P. GILLES.

CARBURETER.

APPLICATION FILED JUNE 5, 1916.

1,240,841.

Patented Sept. 25, 1917.

3 SHEETS—SHEET 1.

Fig. 1.

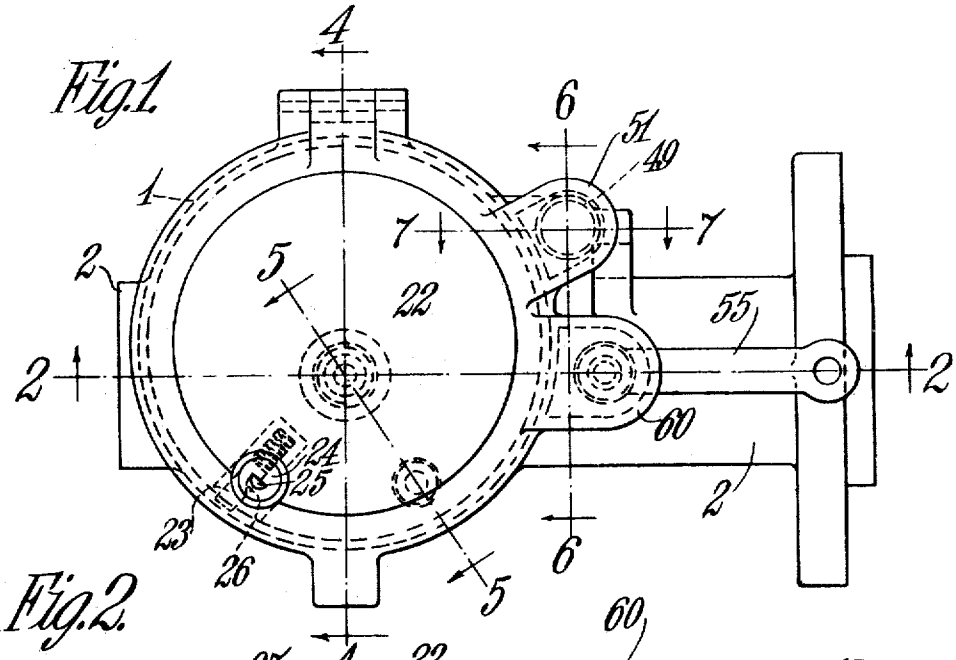


Fig. 2.

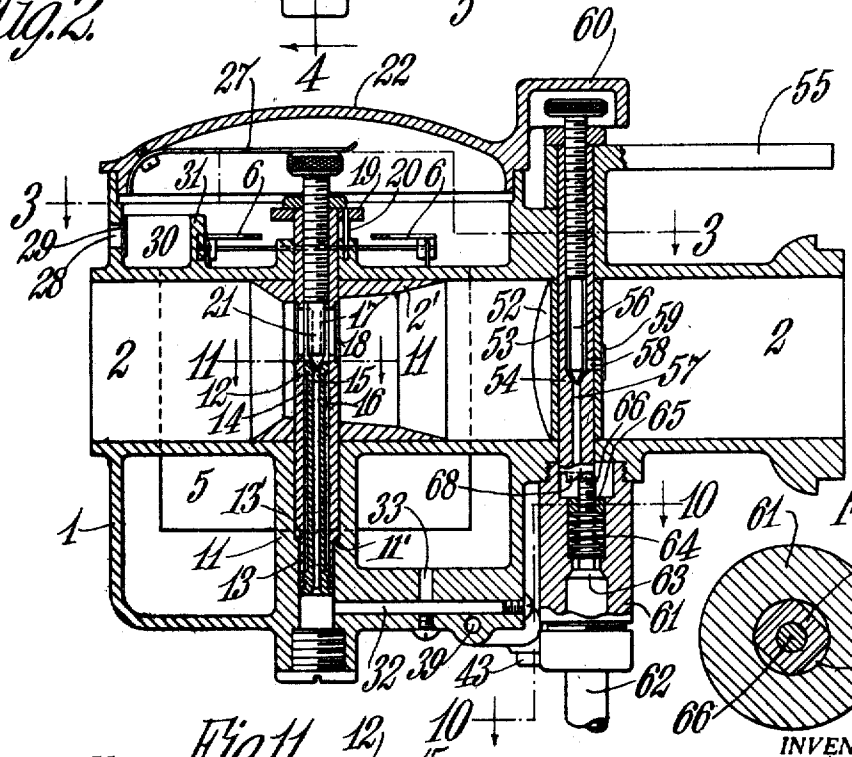


Fig. 10.

