L. ANDERSON.

CARBURETER.

APPLICATION FILED OCT. 15, 1909.

1,035,937. Patented Aug. 20, 1912.

2 SHEETS—SHEET 1.

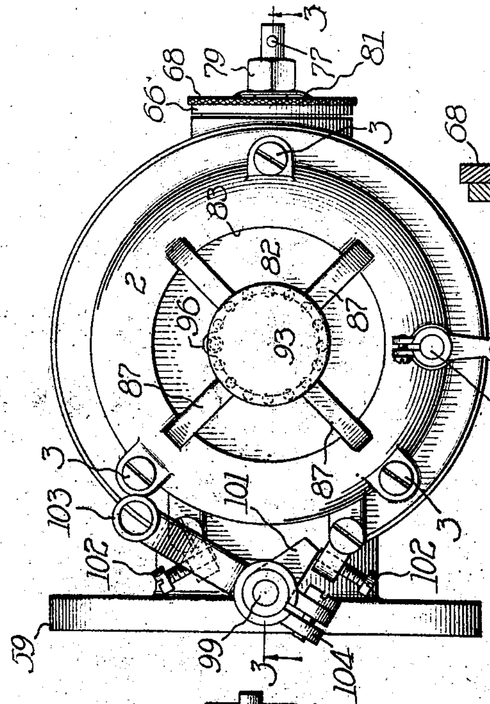

Fig. 2.

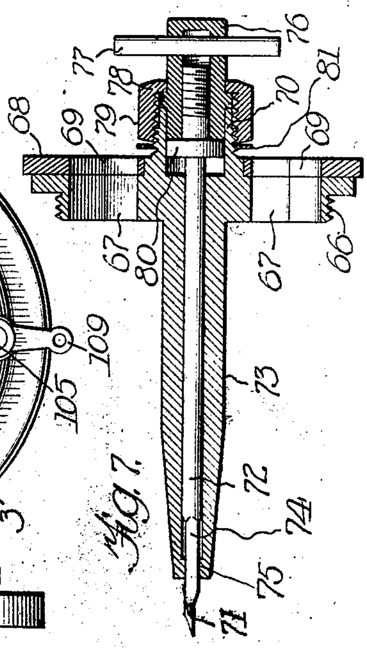

Fig. 7.

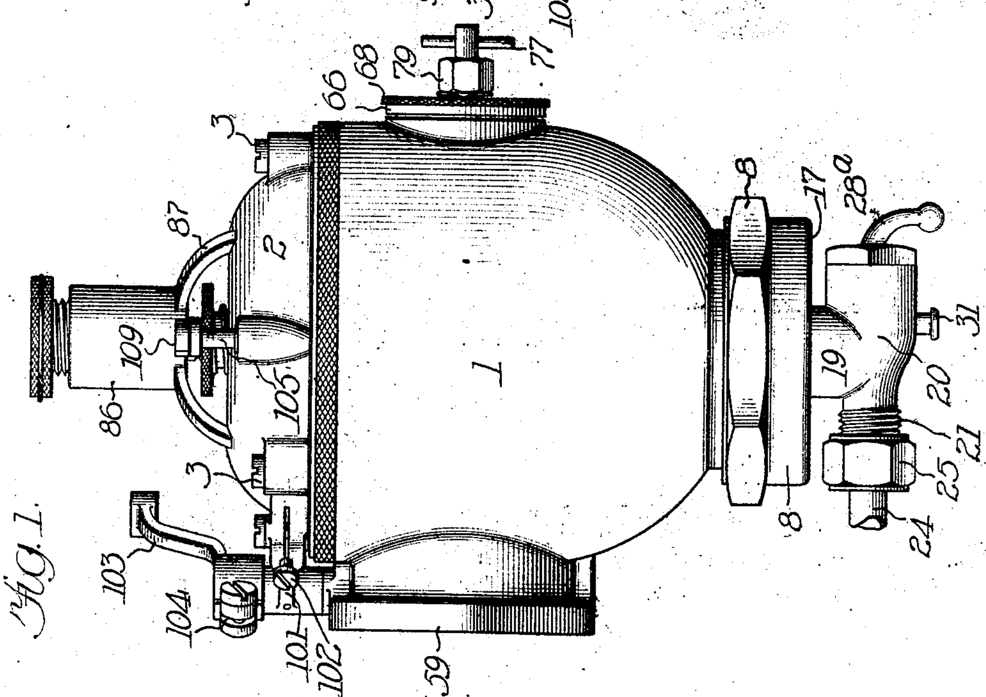

Fig. 1.

