W. H. RATCLIFF.

CARBURETER.

APPLICATION FILED SEPT. 7, 1910.

1,046,014.

Patented Dec. 3, 1912.

3 SHEETS—SHEET 1.

Fig. 1

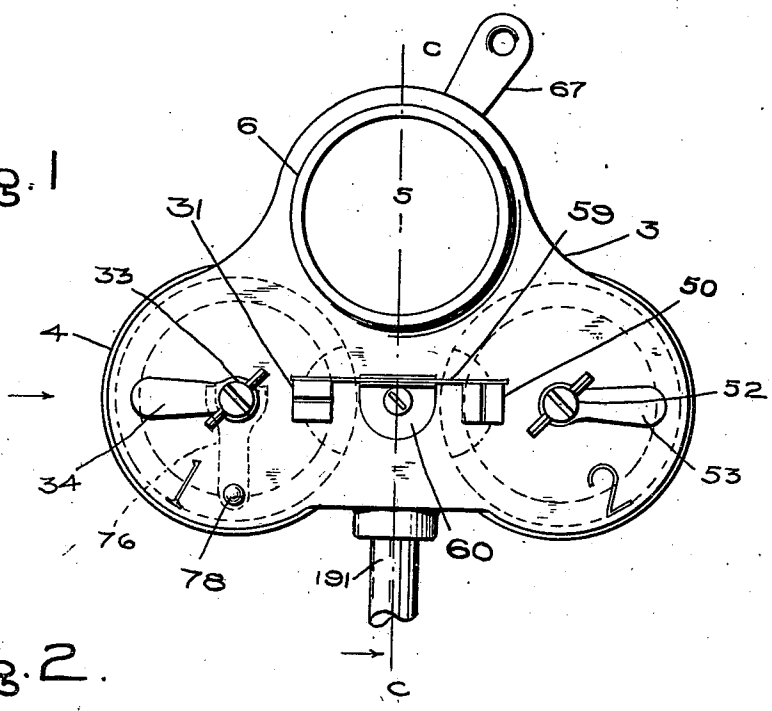


Fig. 2.

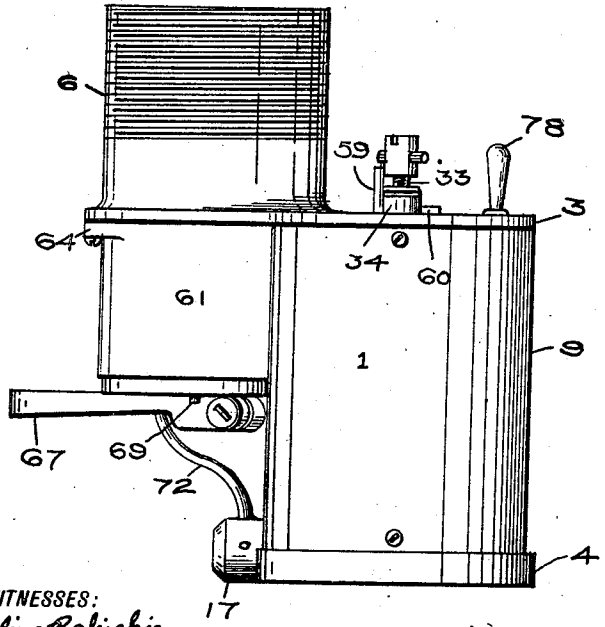
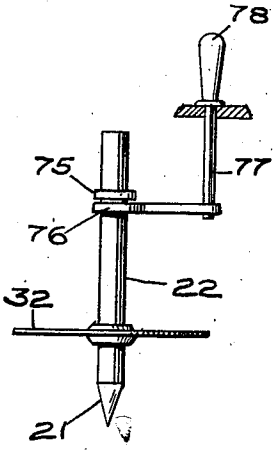


Fig. 3



WITNESSES:

Cornelius Zabriskie.

Frances E. Blodgett.

INVENTOR

William H. Ratcliff,

BY Russell M. Everett,

ATTORNEY.

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3 SHEETS—SHEET 2.