Fig. 11.

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3 SHEETS—SHEET 2.

Fig. 3.

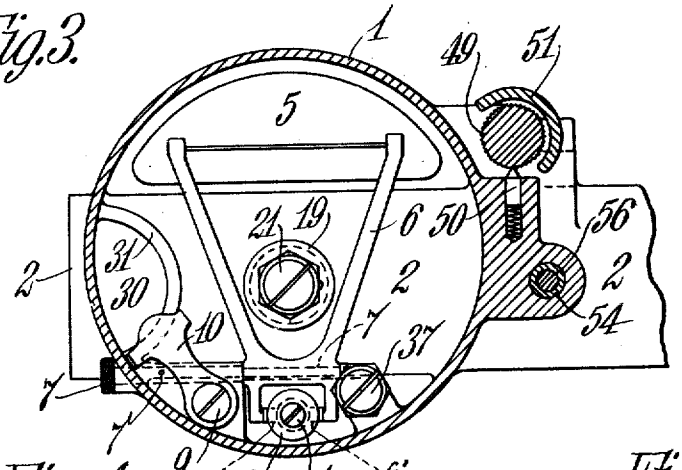
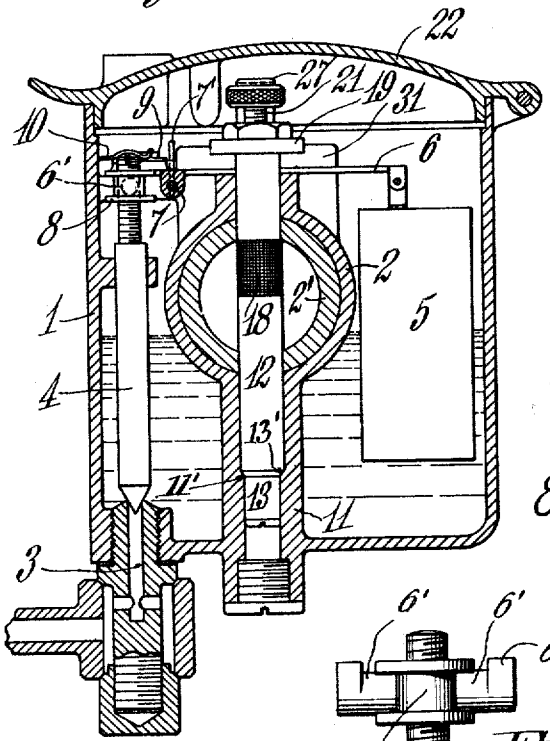
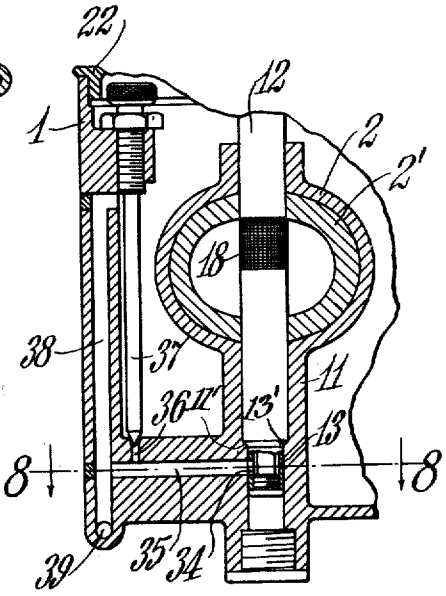


Fig. 4.

