to said conduit below the distributer.

3. In a carbureter, the combination with a casing having a mixing and a diluting chamber provided with a mixture outlet and a primary and a secondary air passage, of a conduit communicating with said chamber at the entrance thereto and having a downwardly tapered portion, a downwardly tapered suction-control distributer movably located within said tapered portion of the conduit, and means to supply hydrocarbon to said conduit below the distributer.

4. In a carbureter, the combination with a casing having a mixing chamber provided with a mixture outlet, of a conduit communicating with said chamber and having a downwardly tapered portion, a downwardly tapered suction-control distributer movably located within said tapered portion of the conduit and provided with upwardly extended grooves and circumferential steps on its exterior surface, and means to supply mixture and air to said conduit below the distributer.

5. In a carbureter, the combination with a casing having a mixture chamber provided with a mixture outlet, of a conduit communicating with said chamber at the entrance opening thereof and contracted between its ends, the upper portion of said conduit having apertures therein, a downwardly tapered suction-control distributer movably located within the upper portion of said conduit, and means to supply mixture and air to said conduit below the distributer.

6. In a carbureter, the combination with a casing having a mixing and diluting chamber provided with a mixture outlet, of means to admit air to said mixing chamber, a needle valve casing extended into the carbureter casing from below the mixing chamber thereof and having communication with a supply of hydrocarbon and provided with a valve seat tapered toward its inner end, a needle valve extended through the lower portion of the carbureter casing into said valve casing and having its inner end tapered to correspond with the taper of said valve seat, a spring actuated operating rod for said valve mounted externally on the carbureter casing and having a cam face on its upper end, a connection uniting the lower portion of said rod to the lower portion of the needle valve, a damper shaft journaled in the mixture outlet of the carbureter casing, a valve on said shaft within said outlet, an adjustable screw on the damper shaft adapted to impinge against the cam faced end of said operating rod, and a connection secured at one of its ends to the damper shaft for rotating the same.

7. In a carbureter, the combination with a casing having a mixing and diluting chamber provided with a mixture outlet, of means to constantly supply air to the former, means to supply hydrocarbon to the mixing chamber, a supplemental air-supply valve-casing communicating with the diluting chamber and having oppositely disposed openings, an apertured plug located in one of said openings and having a valve seat, a tubular extension projected from the other of said openings, a stem adjustably mounted in said extension, a spring actuated sleeve movably mounted on said stem within said valve casing, a yoke extended laterally from the sleeve and toward said plug and having projections between its ends extended toward said plugs, an apertured valve on the ends of said yoke to rest on the valve seat of said plug, an adjustably spring actuated stem extended through said plug, and a valve on the inner portion of said stem to close the opening in the first named valve and when depressed to contact with said projections on said yoke.

BARRY IVOR.

Witnesses:
CHAS. C. TILLMAN,
E. NEWSTROM.