B. IVOR.

CARBURETER.

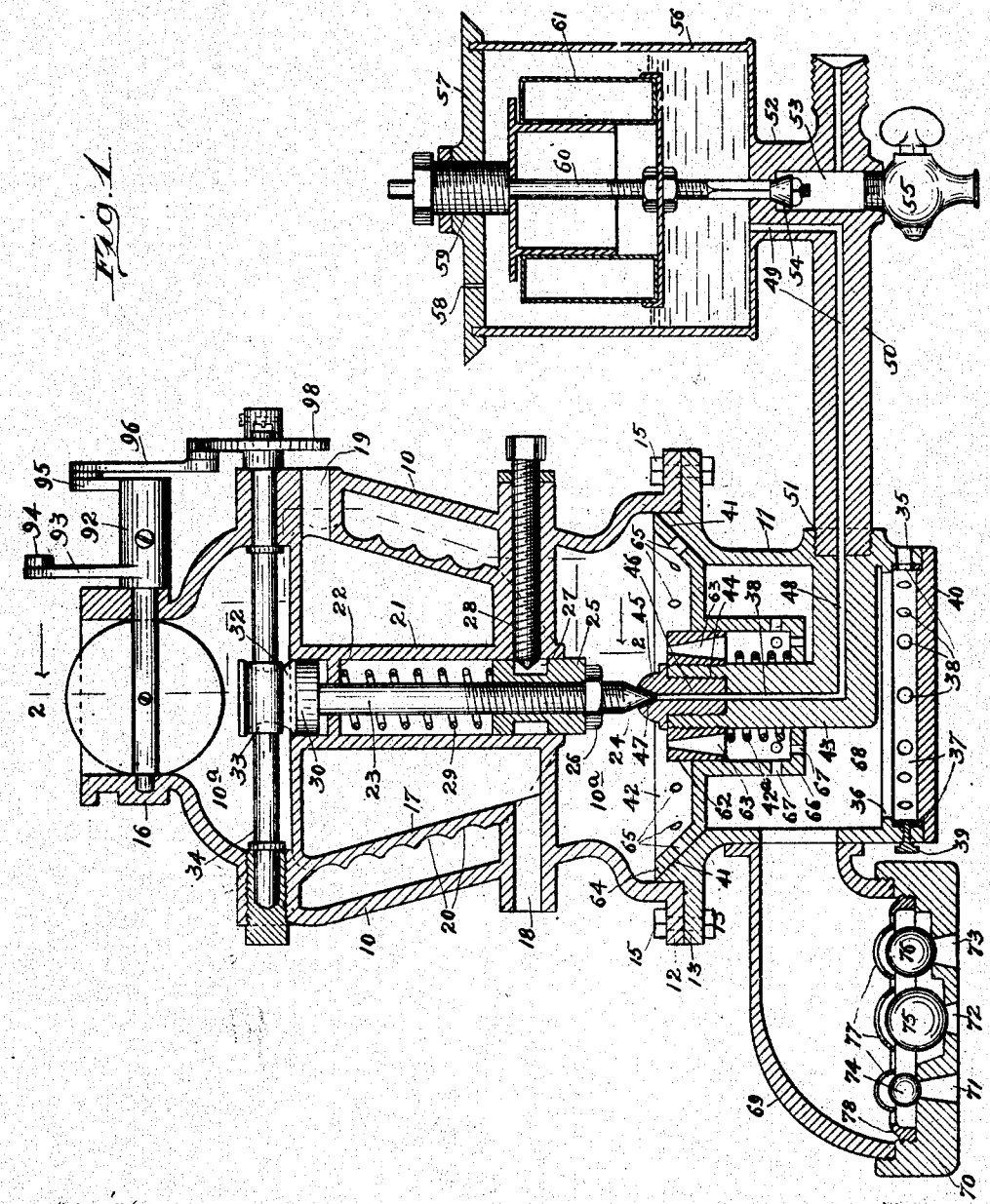
APPLICATION FILED OCT. 24, 1910.

1,019,160.

Patented Mar. 5, 1912.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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3 SHEETS—SHEET 2.

Fig. 3.