Fig. 5.





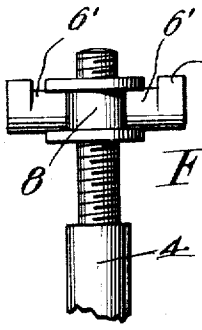


Fig. 12.

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3 SHEETS—SHEET 3.

Fig. 6.

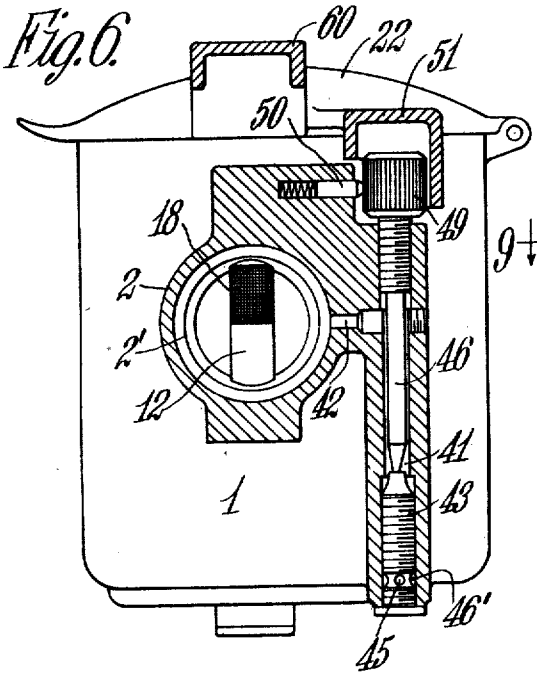


Fig. 7.

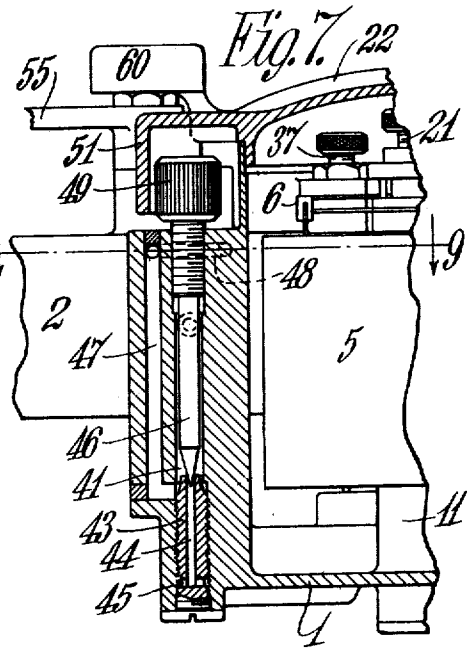


Fig. 8.

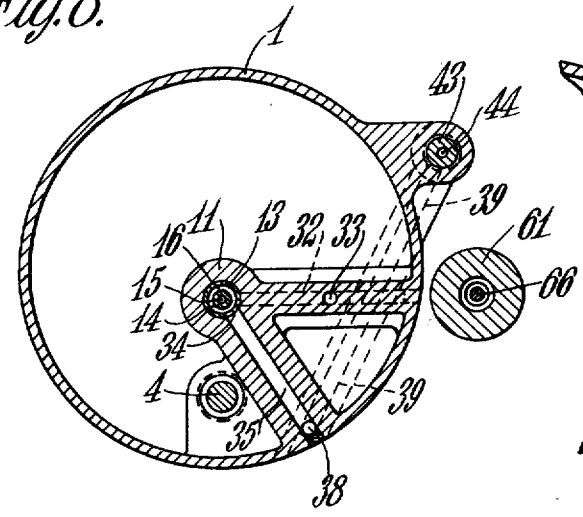
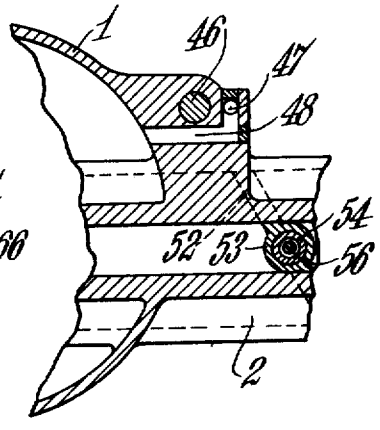


Fig. 9.