Fig. 4

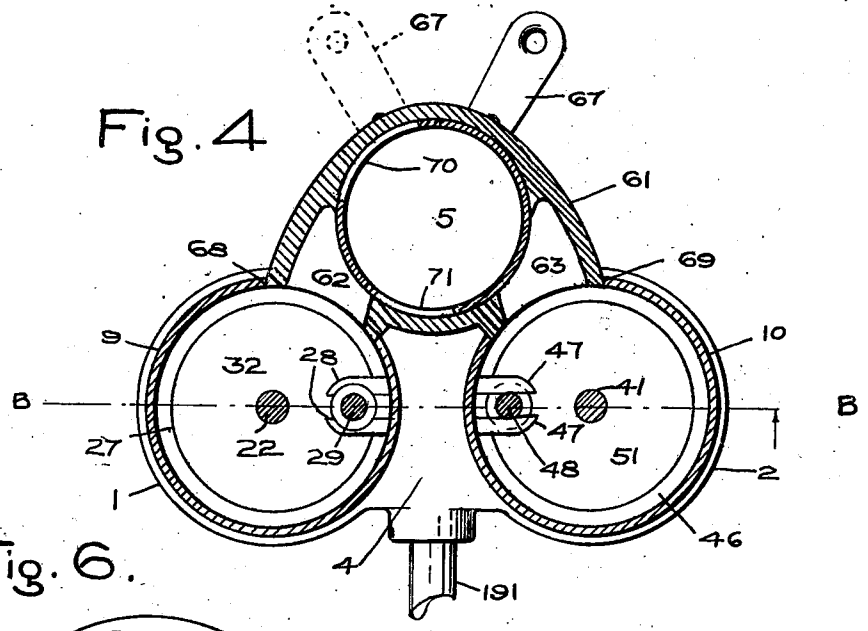

Fig. 6.

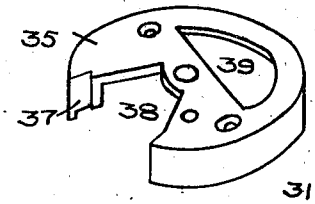

Fig. 5.

WITNESSES:

Cornelius Jabiskie

Frances E. Blodgett

INVENTOR

William H. Ratcliff,

By Russell M. Everett,

ATTORNEY.

W. H. RATCLIFF.

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3 SHEETS—SHEET 3.

Fig. 7

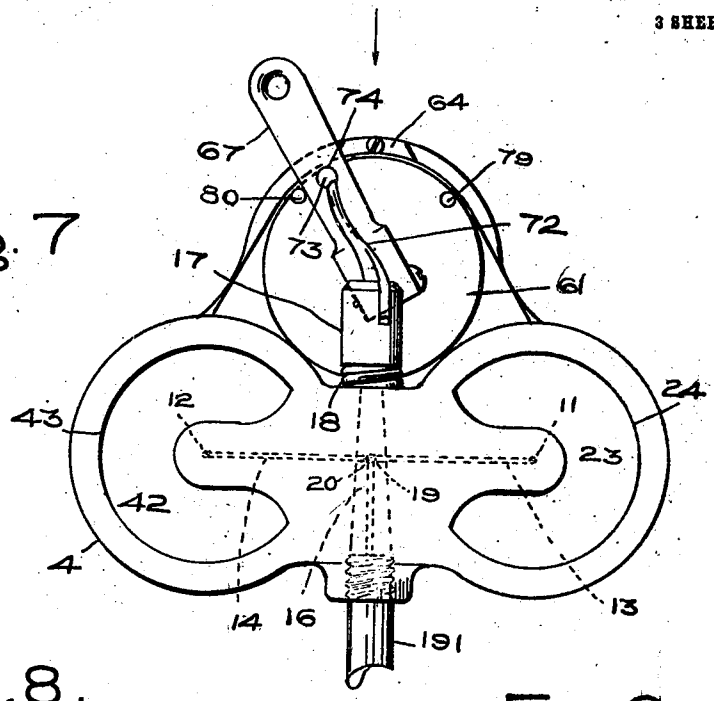


Fig. 8.