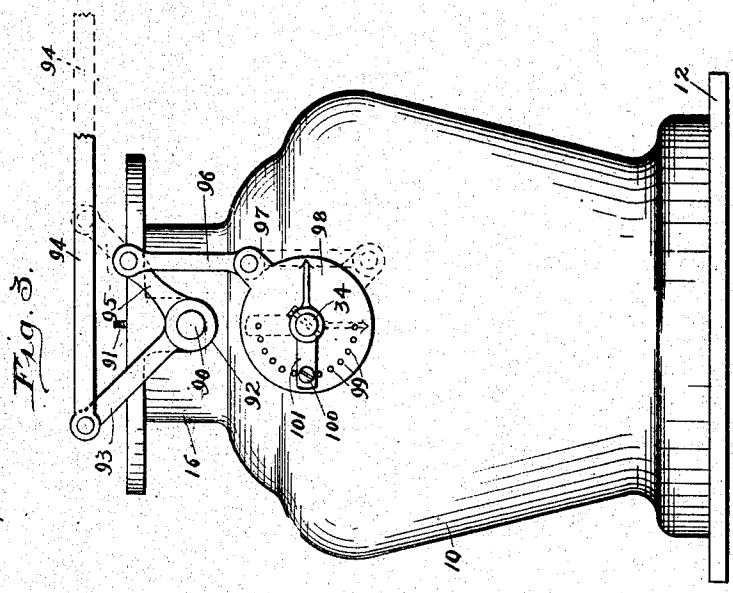
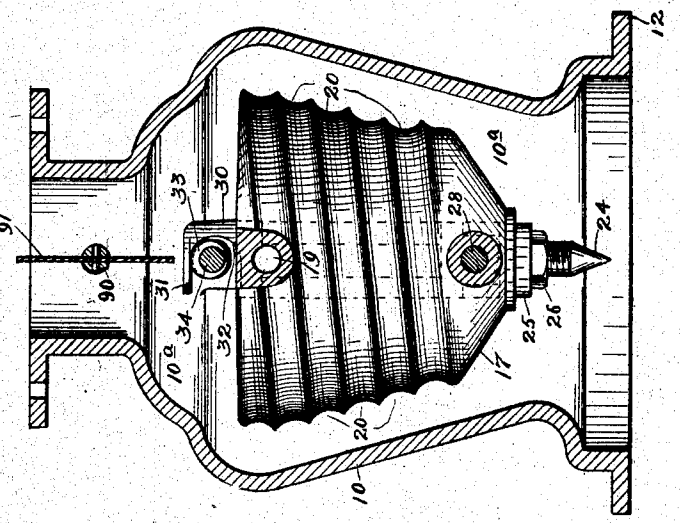


Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 4.

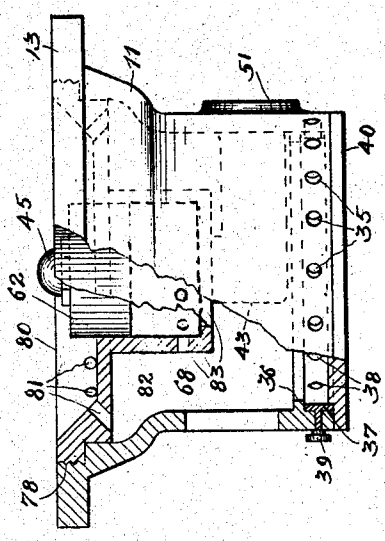


Fig. 8.

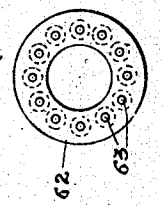


Fig. 5.

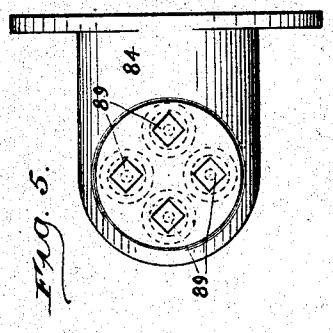


Fig. 6.

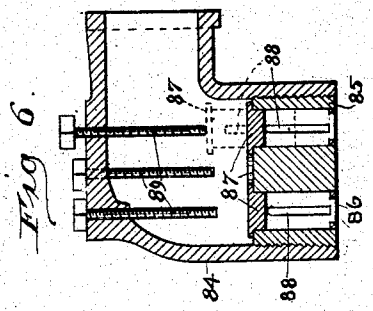
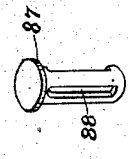


Fig. 7.