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CARBURETER.

1,240,841. Specification of Letters Patent. Patented Sept. 25, 1917.

Application filed June 5, 1916. Serial No. 101,756.

To all whom it may concern:

Be it known that I, PIERRE GILLES, a subject of the Emperor of Germany, residing at Springfield, in the county of Hampden and State of Massachusetts, United States of America, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

This invention relates to carbureters and more particularly to improved carbureters of the compensatory feed type, such as shown, for example, in my prior Patent No. 1,183,294, granted May 16, 1916.

An object of this invention is to provide, in a carbureter having a plurality of nozzles and devices to vary the effective openings of said nozzles, a cover for the carbureter provided with locking means and constructed and arranged to prevent access to said devices, whereby the openings in the several nozzles may be maintained in their adjusted position free from interference except by authorized persons.

Another object of this invention is to provide in a carbureter, improved means for the introduction of water or other desirable fluid into the carbureted mixture or for the injection of an additional fuel, such as kerosene, said means being constructed and arranged for positive and automatic control so that the fluid may be injected in direct proportion to the amount of fuel drawn from the carbureter.

A further object of the invention is to provide a casing having a carbureter chamber and an integral suction pipe extending horizontally through the carbureter chamber, a cover above the suction pipe, a two part nozzle constructed with main and compensating jets and arranged to pass through the suction pipe and communicate with the carbureter chamber therebelow, said nozzle being removably seated in said casing and arranged for quick and convenient insertion or withdrawal as a unit when the cover is opened and means on the cover to retain the nozzle against its seat.

Another object of the invention is to provide in a carbureter of the class described generally simplified and improved mechanical structure.

Other objects and advantages will appear in the description to follow and in the annexed claims.

For the purpose of illustrating one way in which the invention may be practised, a single preferred embodiment thereof is shown in the accompanying drawings, in which—

Figure 1 is a top plan view of the carbureter;

Fig. 2 is a sectional elevation thereof taken on the line 2—2 of Fig. 1 and looking in the direction of the arrows;

Fig. 3 is a sectional plan view taken on the line 3—3 of Fig. 2 and looking in the direction of the arrows;

Fig. 4 is a cross sectional view taken on the line 4—4 of Fig. 1 and looking in the direction of the arrows;

Fig. 5 is a fragmentary sectional view taken on the line 5—5 of Fig. 1 and looking in the direction of the arrows;

Fig. 6 is a cross sectional view taken on the line 6—6 of Fig. 1 and looking in the direction of the arrows;

Fig. 7 is a fragmentary sectional view taken on the line 7—7 of Fig. 1 and looking in the direction of the arrows;

Fig. 8 is a sectional plan view taken on the line 8—8 of Fig. 5 and looking in the direction of the arrows;

Fig. 9 is a fragmentary sectional plan view taken on the line 9—9 of Fig. 7 and looking in the direction of the arrows;

Fig. 10 is an enlarged sectional plan view taken on the line 10—10 of Fig. 2 and looking in the direction of the arrows; and

Fig. 11 is a sectional plan view of the main and compensating nozzles taken on the line 11—11 of Fig. 2 and looking in the direction of the arrows.

Fig. 12 is a fragmentary elevational view showing the connection between the float operated lever and the needle valve.

