C. P. SIMMONS.

CARBURETER.

APPLICATION FILED NOV. 30, 1910.

989,307. Patented Apr. 11, 1911.

3 SHEETS—SHEET 1.

Fig. 1.

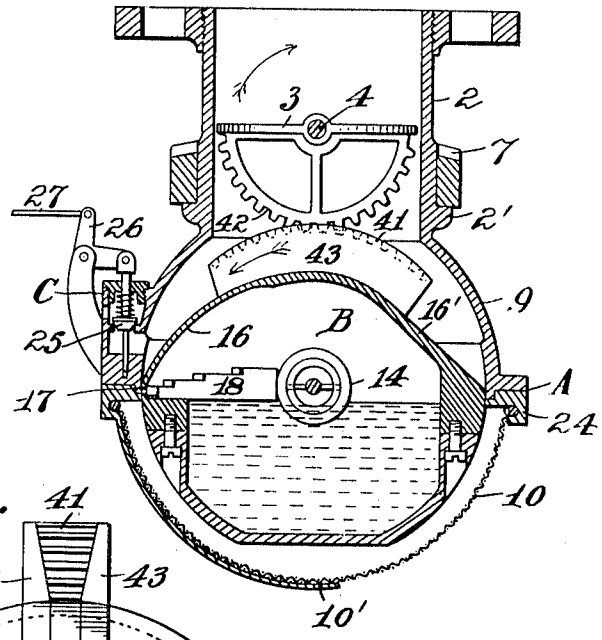


Fig. 2.

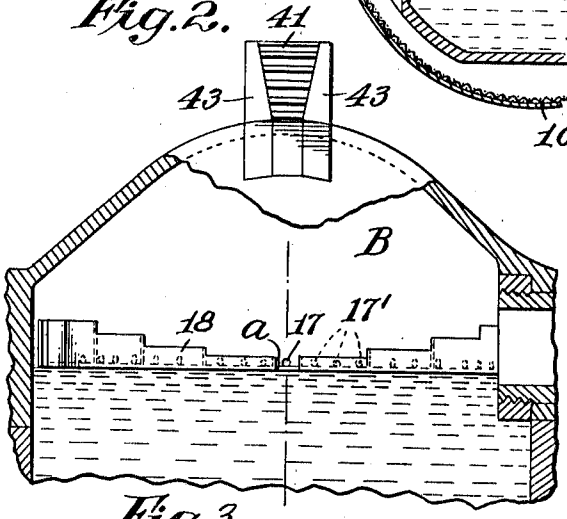


Fig. 3.

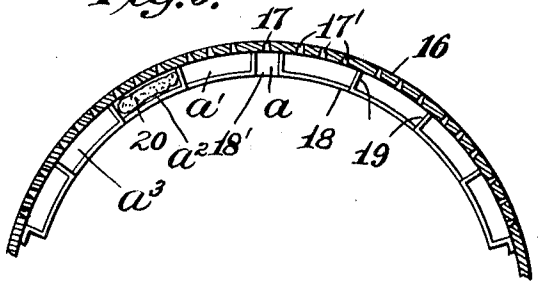
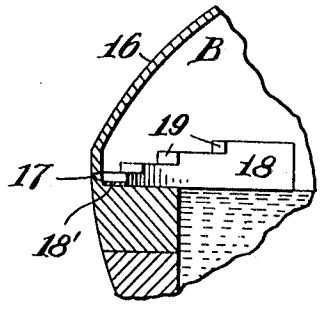


Fig. 4.



Attest:

M. E. Eveland

L. E. Johnston

Inventor:

Charles P. Simmons

by

Timothy D. Merwin Atty

C. P. SIMMONS.

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3 SHEETS—SHEET 2.