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2 SHEETS—SHEET 2.

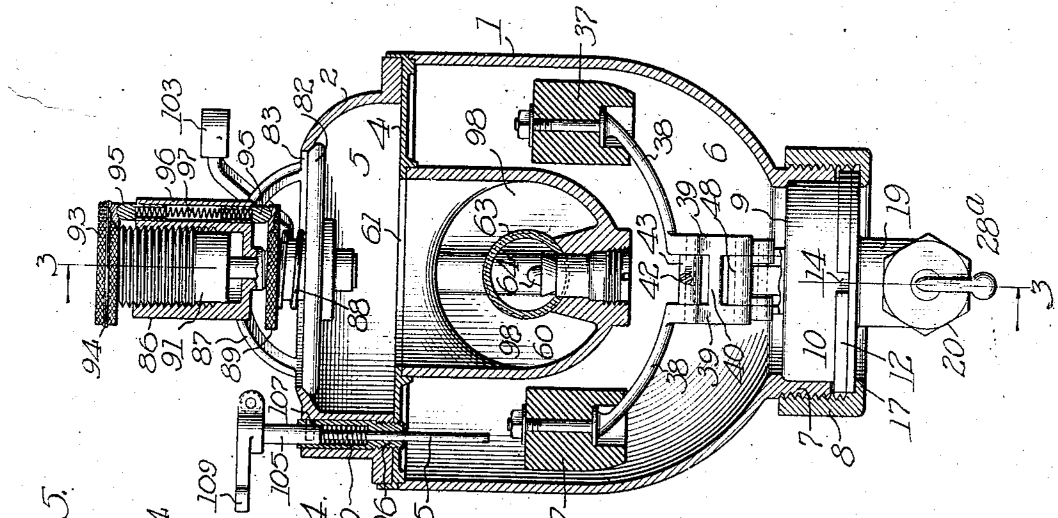

Fig. 4.

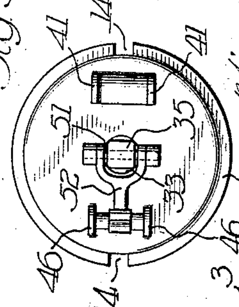

Fig. 5.

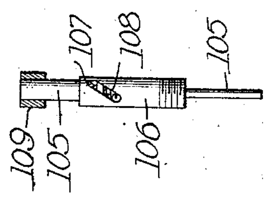

Fig. 6.

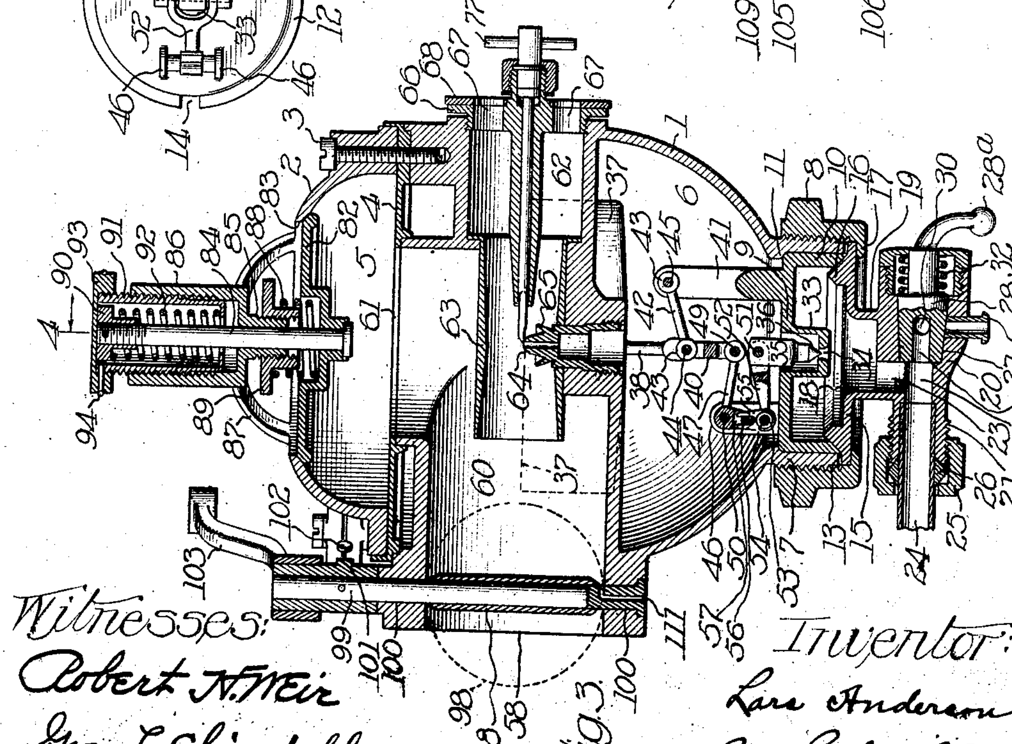

Fig. 3.