Referring to these drawings in detail, the casing 1 is of general cylindrical form open at the top, and the interior thereof forms a float chamber for the reception of fuel. A suction pipe 2, integral with the casing, extends horizontally through the latter with its axis at right angles to the axis of the casing and is provided with a suitable flange at one end for attachment to the intake manifold of an engine. The usual venturi 2′ is placed in pipe 2, as shown in Fig. 2. Fuel is supplied to the carbureter by a pipe 3, at the bottom of casing 1 (Fig. 4) and suitable connections, as shown. The inflow of fuel is controlled by a needle valve 4 which is adapted to be raised and lowered by the fall and rise of a float 5 by means of a lever 6 pivoted intermediate its ends at 7 to lugs on casing 1,

as clearly shown in Figs. 3 and 4. The pivot 7 is a plain pin which may be withdrawn horizontally from outside the casing by the knurled head shown in Fig. 3. A small pin 7', passing vertically through pivot 7, prevents withdrawal of the latter and is disposed within casing 1 so that, when the open end of the casing is closed by means to be described, pivot 7 cannot be removed. The upper end of valve 4 is threaded, as shown in Fig. 4, to receive a flanged sleeve 8 and the end of lever 6 is made in the form of a fork, as shown in Fig. 3 to straddle the sleeve. The forked ends of lever 6 have inwardly extending cylindrical projections 6' which loosely fit between the flanges of sleeve 8 as shown in Figs 3 and 4. The sleeve 8 constitutes an adjustable collar and the arrangement shown permits adjustment of the needle valve 4 relatively to sleeve 8 by rotating the former by a screw driver from above and is advantageous on account of its convenient accessibility for and simplicity of adjustment. Pivoted at 9 to a lug adjacent the top of casing 1 is a flat spring 10 which ordinarily lies in the position shown in Fig. 3 but, when desired, may be swung so that its end overlies the top of valve 4, as shown in Fig. 4, whereby valve 4 may be held to its seat to prevent the inflow of fuel into casing 1.

Extending between pipe 2 and the bottom of casing 1 and formed integral therewith is a hollow cylindrical member 11 (Figs. 2, 4, and 5) which is adapted to receive the main and compensating nozzles which will now be described. A sleeve 12 extends from a point above pipe 2, through the latter and a substantial distance therebelow in the hollow member 11.

The lower portion 13 of the sleeve 12 is of reduced diameter whereby a shoulder 13' is formed, and the bore of member 11 is correspondingly formed to produce a shoulder 11', and shoulder 13' seats on the latter, as shown in Figs. 3, 4, and 5, to position sleeve 12 vertically in member 11. Threaded into the base of sleeve 12 is a spindle 14 which extends upwardly within tube 12 to substantially the axis of pipe 2 and is formed with an axial passage 15. The spindle 14 is so constructed, as shown in Figs. 2 and 5, as to form an annular passage 16 between it and the interior of sleeve 12 which passage is closed off at the base by the threaded portion of the sleeve. The upper portion of spindle 14 is squared, as shown in Fig. 11, so that it may engage the sleeve 12 for centering purposes without closing off communication with passage 15. Above the top of spindle 14, the sleeve 12 is cut away except for two small portions 17, one of which is shown by dotted lines in Fig. 2, and a screen 18 is applied circumferentially about sleeve 12 to cover the cutaway portion, as shown in Figs. 2, 4, 5, and 6. Fixe dto sleeve 12 at the top thereof is a disk 19 which is drilled to receive a pin 20 fixed in the upper portion of pipe 2, as best shown in Fig. 2. Threaded into the upper portion of sleeve 12 is a needle valve 21 which coöperates with spindle 14 to vary the effective opening of passage 15. The latter forms the main nozzle, and the passage 16 the compensating nozzle, and both are arranged to deliver fuel through the screen 18 into pipe 2. The particular arrangement of the dual nozzle structure is advantageous because the sleeve 12 with spindle 14 and valve 21 therein may be lifted vertically through the opening top of casing 1 for inspection, cleaning, or adjustment. Furthermore, the several parts need not be disturbed from their adjusted positions in order to effect the withdrawal, and the latter is made conveniently, simply by lifting the sleeve. The pin 20 serves to prevent rotation of the latter and insures correct angular positioning of the sleeve within member 11 for a reason later to appear.