Fig. 6

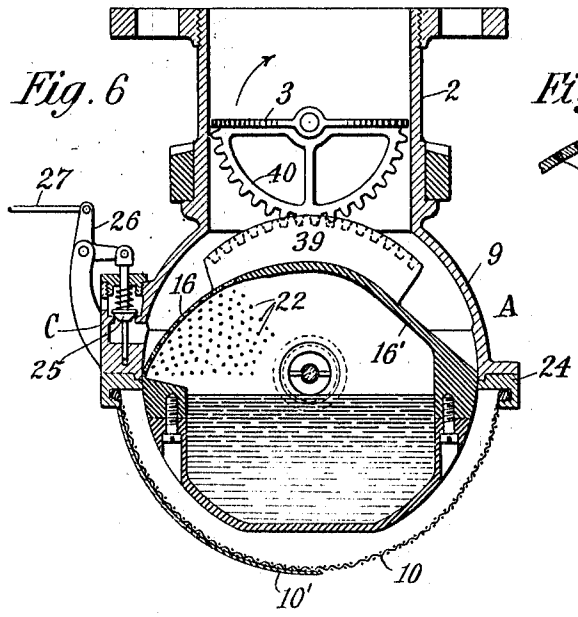


Fig. 10

Fig. 9

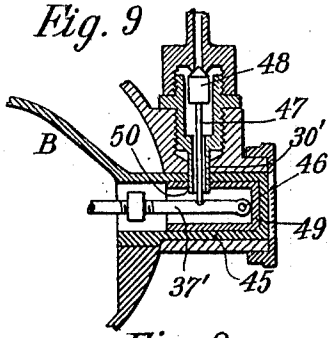


Fig. 8

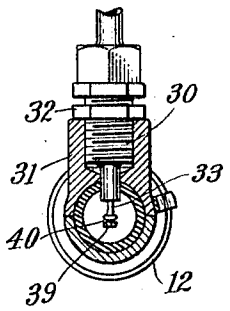


Fig. 7

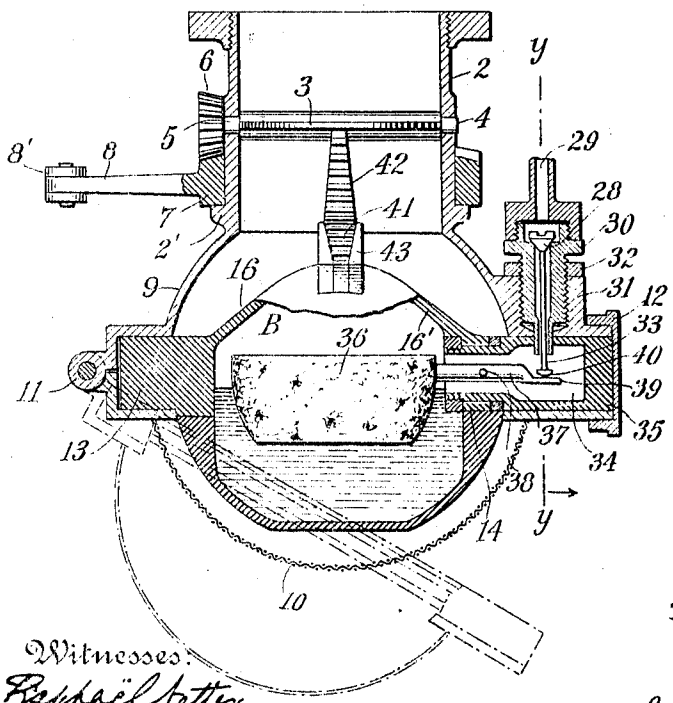
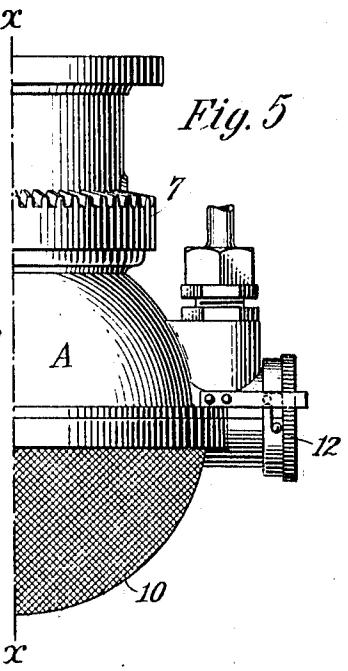


Fig. 5



Witnesses:
Raphael Netter
M. E. Eveland

Inventor:
Charles P. Simmons
By his Attorney
Timothy D. Meravis

C. P. SIMMONS.

CARBURETER.