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UNITED STATES PATENT OFFICE.

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CARBURETER.

1,035,937. Specification of Letters Patent. Patented Aug. 20, 1912.

Application filed October 15, 1909. Serial No. 522,710.

To all whom it may concern:

Be it known that I, Lars Anderson, 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 means for carbureting air to form a fluid fuel for internal combustion engines; and its object, generally stated, is to produce a carbureter that shall be positive and reliable in action and substantially unaffected by such tilting of the device as occurs when a motor car equipped therewith passes over grades and uneven roadways.

The invention also relates to an improved hydrocarbon nozzle valve for carbureters.

In the accompanying drawings, Figure 1 is an elevation of a carbureter embodying the features of my invention. Fig. 2 is a top plan view thereof. Fig. 3 is a vertical central sectional view taken in the plane of dotted line 3 3 of Fig. 2, the plane of the section also being indicated by line 3 3 in Fig. 4. Fig. 4 is a vertical central section upon the plane of dotted line 4 of Fig. 3. Fig. 5 is a detail top plan view of one of the elements of the construction. Fig. 6 is a detail view of a means for manually opening the hydrocarbon inlet valve. Fig. 7 is a detail sectional view of the valve for controlling the flow of the hydrocarbon.

The embodiment which I have selected for illustration comprises a casing consisting of sections 1 and 2, said sections, in this instance, being secured together by screws 3. The casing is divided by the partition 4 into an air chamber 5 and a hydrocarbon chamber 6. In this instance, the partition 4 overlies the upper edge of the casing section 1; and the section 2, which is in the form of a dome, overlies the partition member, the screws 3 passing through the dome and the partition member and into the section 1. Means is provided for admitting hydrocarbon to the lower part of the chamber 6, which admitting means in this instance is constructed as follows: Upon the lower end of the casing-section 1 is formed an annular flange 7 which is externally screw-threaded to receive a gland 8. Within the annular flange 7 is a disk 9 having a peripheral flange 10, said disk lying in contact with a shoulder 11 formed upon the casing 1. The contacting surfaces of the shoulder 11 and the disk 9 are beveled or rounded, as shown in Fig. 3, so that a tight joint may readily be formed between said parts. Upon the lower edge of the flange 10 is an annular outwardly extending flange 12 arranged to underlie the edge of the flange 7. To assist in correctly positioning the disk 9 within the flange 7, said flange has formed thereon two diametrically opposite lugs 13 adapted to enter notches 14 in the flange 12. 15 is a disk having an annular rib 16 adapted to contact the lower edge of the annular flange 10, the contacting surfaces of the flange and the rib being beveled to form a fluid-tight joint. The disk 9 is held in close contact with the annular shoulder 11 and the disk 15 is held tightly against the annular flange 10 by the gland 8, said gland having at its lower end an annular inturned flange 17 which underlies the disk 15. 18 is a strainer supported in any suitable manner by the disk 15. To the disk 15 is attached a means for coupling a hydrocarbon supply pipe to the carbureter and a means for draining the carbureter of hydrocarbon. As herein shown, a central tubular stem 19 is formed integral with the disk 15 and with a drain-valve casing 20. Upon one end of the valve casing 20 is a screw-threaded nipple 21 communicating with the tubular stem 19 through the passages 22 23. The hydrocarbon supply pipe 24 in this instance is attached to the nipple 21 by means of a gland 25 and a taper sleeve 26. Within the tapering chamber 27 of the drain valve casing is rotatably mounted a taper valve plug 28 having ports 29 and 30 communicating with the passage 22. When it is desired to drain the carbureter, the valve plug 28 may be turned to place the port 30 in register with the outlet 31. A spring 32 holds the valve plug in fluid-tight contact with the walls of the chamber 27. 28^a is an arm by means of which the valve plug may be rotated. When the arm 28^a is in the position which it tends to assume by the action of gravity the outlet 31 is closed.