The open top of casing 1 is provided with a hinged cover 22 which is provided with a spring latch 23 to lock in the casing. A suitable cylinder 24 rotatable in cover 22 has an opening 25 to receive a key which may engage in a notch 26 in latch 23 to retract the latter. This particular form of locking means is shown merely for illustrative purposes, and any other suitable means may be provided to lock the outer cover. Secured to the under side of the cover is a flat spring 27 which, when the cover is closed, bears upon the knurled head of needle valve 21 and holds sleeve 12 against its seat in member 11, as shown in Fig. 2.

The carbureter chamber has an opening 28 to permit air to pass therein and a screen 29 is applied to the opening by suitable means, such as soldering, for example, as shown in Fig. 2. A pocket 30 formed by a semi-circular upstanding rim 31 is arranged to collect any dust which may filter through screen 29.

In order to permit fuel from the carbureter chamber to pass to the main nozzle, a transverse passage 32 is formed in the base of casing 1 which communicates with the hole in member 11 below the members 13 and 14, as shown in Fig. 2. A vertical hole 33 communicates between the float chamber and passage 32. The lower portion 13 of sleeve 12 has an opening 34 therein which, by reason of pin 20 and disk 19 is caused to register with a transverse passage 35 (Fig. 5), the angular relation of which with respect to passage 32 is clearly shown in Fig. 8. An opening 36 permits fuel to flow from the float chamber into passage 35, and this opening may be varied by a needle valve 37 which is suitably mounted in the casing and

has a knurled head disposed just beneath cover 22 for convenient actuation, as shown in Fig. 5. A vertical passage 38 (Fig. 5), communicating with the float chamber above the level of fuel therein, communicates with passage 35 and extends therebelow to a passage 39 which, as shown in Fig. 8, extends across and below the passages 32 and 35 to a point on the exterior of casing 1. Passage 38 is arranged to supply air saturated with fuel vapor to the compensating nozzle 16, and passage 39 permits fuel flowing past needle valve 37 to pass to a "slow speed" nozzle which will now be described.

Referring more particularly to Figs. 6 and 7, a vertical passage 41 is formed in an integral exterior extension of casing 1 and a short horizontal passage 42 communicates between the former passage and the suction pipe 2 as clearly shown in Fig. 6. A threaded member 43 closes the base of passage 41 and is formed with an axial passage 44 which, by means of holes 45 and a circumferential recess 46', may be supplied with fuel from passage 39. A needle valve 46, having a portion threaded into passage 41, from above, coöperates with passage 44 to vary the effective opening thereof. Adjacent passage 41 is a vertical passage 47 which communicates with the former slightly below the top of member 43 and at its upper end is connected by a horizontal passage 48 (Figs. 7 and 9) with the air space of the carbureter chamber, whereby air saturated with vapor may be supplied to the slow speed nozzle comprising passages 41 and 42. Valve 46 is provided with a serrated head 49 (Figs. 3 and 6) which is engaged by a spring pressed pin 50, whereby the valve is prevented from movement under vibration, in an obvious manner. In order that the adjustment of valve 46 may be protected from thoughtless tampering by unauthorized persons, an integral cap forming extension 51 is provided on the cover 22 to fit down over head 49 when cover 22 is closed as shown in Figs. 1, 3, 6, and 7.

It is sometimes desirable to supply a small amount of water or other fluid to the carbureted fuel as it passes through suction pipe 2 or to supply an additional fuel, such as kerosene, to the latter and improved means have been provided to effect this object which means will now be described with particular reference to Figs. 1 and 10. Beyond the venturi 2' is a throttle valve 52 which is of the usual butterfly type and has a central hollow sleeve 53. Passing through the latter and the top and bottom walls of pipe 2 is a sleeve 54 which is secured to sleeve 53 by any suitable means, such as a driving fit, for instance. At its upper end, sleeve 54 has fixed thereto a suitable throttle operating lever 55 whereby valve 52 may be turned as desired to vary the amount of air and fuel drawn through pipe 2. Threaded into sleeve 54 from above is a needle valve 56 which is arranged to vary the effective opening of a passage 57 formed in the sleeve and extending from the needle valve through the base of the former. A lateral passage 58 through sleeves 53 and 54 permits liquid flowing past valve 56 to pass into suction pipe 2 through a small screen 59 secured to the exterior of sleeve 53. In order that valve 46 may be protected against unauthorized adjustment, a second cap forming extension 60 is provided on cover 22 to close down over the knurled head of the needle valve when the cover is closed.