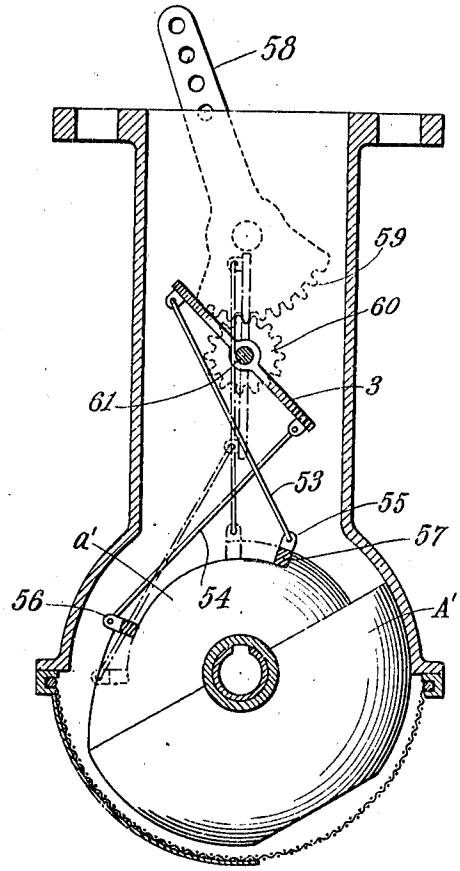
APPLICATION FILED NOV. 30, 1910.

989,307.

Patented Apr. 11, 1911.

3 SHEETS—SHEET 3.

Fig. 11



Witnesses:
Raphael Fetter
M. E. Ireland

Inventor:
Charles P. Simmons
By his Attorney
Timothy D. Merwin

UNITED STATES PATENT OFFICE.

CHARLES P. SIMMONS, OF NEW YORK, N. Y.

CARBURETER.

989,307. Specification of Letters Patent. Patented Apr. 11, 1911.

Application filed November 30, 1910. Serial No. 594,830.

To all whom it may concern:

Be it known that I, CHARLES P. SIMMONS, a citizen of the United States, residing in New York city, county of New York, and State of New York, have invented new and useful Improvements in Carbureters for Internal-Combustion Engines, of which the following is a specification.

This invention relates to improvements in carbureters for internal combustion explosive engines, and has for its objects the provision of means for regulating the supply of gasolene in a more efficient and exact manner than has heretofore been accomplished, and at the same time to admit of the suitable admixture of said gasolene with the air within the carbureting chamber prior to the admission of the same into the engine cylinder.

This invention particularly consists of the improvement in the carbureter described in the patent to E. M. J. Weinat and Joseph Bogey, No. 867,859, of October 8, 1907, and also patent to E. F. and G. H. Abernethy, No. 895,709, of August 11, 1908, and it will be noted that while the invention described in this application embodies, among other elements, a reservoir somewhat similar to the one described in the former patent, and a rotating element somewhat similar to the plug 8 described in the latter patent, that nevertheless there are certain radical and valuable improvements over and above either of the constructions shown in the aforesaid patents.

The invention is fully set forth in detail in the accompanying specification and drawings forming a part thereof, in which,

Figure 1 is a central vertical section of my improved carbureter; Fig. 2 is a fragmentary detailed elevation from within the container B, looking at right angles to the axis of said container; Fig. 3 is a horizontal sectional view, and Fig. 4 is a vertical sectional view of the construction shown in Fig. 2; Fig. 5 is a side elevation of one-half of my improved carbureter, and Fig. 6 is a central vertical section of the same (the carbureter being modified) along the line x—x of Fig. 5; Fig. 7 is a vertical section at right angles to that of Fig. 6, and Fig. 8 is a detailed section on the line y—y of Fig. 7; Fig. 9 is a fragmentary vertical section showing a modified form of container having an integral journal, and Fig. 10 is a fragmentary sectional detail of the container wall shown in Fig. 6; and Fig. 11 is a central vertical section of a modified form of carbureter.