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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.

1,019,160. Specification of Letters Patent. Patented Mar. 5, 1912.

Application filed October 24, 1910. Serial No. 588,834.

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 carbureters for explosion or hydrocarbon engines of various types for various purposes, but more particularly for gasolene engines 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 principal objects of the invention are to simplify the construction of such carbureters; to improve their general efficiency; and to provide carbureters which shall be compact in form, simple, and of such construction as to provide means to adjust and maintain during its operation the proper proportions of air and hydrocarbon admitted thereto, also to introduce the air to the carbureter so as to produce a more thorough and complete mixture than is ordinarily done; to provide automatic means for the admission of air to the carbureter in proper proportions constantly and under different suctions of the engine. Various other objects and advantages of the invention will be disclosed in the subjoined description and explanation.

In the accompanying drawings which serve to illustrate an embodiment of the invention: Figure 1, is a central vertical sectional view through a carbureter embodying one form of the invention: Fig. 2, is a vertical view partly in section and partly in elevation taken on line 2—2 of Fig. 1, looking in the direction indicated by the arrows: Fig. 3, is a view in side elevation of the upper portion of the casing or the carbureting chamber, showing the mechanism for regulating the admission of hydrocarbon to the said chamber and for regulating the quantity of carbureted air to the engine: Fig. 4, is a side view partly in section and partly in elevation of the casing of the air chamber or lower part of the carbureter, showing a modification in its construction; Fig. 5, is a plan view of a modified form of the air inlet conduit and its valves; Fig. 6, is a vertical sectional view thereof; Fig. 7, is a detached perspective view of one of the valves employed in said conduit; and Fig. 8, is a plan view of the distributer for the supply of air to the carbureting chamber.

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

The casing of the carbureter is preferably formed of upper and lower parts 10, and 11, respectively, which are hollow and have meeting flanges 12, and 13, on their lower and upper portions respectively, which flanges may be secured together by bolts 15, extended through suitable openings therein. The upper portion 10, of the casing, is provided with an extension or conduit 16, for the outlet of the mixture of air and hydrocarbon, which etension or conduit has communication with the engine (not shown) and may be connected thereto in any suitable manner. Located within the part 10, but spaced therefrom, is a receptacle 17, for the retention and circulation of hot water, which may be supplied thereto through a conduit 18, in the lower portions of the parts 10, and 17, and may be discharged through a conduit 19, in said parts, preferably at a point above the inlet conduit. In the present instance, the part 10, of the casing, and the receptacle 17, therein, as well as the conduits 18, and 19, are shown as being formed integrally with one another, but it is obvious that they may be separate parts but located with respect to one another, substantially as shown. It is also evident that the conduits 18, and 19, may have connected to their outer portions suitable pipes or tubes for the supply of water to the receptacle 17, and for the discharge of the same therefrom. The receptacle 17, is tapered downwardly and has on its outer surface spirally formed grooves 20, for the upward passage of hydrocarbon and air through the carbureting chamber 10^a, formed by the upper part 10, of the casing. Located vertically and centrally within the receptacle 17, is a tubular portion 21, which has near its upper end a transversely disposed and apertured partition 22, through which the valve stem 23, of the needle valve 24, is extended.

The lower portion of the valve stem 23, is

screw-threaded and has adjustably mounted thereon a collar 25, which fits in the lower portion of the tubular part 21, and may be held in place on the stem 23, by means of a nut 26, on the lower portion of said stem. The collar 25, is provided with a recess 27, which may extend around said collar and is for the reception of the inner end of an adjusting screw 28, which is horizontally located in a suitable opening formed in the lower portions of the casing 10, and receptacle 17, as is clearly shown in Figs. 1, and 2, of the drawings. Surrounding the valve stem 23, and resting at one of its ends against the upper portion of the collar 25, and at its other end against the partition 22, is a spring 29, which actuates the needle valve in one direction. Mounted on the upper end of the valve stem 23, is a head 30, which has at its upper end a laterally disposed projection 31, between which and the lower portion of said head, is formed a transverse recess 32, for an eccentric 33, which is fixed on a shaft 34, which shaft is horizontally and transversely journaled in the upper portion of the part 10, of the casing.