Threaded into the under side of pipe 2 and slightly off-set from the axis of throttle 52 is a bushing 61, the interior of which may be supplied with water through a pipe 62. A valve 63 is normally held against its seat in bushing 61 by a spring 64 which acts between a shoulder in bushing 61 and a nut 65 threaded on the stem 66 of valve 63. Nut 65, as shown in Fig. 10, is square so that fluid admitted by valve 63 may flow through the spaces 67 and thence into passage 57 in sleeve 54. Stem 66 engages the base of the latter and is adapted to be depressed as throttle 52 is turned by a cam 68 formed on the sleeve. The throttle 52 is shown in closed position in Fig. 2, and, when so positioned, valve 63 is closed. As the throttle 52 is turned from the position shown, valve 63 is opened proportionately so that water is supplied in direct proportion to the fuel passing through pipe 2.

In operation fuel is supplied to the compensating and slow speed nozzles in uniform quantities per unit of time and only relatively small quantities pass by needle valve 37. The main nozzle, however, is fed directly by suction so that, when the engine is running at high speeds, most of the fuel is supplied through passage 15. When the engine is running the passage 35 is only partly filled with fuel, and air saturated with vapor may be drawn from passage 38 through passage 35 into the compensating nozzle to assist in thorough carburation of the fuel. Similarly, air from the float chamber may also be drawn into pipe 2 through passages 48, 47, 41 and 42. When the engine is running at very slow speeds, however, passages 35 and 16 become filled with fuel and act as an auxiliary feeding means working in compensatory relation with the main nozzle in a now well known manner. Very little fuel passes by the slow speed needle valve 46 ordinarily, but, when the engine is idle, passage 41, eventually fills so that subsequently when the engine is started a rich mixture is drawn into pipe 2 when most needed.

It is to be noted that the several adjustable parts, namely, needle valves 4, 21, 37,

46, and 56 and pivot pin 7 are all protected by the cover 22 so that no adjustable parts are accessible when the cover is closed and locked. Much annoyance has been caused heretofore by thoughtless and curious persons by changing the relative positions of nicely adjusted parts. Frequently, much time and trouble is necessary to secure the desired nicety of adjustment, and the work of hours is oftentimes set at naught through meddling and tinkering. The structure described, effectively prevents such trouble and insures the preservation of the desired adjustment.

Despite the inaccessibility of the working parts of the carbureter when the cover is closed, the opening of the latter renders the parts immediately and conveniently accessible. All needle valves are within convenient reach from the top of the casing, the main and compensating nozzles may be almost instantly withdrawn without the use of any tool. Similarly the float, its lever, and needle valve 4 may be lifted out after removing the pivot stud 7. Moreover, the advantages incident to a carbureter having main, compensating, slow speed, and water nozzles with independent controlling devices for each are obtained by comparatively simple structure with relatively few parts considering the results obtained. Furthermore, the parts are grouped into close and compact relation so that the carbureter as a whole occupies a minimum of space.

The invention has been defined in a preferred form for illustrative purposes but the scope of the invention is defined by the appended claims rather than by the foregoing description.

What I claim is—

1. A carbureter, comprising, a casing formed with a fuel supply chamber and open at its upper end, a plurality of nozzles adapted to feed fuel from said chamber, an adjustable device for each nozzle arranged to vary the fuel fed therefrom, a cover to close the open end of said casing and means to lock the cover, said means being key operable to release the cover, the locked cover being arranged to render each of said devices inaccessible, whereby the adjustment of the devices may be protected against unauthorized interference.