Referring to the drawings, the reference numeral 2 designates the casing of a cylindrical carbureting chamber in which a circular valve 3 is mounted and adapted to be oscillated upon gudgeons 4 and 5, the latter being provided with a pinion 6 which is arranged to mesh with the annular gear 7, and that is in turn swiveled upon a shoulder 2′ of the casing 2. The said annular gear is operated by means of the arm 8 which is pivoted to a connecting rod 8′ and thus in operative connection with the throttle-controlling mechanism of the well known type. Below the chamber 2 is positioned a two-part approximately spherical casing A, the upper half 9 of which is integral with the casing 2, and the lower half 10 constituting a semi-spherical screen, is connected thereto by a hinge 11, being held in a closed position with respect to the part 9 by means of the screw-cap 12. Arranged within this casing, or housing, is a fluid fuel receptacle or container B which is provided with a gudgeon 13 and a bearing 14, and thereby being pivotally mounted as indicated and being readily removable from the casing when the lower part is thrown into the position indicated by the dot-and-dash line in Fig. 7. Portions of this container are also deformed with respect to a sphere, one side 16 being of greater curvature than the top of said container and the other side 16′ being preferably flattened as shown, (see Fig. 1). A series of fine orifices 17, 17′ is arranged peripherally in a single horizontal line, all at the same level, from a point adjacent the gudgeon 13 to a point adjacent the bearing 14. These apertures as shown, are preferably interiorly enlarged in order to admit of the same being plugged or packed with pieces of chamois, whereby any gasolene contained within said container will be permitted to pass through said orifices, while at the same time the gasolene, which owing to its fluidity, tends to flow very rapidly through even the smallest of apertures, will be somewhat retarded in its flow therethrough. A sheet metal casing is arranged along the inner wall of said spherical container adjacent the said orifices. Said casing consists of a vertical front wall 18 and a bottom-plate 18′ integral therewith, a portion of the said front wall 18 being

cut away adjacent the center in order to expose the central orifice 17. As shown the said bottom-plate is secured to the casing immediately below the level of the orifices. The casing is partitioned as indicated by the reference numeral 19, intermediate certain of said orifices, in such a manner that with the exception of the central orifice 17, which as stated is exposed, several of said orifices will communicate with a single one of the compartments a, a^1, a^2, a^3, and permit of the escape of gasolene therefrom. The vertical walls of the successive compartments each extend to different levels on either side of the central orifice 17, so that gasolene will be successively admitted to the compartments a^1, a^2, on either side of said central compartment a according to the degree to which said container is tilted and thereby a regulated and predetermined amount of gasolene is permitted to escape from the orifices. For example, upon the slight tilting of said container the gasolene will escape from the orifice 17 leading from the central compartment a, but upon increasing the tilt of said container the gasolene will flow from the orifices leading from the compartments a^1, a^2, and upon the further tilting of said container, in a like manner the gasolene will escape in addition from the orifice leading from the compartments a^3, etc. These compartments being preferably very narrow, being but approximately $\frac{1}{16}$ of an inch in width, admirably serve for the reception of small strips or pieces of chamois 20, which serve as a packing to restrict the excessive flow of the gasolene through even relatively small orifices. Preferably the inner surface of the container is scored or grooved to correspond with and to receive the partitions 19, and thereby the said partitions are more conveniently soldered or otherwise secured to the said wall, and the leakage of gasolene from one compartment to another is prevented.

The annular ring 24 not only serves as a support for the air screen 10, but also constitutes a seat into which the container B closely fits when in a closed position, thus admission of the inlet of air to the carbureting chamber is entirely cut off.

The eccentric curvature of one side of the container serves when it is oscillated on its bearings to afford a carefully graduated air inlet opening between the container and its seat; *i. e.* the inner face of the ring 24, and the said current flowing past the openings 17, or as hereinafter set forth the openings 22, while the opposite flattened portion 16 serves, when the container is oscillated in the opposite direction, to admit of the passage of air on the opposite side of said container and distant from the aforesaid openings. However owing to the spherical configuration of the lower portion of the container the passage of air into the carbureting chamber will be entirely cut off when the said container is in a normal and horizontal position.

In order to manually and optionally vary the quantity of fresh air admitted to the carbureting chamber without changing the position of the container, I have provided an auxiliary spring-controlled valve 25, the same being arranged within a casing C and adapted to be operated by means of a bell-crank lever 26 and connecting rod 27 which is operatable from the dash-board of the car. A valve 28 controls the inlet of gasolene to the container through the pipe 29 from the gasolene tank. A valve casing 30 is threaded into the boss 31 of the wall of the casing A and may be set in any adjusted position desired and then secured by a set-nut 32. The valve stem 33 extends downward and into the float-stem chamber 34 which is held rigidly in position by a valve casing 30, the end of which projects through the opening in its wall as shown in Fig. 7.