Centrally of the disk 9 is a tubular boss 33 having in one end thereof a hydrocarbon inlet opening 34. The flow of hydrocarbon through said opening is controlled by means of a valve member consisting, in this instance, of a square pin 35 having at its lower end a conical valve portion 36. The square pin 35 is guided and confined by the interior walls of the tubular boss 33 so that the valve member cannot get out of proper alinement with the opening 34.

The valve 36 is controlled by a float, the connections between the float and the valve being such that any chance or irregular movements of the float do not detrimentally affect the operation of the valve. As herein shown, the float consists of two sections 37 of cork or other suitable material, said sections being secured to two branching arms 38. Said arms, in this instance, are formed integral with two upright members 39 connected together by the cross bar 40. The upright members 39 are connected to the upper ends of two posts 41 (Fig. 5) rising from the disk 9 by means of a link 42, said link having elongated hubs 43 to receive the pivot pins 44 and 45. The lower ends of the upright members 39 are connected with the upper ends of two posts 46 (Fig. 5) on the disk 9 by means of a link 47, said link having elongated hubs 48 which are rotatably mounted on the pins 49 and 50. The pin 49 is fixed in the lower ends of the upright members 39 (Fig. 4), while the pin 50 is fixed in the upper ends of the posts 46. The upper end of the valve member 35 36 is pivotally mounted upon a pin 51 carried by the forked end of a lever 52, said lever having an elongated hub 53 which is mounted upon a pin 54 fixed in the posts 46. On the upper side of the hub 53 is formed a fork 55 which receives a pin 56 fixed in ears 57 upon the lower side of one of the hubs 48. It will be seen that the float is maintained in a substantially horizontal position by the links 42 and 47 and that the vertical movement of the float is positively transmitted to the valve 36 through the links 47 and 52, the fork 55 and the pin 56. When the float rises the valve 36 is lowered to reduce or cut off the inflow of hydrocarbon. It will be understood that the pivoted bearings in the system of levers connecting the float with the valve should be somewhat loose so that they may operate freely. Any tendency to undue play or lateral displacement is obviated by the elongated hubs 43 48 53.

The casing-section 1 has an outlet or attaching tube 58, lugs 59 providing means for mounting the carbureter with its outlet in communication with the inspiration pipe (not shown) of an internal combustion engine or other apparatus. Within the casing section 1 is a mixing chamber 60 communicating at one end with the outlet 58 and at its other end with the air chamber 5 through an opening 61 in the partition 4. Alined with and diametrically opposite the outlet 58 is a chamber 62, the inner end of which connects with an air inlet tube 63 that extends into the chamber 60 and is alined with the outlet 58. The tube 63 is internally tapered or flaring from its midportion outwardly to its opposite ends. Centrally of the tube 63 is a nozzle 64 arranged in this instance in a vertical position and projecting inwardly from the lower side of the tube 63. Said nozzle communicates with the hydrocarbon chamber 6. Surrounding the tip or orifice of the nozzle 64 are two annular grooves 65 to receive a quantity of hydrocarbon when the carbureter is primed, and thus assist in quickly providing a supply of the explosive mixture. The outer end of the chamber 62 is closed by a screw cap 66 having air inlet openings 67 therein. The entrance of air through these openings may be controlled by means of a rotatable valve or damper 68 having openings 69 arranged to be turned into and out of register with the openings 67. The valve 68 is mounted upon a central tubular stud 70 on the cap 66.

The flow of hydrocarbon through the nozzle 64 may be controlled by means of a valve member 71 having a flat lower side adapted to slide in contact with the upper end of the nozzle, means being provided for adjusting the position of said valve member so that it shall cover more or less of the orifice in said nozzle. In this instance the valve member 71 has a stem 72 which is longitudinally slidable within a guide tube 73 fixed to or formed upon the inner side of the cap 66. The valve member is held from rotation by means of a squared portion 74 of the stem, said squared portion lying within a square portion 75 of the bore of the guide tube 73. Upon the outer screw-threaded end of the valve stem 72 is turned a nut 76 provided with suitable means for rotating it, such as a pin 77. The nut 76 is rotatable within the tubular boss 70, but is held against longitudinal movement by a peripheral flange 78 which lies between the end of the tubular boss and a nut or gland 79. It will thus be seen that when the nut 76 is rotated by the operator, the valve member, being held against rotation, will slide longitudinally to cover or uncover the orifice of the nozzle to the desired extent. The extent of sliding movement of the valve is limited by a collar 80 formed on the valve stem and lying between the nut 76 and the bottom of the tubular boss 70.