The lower part 11, of the casing, is provided at its lower end with a series of openings 35, for the admission of air, and is preferably provided on its inner surface with an inwardly extending annular flange 36, located just above said openings, against the lower surface of which flange, a band 37, having a series of openings 38, which may be brought to register with the openings 35, in the part 11, of the casing, may rest. This air regulating band is provided with an extension 39, which projects through a suitable opening or slot in the wall of the part 10, by means of which projection the said band or regulator may be turned so as to cause the openings 38, therein to register with the openings 35, in the casing, or when desired, to throw the same out of register. Secured on the lower end of the part 11, is a plate 40, on which the lower surface of the regulator 37, will rest. The upper portion of the part 11, is provided on its inner surface with a valve seat 41, for the valve 42, for the carbureting chamber. Extended inwardly from the wall of the part 11, and then upwardly and centrally therein, is an extension 43, the upper portion of which is provided with a socket 44, in which is fitted a plug 45, having a channel or port 46, therethrough, and provided at its upper end with a tapered valve seat 47, for the tapered end of the needle valve 24, which co-acts with said seat to regulate the flow of hydrocarbon through the opening in said plug. The extension 43, is provided with a channel 48, which communicates at one of its ends with the channel 46, in the said plug and at its other end with the channel 49, of a pipe 50, which may be suitably secured in an opening 51, formed in the part 11, of the casing. The outer portion of the pipe of connection 50, is provided with an upward extension 52, which has a valve chamber 53, for a float operated valve 54, which is seated in the upper portion of said chamber. The lower part of the chamber 53, is provided with a drain-cock 55, and the upper part of the extension 52, has mounted thereon a receptacle 56, which has communication with the channel 49, and valve chamber 53, as shown in Fig. 1, and said vessel or receptacle has mounted on its upper end a cover 57, which is provided with a vent opening 58, and a central opening 59, through which the upper portion of the valve stem 60, is extended. This stem has mounted thereon within the vessel 56, a float 61, to actuate the valve 54, on the lower end of said stem. The pipe or connection 50, has communication at its outer end with a supply of hydrocarbon, not shown.

Mounted on the upper end of the extension 43, is an air distributer 62, which is provided with a series of upwardly tapered openings 63, which communicate at their upper ends with the carbureting chamber around the plug 45, so that the air passing through said openings will commingle with the hydrocarbon as it is discharged through the discharge port or channel 46, in said plug. The valve 42, for the carbureting chamber is provided with a peripheral flange 64, which is upwardly and outwardly inclined, to correspond with the inclination of the seat 41, for said valve, and is provided with a series of openings 65, which are inwardly directed as is clearly shown in Figs. 1, and 4, of the drawings. At its central portion, the valve 42, is provided with a hollow depending extension 66, in the upper portion of which the air distributer 62, is located. The lower part of the extension 66, is provided with openings 67, for the passage of air from the air chamber 68, which is formed by the lower part 11, of the casing. Communicating at one of its ends with the air chamber 68, is an air inlet pipe 69, which has its outer portion downturned and screw-threaded to engage a cap 70, which is provided with a series of openings 71, 72, and 73, preferably of different sizes. These openings are governed by ball valves 74, 75, and 76, respectively, which balls are preferably of different sizes and are guarded by means of arches 77, located directly over said valves and mounted on a foraminous member or plate 78, in screw-engagement with the inner upper surface of the cap 70.

In Fig. 4, of the drawings is shown a modification in the construction of the lower portion 11, of the casing, which consists in forming the upper inner portion thereof with internal screw-threads, to engage screw-threads in the periphery of a

plate or diaphragm 80, which is provided with a series of openings 81, leading from the air chamber 68, to the carbureting chamber. The plate or diaphragm 80, is provided with a downward and hollow extension 82, in the upper portion of which the air distributer 62, is located. The lower portion of the extension 82, is provided with openings 83, for the passage of air.