Arranged within the container is the float 36 and stem 37, which is secured to a fulcrum pin 38. The outer end 39 of the stem is preferably flattened in order to afford a support for the reception of the beveled end 40 of the valve stem 33. Upon the top of the container (see Fig. 1) is arranged a segmental gear 41, which meshes with the gear 42 on the oscillating valve 3, whereby when the shaft 4 is turned to open or close the said valve 3, the container is correspondingly oscillated in its bearings. On each side of the gear 41 is arranged a flange 43 the top of which is flush with and slightly above the top of the gear teeth. The faces of the gears 41 and 42 are correspondingly of varying width as shown, the purpose of which is that when the valve 3 is in a closed position, the container can be put in place, and the teeth of its gear 41 will engage with those of the gear 42, only when the container is in its proper position with respect thereto, and in proper adjustment with the upper valve; or in other words, when the valve 3 is closed the container will assume a closed position with reference to its seat in the ring 24.

In Fig. 9 is shown a modified construction of a bearing and support, for a container B, and in the same the shaft 4′, integral with said container, serves as a bearing therefor. A float stem 37′, being fulcrumed at 46, engages a stem 47 of a valve 48, the latter being normally adapted to close against the pressure from the gasolene confined above the same. When employing this construction, an inner sleeve 49 is provided, (see Fig. 9). The said shaft 45 is provided with a slotted opening 50 for the reception of the lower end of the valve casing 30′, whereby the rotation of the shaft 45 is per-

mitted and the sleeve 49 is held in stationary position during the said rotation of the shaft 45.

In the modified construction, (see Fig. 11), A^1 is rotated in its seat by means of a pair of links 53 and 54, which are connected to ears 55 and 56 on an annular ring 57 which latter is seated in a recessed portion a' of the top of the container, the other ends of the links being connected to the opposite side of the throttle valve 3, and the valve in this construction is operated by means of the lever 58 externally mounted with respect to the housing shown, and provided with a segmental gear 59 which engages the pinion 60 upon the axis 61 of the valve 3. The operation of this mechanism is evident from the construction as the container is adapted to oscillation in the same manner as in the other construction previously described.

The operation of the device shown in Figs. 1, 2, 3 and 4 is substantially as follows:— Upon the operation of the throttle lever so as to effect the opening of the valve 3, in the direction of the arrow, the gear 41 engages with the gear 42, effecting the rotation of the container in the same direction as the other arrow, and consequently, the orifices 17, being all at the same level, will be moved downwardly, and gasolene will be admitted into the compartments submerged therein, and obviously the more said openings are depressed the greater will be the number of the compartments submerged in the gasolene. Simultaneously, air is admitted between the curved outer surface of the container and the inner surface of the ring 24, the current being obviously induced by the suction stroke of the engine piston. The said current of air serves to supplement the action of gravity, when aspirating the gasolene through the orifices 17, and serves moreover to effect a complete atomization of said gasolene with the consequent thorough mixture of the same within the carbureter chamber. When the car is running down hill, since no power is therefore required, it is desirable that the gasolene supply be shut off and air be admitted in order to cool the engine. This can be conveniently accomplished by throwing the throttle lever in the opposite direction, whereby the valve 3 is opened to a corresponding extent, and the container is rotated so as to furnish quick and full inlet of pure air, while preventing the escape of gasolene through the orifices 17, said orifices being obviously elevated to a point above the level of the gasolene within the container. The air passes between the inner face of the ring 24 and the closed surface of the part 16′ of said container when the throttle lever is thrust in the aforesaid position to effect the admission of air into the engine.