In order to frictionally hold the valve 68 in adjusted position, I provide a spring 81 confined between said valve and the nut 79 and serving to press the valve against the cap 66. When the engine is running, air enters the openings 67 and passes through the chamber 62, the tube 63 and the chamber 60 to the outlet 58, hydrocarbon being drawn through the nozzle 64 and vaporized and mixed with the air. In order to afford an additional supply of air, I provide an air valve 82 having, in this instance, the form of a disk and arranged to close against a seat formed around an opening 83. To the valve disk 82 is fixed a stem 84 which is slidably supported in a bearing 85 upon the lower end of a sleeve 86, said sleeve being connected with the casing-section 2 by means of arms 87. The closing movement of the valve disk 82 is cushioned by a coiled spring 88 interposed between the disk and an adjusting nut 89 on the bearing 85. Upon the upper end of the stem 84 is a projection 90 which may be a nut, as shown in Fig. 3, between which projection and the end wall of a bushing 91 a coiled spring 92 is confined. The bushing 91 has a screw-thread connection with the sleeve 86, and may be rotated by means of a milled head or cap 93 to adjust the tension of the spring 92. Said head is in the form of a nut turned on the upper end of the bushing. The nut 93 may be locked against rotation with reference to the bushing by suitable means such as a spring clip 94 removably fitting in a groove in said nut, one end of the clip extending through openings in the nut and the bushing as shown in Fig. 3. When access to the interior of the bushing is desired the nut 93 may readily be removed from the bushing. The downward or opening movement of the valve disk is yieldingly resisted by the spring 92. The tension of the opposed springs 88 and 92 may be adjusted so that the valve disk shall move with the desired degree of freedom.

In order to hold the adjusting members 89 and 91 in adjusted position, I provide two pins 95 slidably mounted in a passage 96 in a cylindrical longitudinal projection on the sleeve 86, said pins being yieldingly pressed against the parts 89 and 93 by a spring 97 inclosed within the opening 96. The outer ends of the pins 95 are rounded so that they may slip into and out of a series of shallow recesses in the parts 89 and 93.

98 is a throttle valve secured to a spindle 99 which is rotatable in bearings 100. A stop 101 fixed on the spindle 99 is arranged to engage adjustable stop screws 102 (Fig. 2) to define the open and closed positions of the throttle valve. An operating arm 103 is adjustably secured to the upper end of the spindle 99 by means of a pinch-fit 104, so that the relation of said arm to the throttle valve may be altered to suit the location of operating connections.

Means is provided for depressing the float to prime the carbureter, said means in the present instance consisting of a pin 105 slidable within a sleeve 106 and located above one of the float-sections 37. In the side of the pin 105 is set a stud 107 which extends into a cam slot 108 in the sleeve 106. A crank arm 109 provides means for rocking the pin 105. When the pin is rocked by the operator the stud 107 travels down the cam slot 108, causing the pin to move downward against the adjacent float section. A spring 110 restores the pin to its normal position. A small port 111 in the spindle 99 affords an outlet for any condensed hydrocarbon vapor that may find its way into the chamber 60.

In use, the entrance of hydrocarbon to the chamber 6 is regulated by the float-controlled valve 36. The suction of the engine causes an inflow of air through the openings 67 and 83, a flow of hydrocarbon upward through the nozzle 64 being thereby induced. It will be seen that the tip of the nozzle extends to the axis of the tube 63, whereby the hydrocarbon is discharged into the center of the air current and thoroughly intermingled therewith. The upper entrance to the chamber 60, to wit, the opening 61, is axially alined with the direction of movement of the valve disk 82. There is, consequently, no suction tending to move the valve disk laterally and cause it to bind or stick in its bearing in the boss 85. The valve 71 may be easily adjusted to afford the desired flow of hydrocarbon through the nozzle 64.

It will be seen from Figs. 3 and 4 that the fuel nozzle 64 is located approximately centrally within the carbureter, and that the orifice of said nozzle coincides substantially with the axis of the outlet 58, the chamber 60 and the tube 63. The relation between the fuel nozzle and the level of the fuel in the float chamber 6 is, therefore, disturbed as little as possible by tilting of the carbureter due to the passage of the car over grades and rough roads. The float sections 37, also, are located substantially centrally of the carbureter. Said float sections being vertically movable, the relative extent to which they are submerged in the liquid is approximately constant, hence their buoyancy is practically unaffected by tilting of the carbureter, and a reliable and sensitive control of the fuel inflow is thereby obtained.