In Figs. 5, and 6, is shown a modification in the construction of the air inlet, which consists of a tubular extension 84, which is secured at one of its ends to the lower part 11, of the casing and has its other end downturned and internally screw-threaded to receive a plug 85, which is provided with a series of vertical openings 86, each having therein a valve 87, the heads of which will normally rest on the upper end of the plug 85, and close the openings therein. Each of the valves 87, is hollow and provided with slots 88, so that when the heads 87, are raised from their seats or the upper ends of the openings 86, in the plug 85, by reason of the pressure of air, the same may pass through the slots 88, into the tube 84, and from thence into the air chamber. Located in the upper portion of the inlet tube 84, and directly above the valves 87, are a series of screws 89, which can be adjusted so as to regulate the vertical movements of said valves.

Referring again to Fig. 1, of the drawings, it will be seen that the extension 16, has journaled therein, a shaft 90, on which is mounted a damper or valve 91, to regulate the passage of the mixture from the carbureting chamber to the engine. This shaft has one of its ends extended through the extension 16, and has mounted thereon a bell-crank-lever 92, to one arm 93, of which is pivotally secured one end of a bar or rod 94, which may be suitably connected to a lever (not shown) on the machine used for regulating the supply of carbureted air to the engine. The other arm 95, of the bell-crank-lever has pivotally connected thereto, one end of a link 96, the other end of which is pivotally connected to an arm 97, extended from a disk 98, loosely mounted on the outer portion of the shaft 34. The disk 98, is provided with a series of openings 99, to receive a pin or screw 100, on one end of an indicator 101, which is fixed on the outer end of the shaft 34. By disengaging the pin or screw 100, from the disk 98, it is apparent that the shaft 34, may be turned, by means of the indicator 101, independently of said disk, thereby placing the eccentric 33, on said shaft in the proper position with respect to the arm 31, on the head of the valve stem, so as to regulate the vertical movement of the valve 24, and its stem 23, thus regulating the discharge of hydrocarbon into the carbureting chamber. When the proper position of the eccentric 33, is attained, the pin 100, should be inserted in one of the openings therefor in the disk 98, thus rigidly securing said disk on the shaft 34, and in such a manner that the quantity of the mixture of air and hydrocarbon discharged through the outlet conduit 16, will be simultaneously regulated with the admission of hydrocarbon to the carbureting chamber. By properly adjusting the screw 28, so that its tapered inner end will project into the recess 27, of the collar 25, on the needle valve stem, it is apparent that the limit of the downward stroke of said stem and its valve can be regulated or restricted.

The operation of the device is as follows: Hydrocarbon is supplied to the carbureting chamber 10^a, from the source of supply and through the pipe 50, float valve chamber 56, and through the discharge channels 46, and 48, into the carbureting chamber. Through the suction or operation of the engine, the valve 42, will be raised until the openings 65, therein are placed in communication with the air chamber 68, when air will pass through said openings and be discharged inwardly and upwardly into the carbureting chamber above the upper end of the nipple 45, which is provided with the discharge port 46, and the valve seat 47, for the needle valve as before stated. The constant supply of air to the carbureting chamber may be controlled or shut off by turning the regulator 37, which is located in the lower portion of the casing and can be turned by means of the projection 39, so as to cause the openings 38, in said regulator to partially or entirely register with the openings 35, in the casing, or if desired, so that they will be out of register with one another. As the air is admitted to the chamber 68, through the openings 35, it will pass through the openings 67, in the extension 66, of the valve and through the tapered channels 63, in the air distributer, both while the valve is in its open or closed position, thus breaking up the volume of air which passes into the carbureting chamber or causing the same to pass therein in jets which commingle with the hydrocarbon, as the latter is discharged into the carbureting chamber. By this arrangement, a most perfect commingling of air and hydrocarbon and carburization will be accomplished. The quantity of liquid hydrocarbon supplied to the carbureting chamber can be regulated by means of the needle valve 24, on the stem 23, which may be suitably adjusted at its upper end within the recess 32, by turning the shaft 34, and its eccentric 33, in the proper direction so as to impart a greater or less movement to the head 30, on the valve stem 23, when said shaft is rocked or rotated. When the desired adjustment of the valve 24, has thus been at-