In the construction shown in Fig. 6 and the corresponding figures, the container wall is shown provided, through a considerable area, with a plurality of orifices 22, and it is obvious that somewhat the same result can be accomplished upon the rotation of the container when the orifices are thus arranged, as when compartments are formed on the inner wall of the container as previously described. For example, upon slight movement of the container so as to depress the lower row of orifices 22 below the gasolene level, the gasolene will be impelled through said orifices due to gravity and aspiration of the inflowing air current, and as the number of orifices which are brought below the level of the gasolene increases the greater will be the flow of gasolene from the said container. Preferably, in order to restrict the flow of gasolene through the orifices in the manner previously described, these orifices are also packed with small chamois plugs 44′. The configuration of the container shown therein is extremely important since it not only admits of greatly enlarging the capacity of the container without increasing materially the total size of the carbureter, for as well known a sphere has a greater cubic content that any other geometrical figure, but also since the cross sectional area at the point of the greatest dimension of the container is substantially co-extensive with the interior cross sectional area of the housing, the said container itself forms a valve. Thereby any protruding valve-elements which are likely to become deranged or worn out are entirely dispensed with and the admission of air is controlled in exact accordance with the demands upon the engine in a most efficient and simple manner. Another important feature in addition to the enlarged capacity, and the fact that the container also constitutes a valve element of the mechanism, is the fact that the container is adapted to be rapidly and instantly removed either for putting the "engine out of commission" and preventing so-called "joy riding" or for heating the container when chilled to elevate the same to the proper temperature to insure the necessary volatilization of the gasolene, and the consequent immediate starting of the engine irrespective of the external temperature. As a matter of fact, although it is often advisable in cold weather to place the said container upon a steam radiator a few minutes, the starting of the engine will be remarkably facilitated if the container is merely carried in one's pocket to impart thereto the relatively slight warmth obtainable from the body.

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

1. In a carbureter, the combination com-

prising a housing having an air inlet and a mixture outlet and whose diametrical horizontal cross sectional area is less than all other diametrical areas, a gasolene container pivotally mounted in said housing and having a maximum external cross sectional area substantially co-extensive with the diametrical horizontal cross sectional area of said housing, said container itself constituting a valve and being adapted when rotated to admit a graduated supply of air between its outer surface and the inner surface of said housing and the said container being provided with one or more orifices extending through the walls of said container, adapted to permit the escape of gasolene from said container and into said housing.

2. In a carbureter, the combination comprising a housing, and a gasolene container of approximately spherical configuration pivotally mounted therein, said container being of sufficient size to approximately extend completely across the said housing at the point of maximum horizontal cross sectional area of the container, and said container being provided with orifices adapted to admit of the passage of gasolene from the interior of said container to the interior of said housing in exact accordance with the requirements therefor.

3. In a carbureter, the combination comprising, a housing having an air inlet and a mixture outlet, a container substantially co-extensive in its external cross sectional area with the interior cross sectional area of the corresponding portion of the said housing, said container being pivotally mounted in such position as to normally seal communication between said inlet and outlet openings, a plurality of compartments arranged along the inner wall of said container and extending to substantially the same level, certain of said compartments extending to higher levels than others, and orifices extending through the wall of said container affording communication between said compartments and the interior of said housing, said orifices being arranged at the same level along the periphery of said container.

4. In a carbureter, the combination comprising a housing having an air-inlet opening and a mixture-outlet opening and provided with a carbureting chamber therein, a movable valve-element including a gasolene container for admitting a mixture of air and gasolene to said carbureting chamber, and valve-controlled means for independently admitting fresh air directly to said carbureting chamber without prior admixture with gasolene.

5. In a carbureter, the combination comprising a housing having an air inlet and a mixture outlet, means, including a container, pivotally mounted within said housing and adapted to snugly fit therein so as to constitute a valve and optionally cut off communication between said inlet and said outlet, said container being provided with orifices extending through the wall thereof, a flexible packing means pervious to the gasolene arranged to retard the flow of gasolene through said orifices.

6. In a carbureter, the combination comprising a housing, having an air inlet and a mixture outlet, an approximately spherical gasolene container fitted thereto and adapted to close communication between said inlet and outlet, and being partially deformed or eccentric, whereby it is adapted when rotated to produce a graduated air opening between it and the inner wall of said housing and having a series of openings to permit a flow of gasolene from said container into the air current in proportion to the volume of said current.

7. In a carbureter, the combination comprising a housing, having an air inlet and a mixture outlet, a gasolene container fitted centrally within said housing as a valve and adapted to close communication between said inlet and outlet, by contact of its own wall with the wall of said housing, and having its upper walls deformed or eccentric, whereby when rotated in said opening air is admitted in graduated volumes between the wall of said container and the wall of said housing, said deformed or eccentric portion of the container being provided with a series of orifices permitting the flow of contained gasolene into the passing air current in proportion to the volume of air permitted to flow across the same.

8. In a carbureter, the combination comprising a housing, having an air inlet and a mixture outlet, a gasolene container fitted to and rotatable in said housing, the wall of the said container being adapted to contact with the wall of the housing, which constitute a valve seat, in order to close communication between said inlet and outlet, the upper portion of said container having its wall deformed so that when turned to bring such deformed portion of its wall adjacent the valve seat, a graded air inlet opening is provided, a valve-controlled conduit for supplying gasolene to said container and a float within said container controlling said valve.