2. A carbureter, comprising, a casing formed with a fuel supply chamber open at its upper end and a suction pipe extending through the chamber, a sleeve extending from the upper part of the casing downwardly through and below said pipe, means formed on the sleeve adapted to seat in the casing to axially position the sleeve, a main nozzle removably secured in the base of said sleeve and arranged to leave an annular passage between the latter and the nozzle, whereby an auxiliary nozzle is formed, an opening formed in the sleeve in communication with said pipe, means formed in the casing to supply the main and auxiliary nozzles from said chamber, a needle valve threaded into the upper portion of the sleeve and depending therein into coöperative engagement with the main nozzle, the sleeve being constructed and arranged for withdrawal axially through the open end of the chamber, a cover for the latter, means to lock the cover, and a device on the cover engageable with the upper part of the needle valve to force and hold said sleeve against its seat in the casing.

3. A carbureter, comprising, a casing formed with a fuel supply chamber open at its upper end and a suction pipe extending through the chamber, a sleeve extending through and below the pipe and formed with an opening communicating therewith, a shoulder formed on the lower part of the sleeve to seat against a corresponding shoulder formed in the casing, whereby the sleeve may be positioned axially, a nozzle removably secured within the sleeve in concentrical relation therewith and constructed to form an annular passage between the nozzle and sleeve, an axial fuel passage formed in the nozzle, a passage formed in the casing communicating between the chamber and the base of said nozzle, the latter having an enlarged portion to closely fit the base of the sleeve and a head portion positioned at the top of the sleeve and constructed to form a delivery opening between the head and sleeve, whereby an auxiliary nozzle is formed, an opening formed in the sleeve above said enlarged portion, a passage formed in the casing communicating between the chamber and said opening, a needle valve threaded into the upper end of the sleeve and depending therein into coöperative engagement with the axial passage in the nozzle, said sleeve with the nozzle and valve assembled therein being constructed and arranged for withdrawal axially through the open end of the casing, and means on the casing engageable with a part of the sleeve to position the sleeve so that the opening therein registers with the last-named passage in the casing.

4. The combination in a carbureter, of a main suction controlled nozzle, a constant level fuel supply chamber therefor, a compensating nozzle in concentrical relation with the main nozzle, a valve controlled connection between the chamber and the compensating nozzle adapted to supply the latter at a uniform rate, a suction pipe into which said nozzles deliver, a throttle in said pipe, a third nozzle arranged to deliver into said pipe in proximity to the throttle, a connection between the first-named connection and the third nozzle adapted to supply fuel thereto at a uniform rate, a connection from the air space of said chamber to

the first-named connection and a connection from the air space of the chamber to the third nozzle, all constructed and arranged so that air saturated with fuel vapor may be drawn into said pipe through the compensating and third nozzles when the engine is running.

5. A carbureter, comprising, a fuel supply chamber, a suction pipe, atomizing devices to deliver fuel from the chamber to the pipe, a throttle valve in the pipe to vary the amount of fuel mixture passing therethrough, an axial passage formed in the throttle and opening at one end into said pipe, means to supply another fluid to the other end of said passage, a valve in said connection and means operable by movement of the throttle to open and close said valve proportionately with the opening and closing of the throttle valve, all constructed and arranged so that an auxiliary supply of fluid may be injected into said pipe in direct proportion to the amount of fuel mixture passing therethrough.

6. The combination in a carbureter with the suction pipe thereof, of a throttle pivotally mounted therein and having an end projecting therethrough, a passage in the throttle pivot communicating between said end and said pipe, a cam formed on said end of the throttle pivot, a casing removably secured to the suction pipe and having a cylindrical chamber to inclose said end of the throttle pivot, a fluid connection to said chamber, a valve slidable in the latter, resilient means tending to hold the valve in closed position to partition said chamber, the axis of said latter pivot extending eccentrically into the chamber and arranged so that an end of said valve is yieldingly held against said cam, whereby said valve may be opened proportionately with the throttle by turning the latter, all constructed and arranged so that the valve, cam, and resilient means are entirely inclosed and so that the valve may be applied to or removed from the throttle as a unit, when desired.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."