tained, the screw 28, is adjusted so as to restrict the downward movement of the collar 25, and the valve 24, when the indicator 101, should be fixed by means of the pin or screw 100, to the disk 98, in such position that when the lever 94, is moved back and forth and the valve 91, thereby operated, the quantity of carbureted air admitted to the engine will be simultaneously regulated with the quantity of hydrocarbon admitted to the carbureting chamber, which operation will be performed by reason of the connections uniting the shafts 34, and 91, as is apparent. As soon as the suction in the carbureting chamber ceases or is overcome, the spring 42ª, which surrounds the upper portion of the extension 43, and rests at one of its ends against the extension 66, and at its other end against the air distributer 62, will force the valve 42, downwardly and seat said valve, after which the above-named operation will be repeated. During the operation of the device, air will be automatically supplied to the air chamber 68, and from thence to the carbureting chamber through the air inlet or conduit 69, and the quantity automatically regulated to meet the requirements of the suction of the engine by means of the different sized gravity valves 74, 75, and 76, (and by means of the gravity valves 87, which may differ in size when the modified construction shown in Figs. 5 to 7, inclusive is employed,) for it is apparent that when the engine is running at low speed and requires a small amount of air in excess of that supplied through the regulator 37, the smallest of the gravity valves will be automatically operated by the action of the engine, but when the speed of the latter is increased, and a greater quantity of air is required, the larger gravity valves will be automatically actuated as well as the small ones, thus supplying the necessary quantity of air to the air chamber from which it will pass into the carbureting chamber and be charged with hydrocarbon, from which chamber it will pass through the extension or conduit 16, into the engine.

When the modified form shown in Fig. 4, is employed, it is apparent that as the diaphragm or plate 80, is rigidly held on the part 11, of the casing, the openings 81, in said plate or diaphragm are located so as to communicate with both the air chamber 68, and carbureting chamber, and that as air is drawn through said chambers by the operation of the engine, and its quantity may be regulated in any desired manner, the volume of air will be broken up or caused to pass into jets through the openings 81, in the diaphragm 80, and through the openings 63, in the air distributer 62, in a manner very much the same as is done when the movable valve 42, is employed.

It will be understood from the above description of my improvements, that the invention is susceptible of considerable modification without material departure from the spirit and principle of the invention, and for this reason I do not desire to be understood as limiting myself to the precise form and arrangement of the several parts, of the device, in carrying out my invention in practice.

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 carbureting chamber provided with a mixture outlet, of an apertured member extended across the casing within the same and having on one of its surfaces a hollow extension provided with openings, a channeled projection extended into the extension of said member, said channel having communication at one of its ends with a supply of hydrocarbon and at its other end with the carbureting chamber, and a perforated air distributer located between said projection and the extension of the apertured member.

2. In a carbureter, the combination with a casing having a carbureting chamber provided with a mixture outlet, of an apertured member movably mounted across the cavity of said casing and having on one of its surfaces a hollow extension provided with openings, a channeled projection extended into the extension of said member, the channel of said extension having communication at one of its ends with a supply of hydrocarbon and at its other end with the carbureting chamber, and means for actuating said member.

3. In a carbureter, the combination with a casing having a carbureting chamber provided with a mixture outlet, of an apertured member movably mounted across the cavity of the casing and having on one of its surfaces a hollow extension provided with openings, a channeled projection extended into said hollow extension, the channel in said projection having communication at one of its ends with a supply of hydrocarbon and at its other end with the carbureting chamber, a perforated air distributer located between said projection and the extension on the apertured member, and means for actuating said member.

4. In a carbureter, the combination with a casing having a carbureting chamber provided with a mixture outlet, of an apertured valve movably mounted at one end of said chamber and having on one of its surfaces a hollow extension provided with openings, a channeled projection extended into said hollow extension, the channel in said projection having communication at one of its ends with a supply of hydrocarbon and at its other end with the carbureting chamber,

a perforated air-distributer located within said extension and around said projection, and a spring to actuate the valve in one direction.

5. In a carbureter, the combination with a casing having a carbureting chamber provided with a mixture outlet, of a valve movably mounted within the casing and having near its periphery a series of openings, said valve also having on one of its surfaces a hollow extension provided with openings, a channeled projection extended into said extension, the channel in said projection having communication at one of its ends with a supply of hydrocarbon and at its other end with the carbureting chamber, a perforated air-distributer located in said extension around the projection therein, and means for actuating said valve.