9. In a carbureter, the combination comprising a carbureting chamber having a circular bottom opening constituting a valve seat, a gasolene container fitted in said housing and serving as a valve fitted to said seat, said container having its upper walls deformed, means for rotating said container to bring said deformed portion thereof adjacent said valve seat and thereby provide a graded air inlet opening, a series of outlets in said deformed wall adapted to de-

liver gasolene into the passing air current in proportion to the area of said air inlet, said container being also adapted to be rotated oppositely to provide an inlet for air free of the admixture of gasolene.

10. In a carbureter, the combination comprising a carbureting chamber having a bottom opening serving as a valve seat, a gasolene container fitted as a valve to said seat and rotatable therein, having a portion of its wall eccentric or deformed so that when rotated it will provide a graduated air inlet opening between said deformed portion of the wall and said valve-seat, said container having a plurality of needle point orifices adapted to permit and control a graduated flow of gasolene therethrough into the air current, a gasolene conduit leading to said container, a valve in said conduit and a float in said container controlling said valve.

11. In a carbureter a substantially hemispherical carbureting chamber having an equatorial opening serving as a valve seat, a substantially globular gasolene container fitted as a valve to said seat but cut away or deformed in its upper part, so that when rotated it will provide a variable air inlet opening therebetween, said deformed wall being provided with a series of needle point openings to permit the flow of gasolene in proportion to the size of said air inlet opening, a substantially hemispherical air screen fitted to said chamber and adapted to inclose the lower portion of said gasolene container and having an impervious shield or wall adjacent to and underneath the said air inlet opening, whereby the current of air passing through said opening is compelled to travel in close contact with the wall of said container and over said needle-point openings.

12. In a carbureter, a substantially hemispherical carbureting chamber, a gasolene container whose greatest diameter is substantially the same as that of the carbureting chamber fitted to the opening of the carbureting chamber as a valve, the top of said container being eccentric with the carbureting chamber and having a plurality of gasolene outlets therethrough, and means for oscillating the container to admit a graduated amount of air into the chamber and past the gasolene outlets.

13. In a carbureter, the combination comprising a housing having an air-inlet opening and a mixture-outlet opening, a valve controlling the said outlet opening, a removable gasolene container mounted in said housing and rotatable with respect thereto, and a pair of meshing gears, one of said gears being secured to said valve and the other being secured to said container, said gears, when said container is secured in a single, proper, initial position in said housing while said valve is closed, being adapted to permit of free and simultaneous reciprocation of said valve and said container and to prevent the said container from being operatively secured in said housing when placed therein in any other initial position while said valve is closed.

14. In a carbureter, the combination comprising a housing having at least two parts which are separably secured together and having an air-inlet opening and a mixture-outlet opening, a valve controlling said opening, a removable gasolene container mounted in said housing and rotatable with respect thereto, and a pair of meshing gears, one of said gears being secured to said valve and the other being secured to said container, said gears, when said container is secured in a single, proper, initial position in said housing while said valve is closed, being adapted to permit of free and simultaneous reciprocation of said valve and said container and to prevent the complete closing of the said parts of said housing when said container is placed in said housing in any other initial position while said valve is closed.

15. In a carbureter, the combination comprising a housing permitting of access to its interior and having an air-inlet opening and a mixture-outlet opening, readily removable means, including a gasolene container pivotally mounted in said housing intermediate said openings and adapted to seal communication therebetween when in a normal inoperative position, said container being provided with orifices which extend through the wall thereof, and means for optionally depressing or elevating said orifices with respect to the level of gasolene within said container whereby the gasolene may be fed from said container in accordance with the requirements of an engine, and means for temporarily connecting said container, while still permitting of rotation thereof, with a valve-controlled gasolene supply-conduit adapted to cut off automatically the flow of gasolene therefrom upon the removal of said container from said housing and adapted to normally permit the flow of gasolene into said container when the gasolene therein falls below a predetermined level.

In witness whereof I have hereunto set my hand at the city of New York this 29th day of November, 1910.

CHARLES P. SIMMONS.

Witnesses:
M. E. EVELAND,
CLARENCE J. WYCKOFF.