While I have described the present embodiment of the invention with some particularity, it will be understood that the invention is not limited to the details specified, for various modifications will occur to persons skilled in the art.

Certain features of the carbureter herein illustrated are claimed in my copending applications Serial Nos. 562,618 and 562,619 filed May 21, 1910.

I claim as my invention:

1. In a carbureter, in combination, a casing, the lower portion of which constitutes a float chamber; a mixing chamber extending horizontally within said casing and having an outlet at one side of the casing; a vertically extending fuel nozzle communicating at its lower end with the float chamber and at its upper end with the mixing

chamber; an air inlet for said mixing chamber alined with said outlet; a horizontally disposed bearing in the side of said casing adjacent to said air inlet; a valve for said fuel nozzle, said valve having a stem mounted in said bearing; and means for moving said stem to operate said valve.

2. In a carbureter, in combination, a casing, the lower portion of which constitutes a float chamber, a mixing chamber extending horizontally within said casing and having an outlet at one side of the casing; a vertically extending fuel nozzle communicating at its lower end with the float chamber and at its upper end with the mixing chamber; an inlet for said mixing chamber alined with said outlet; a horizontally disposed bearing in the side of said casing adjacent to said air inlet; a valve for said fuel nozzle, said valve having a stem non-rotatably mounted in said bearing, the valve overlying the tip of said nozzle and being slidable to cover, to a greater or less extent, the orifice of said nozzle; and means for operating said valve.

3. In a carbureter, in combination, a casing, the lower portion of which constitutes a float chamber; a mixing chamber within said casing and having an outlet in one end of the casing; an air inlet tube extending horizontally within said casing and projecting into the mixing chamber, and having an air inlet in the side of the casing opposite said outlet; a hydrocarbon nozzle within said air tube and communicating at its lower end with the float chamber; a bearing attached to said casing adjacent to said air inlet and alined with said air tube; a valve controlling said nozzle, said valve having a stem which is slidably mounted in said bearing; and means for operating said valve.

4. In a carbureter, in combination, a casing, having a horizontal partition therein, the lower portion of said casing constituting a float chamber and the upper portion thereof forming an air chamber; a mixing chamber within the casing and below said partition, the casing having an attaching tube which forms the outlet for said mixing chamber, the inner portion of said mixing chamber communicating with said air chamber; a horizontal air inlet tube extending into said mixing chamber and having an air inlet alined with said outlet; a fuel nozzle located within said air inlet tube and communicating at its lower end with the float chamber; a valve controlling said fuel nozzle; and a valve-controlled air inlet for said air chamber.

5. In a carbureter, in combination, a casing having a horizontal partition therein, the lower portion of said casing constituting a float chamber and the upper portion thereof forming an air chamber; a mixing chamber within the casing and below said partition, the casing having an attaching tube which forms the outlet for said mixing chamber, the inner portion of said mixing chamber communicating with said air chamber; a horizontal air inlet tube extending into said mixing chamber and having an air inlet alined with said outlet; a fuel nozzle located within said air inlet tube and communicating at its lower end with the float chamber, said nozzle being located approximately centrally of the casing and the orifice thereof substantially coinciding with the axes of the mixing chamber and the outlet; a valve controlling said fuel nozzle; and a valve-controlled air inlet for said air chamber.

6. In a carbureter, in combination, a casing having chambers 60 and 62 therein; an air inlet tube extending from the chamber 62 and projecting into the chamber 60; a member closing the outer end of the chamber 62; a bearing on said member; a hydrocarbon nozzle arranged to discharge hydrocarbon into said air-inlet tube; a valve controlling said nozzle, said valve having a stem which is slidably mounted in said bearing; and means for moving said stem to operate said valve.

7. In a carbureter, in combination, a casing having a float chamber in its lower portion, an air chamber in its upper portion, and a mixing chamber, the casing having an attaching tube which forms the outlet for, and is alined with, the mixing chamber, the inner portion of the mixing chamber communicating with the air chamber; a horizontal air inlet tube extending into said mixing chamber and having an air inlet alined with said outlet; a fuel nozzle located within the air inlet tube and communicating at its lower end with the float chamber; a valve controlling said fuel nozzle; a valved air inlet for said air chamber; and a float-controlled fuel inlet in the lower end of said float chamber.

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Witnesses:

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