6. In a carbureter, the combination with a casing having a carbureting chamber provided with a mixture outlet, of a valve movably mounted to open and close said chamber and having a series of openings near its periphery, a seat within the casing for the apertured portion of said valve, a perforated hollow extension on the central portion of said valve, a channeled projection extended into said hollow extension, the channel in said projection having communication at one of its ends with a supply of hydrocarbon and at its other end with the carbureting chamber, a perforated air-distributer located within said extension and around said projection, a spring to actuate the valve, and automatic means to regulate the admission of air to the carbureting chamber.

7. In a carbureter, the combination with a casing having a carbureting chamber provided with a mixture outlet, of means to admit air to said chamber, a channeled projection extended within the casing and having an intake port communicating with a supply of hydrocarbon and a discharge port communicating with the carbureting chamber, a suction control valve surrounding said projection and located within the casing to open and close the carbureting chamber, means to return said valve, a spring-pressed needle valve mounted to open and close the discharge port of said projection, a recessed head on the stem of the needle-valve, a shaft transversely journaled in the casing and extended through said recess, an eccentric mounted on said shaft within the recess of said head, and means to turn said shaft.

8. In a carbureter, the combination with a casing having a carbureting chamber provided with a mixture outlet, of means to admit air to said chamber, a channeled projection extended within the casing and having an intake port communicating with a supply of hydrocarbon and a discharge port communicating with the carbureting chamber, a needle valve mounted to open and close the discharge port of said projection, a recessed head on the stem of said needle-valve, a shaft transversely journaled in the casing and extended through said recess, an eccentric mounted on said shaft within the recess of said head, a damper shaft journaled in the mixture outlet, a valve on the damper shaft within said outlet, a bell-crank-lever mounted on the damper shaft, a disk adjustably mounted on the shaft of said eccentric and having an arm extended therefrom, a link pivotally connecting said arm and one of the arms of the bell-crank-lever, and a connection secured at one of its ends to the other arm of the bell-crank-lever for operating the same.

9. In a carbureter, the combination with a casing having a carbureting chamber provided with a mixture outlet, of means to admit air to said chamber, a channeled projection extended within the casing and having an intake port communicating with a supply of hydrocarbon and a discharge port communicating with the carbureting chamber, a needle-valve mounted to open and close the discharge port of said projection, a recessed head on the stem of the needle-valve, a shaft transversely journaled in the casing and extended through said recess, an eccentric mounted on said shaft within the recess of said head, a guideway for the needle-valve stem mounted within the casing, a recessed head on the lower portion of said stem, an adjusting screw having a tapered end extended into said recess, and means to turn the eccentric shaft.

10. In a carbureter, the combination with a casing having a carbureting chamber provided with a mixture outlet, of means to admit air to said chamber, a channeled projection extended within the casing and having an intake port communicating with a supply of hydrocarbon and a discharge port communicating with the carbureting chamber, a needle-valve mounted to open and close the discharge port of said projection, a recessed head on the stem of the needle-valve, a shaft transversely journaled in the casing and extended through said recess, an eccentric mounted on said shaft within the recess of said head, a guideway for the needle-valve stem mounted within the casing, a recessed member on the lower portion of said stem, an adjusting screw having a tapered end extended into said guideway, and means to turn the eccentric shaft.

11. In a carbureter, the combination with a casing having a carbureting chamber provided with a mixture outlet, of means to admit air to said chamber, a channeled projection extended within the casing and having an intake port communicating with a supply of hydrocarbon and a discharge port

communicating with the carbureting chamber, a perforated member extended across the casing and around said projection, a needle-valve mounted within the carbureting chamber to open and close the discharge port of said projection, a shaft journaled in the casing, a connection eccentrically uniting said shaft and the stem of said valve, and means to turn said shaft.

12. In a carbureter, the combination with a casing having a carbureting chamber provided with a mixture outlet, of means to admit air to said chamber, a channeled projection extended within the casing and having an intake port communicating with a supply of hydrocarbon and a discharge port communicating with the carbureting chamber, an apertured member extended across the casing at one end of the carbureting chamber and surrounding said projection, a needle-valve mounted within the carbureting chamber to open and close the discharge port of said projection, a shaft journaled in the casing, a connection eccentrically uniting said shaft and the stem of said valve, means to turn said shaft, and means to restrict the downward movement of the needle-valve.

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