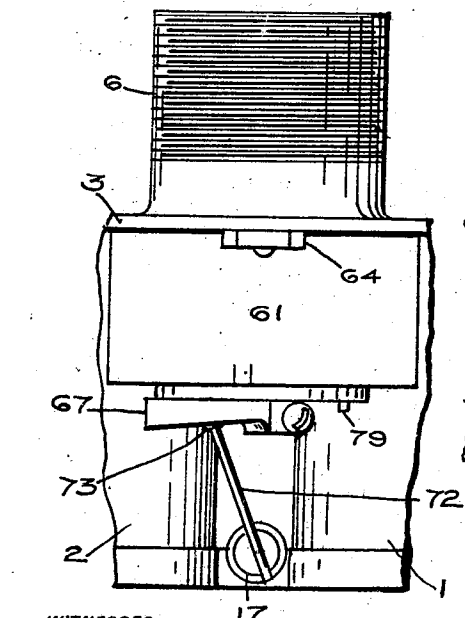
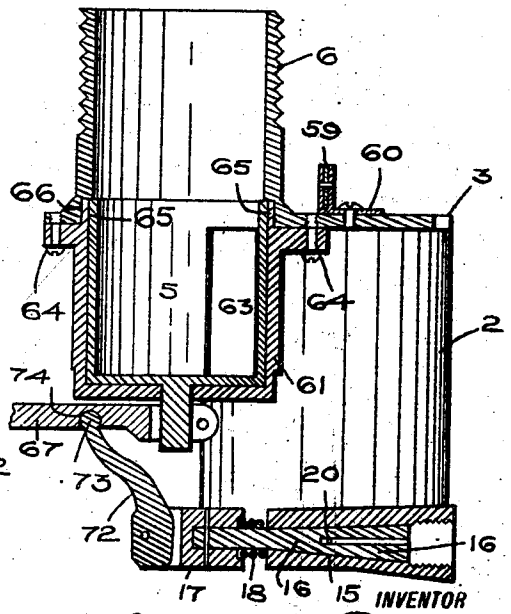


Fig. 9.



WITNESSES:
Cornelius Gabiskie
Frances E. Blodgett

INVENTOR
William H. Ratcliff,
BY
Russell M. Everett,
ATTORNEY.

UNITED STATES PATENT OFFICE.

WILLIAM H. RATCLIFF, OF NEWARK, NEW JERSEY, ASSIGNOR TO HYDRO-CARBON MACHINE COMPANY, A CORPORATION OF NEW JERSEY.

CARBURETER.

1,046,014. Specification of Letters Patent. Patented Dec. 3, 1912.

Application filed September 7, 1910. Serial No. 580,817.

To all whom it may concern:

Be it known that I, WILLIAM H. RATCLIFF, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain Improvements in Carbureters, of which the following is a specification.

The objects of this invention are to secure a carbureter in which the throttle valve shall also open and close the supply of gasolene or other hydro-carbon fuel to the carbureter; to thus insure that the gasolene shall be positively shut off when the throttle is closed, so that there can be no flooding of the carbureter; to secure a carbureter comprising two vaporizing portions which can operate both together for high speed or one of them alone for low speed; to thus enable said vaporizing portions to be adjusted differently, one for high speed and one for low, whereby greater adaptation of the carbureter to different speeds is secured; to provide suitable means for shutting off one of said vaporizing portions both from the gasolene supply and by the throttle, while the other vaporizing portion is open both to the gasolene supply and to the throttle; to enable the vaporizing portion which first comes into action to be opened more or less by the throttle valve while the other vaporizing portion remains closed; to enable the second vaporizing portion to be opened more or less after the first one has been opened to its maximum capacity; to effect such control of both vaporizing portions by the throttle valve; to secure a simple and compact construction, and to obtain other advantages and results as may be brought out in the following description.

Referring to the accompanying drawings, in which like numerals of reference indicate the same parts throughout the several figures, Figure 1 is a plan of a carbureter of my improved construction; Fig. 2 is a side elevation of the same, looking in the direction indicated by the arrow in Fig. 1; Fig. 3 is a detail view of a certain priming device; Fig. 4 is a horizontal section of the carbureter on line A—A of Fig. 5; Fig. 5 is a vertical section taken on line B—B of Fig. 4; Fig. 6 is a detail perspective view of a certain top disk for attaching the cylindrical casings of the vaporizing portions; Fig. 7 is an underneath view of the carbureter; Fig. 8 is an elevation of a portion of the carbureter, looking in the direction indicated by the arrow in Fig. 7, and Fig. 9 is a vertical section taken on line C—C, Fig. 1, with the throttle valve lever in central position.

In said drawings, 3 indicates a top plate and 4 a bottom plate, between which plates extend vertical cylindrical vaporizing portions 1 and 2. Gasolene or other hydro-carbon liquid fuel is supplied to said vaporizing portions through the said bottom plate 4, and from the tops of the portions 1 and 2 the vaporized fuel mixed with air passes through a barrel throttle valve 5 connected to both vaporizing portions and leading into a duct leading upward from the top plate 3 and adapted to be connected to an engine. It will be understood that one of the vaporizing portions, as 1, is adapted to be employed alone at first, but after it has been opened to a certain extent it is supplemented by the other vaporizing portion 2.

The bottom plate 4 has at the upper surface of its ends similar seats 7 and 8 adapted to receive the cylindrical casings 9 and 10 of the two vaporizing portions 1 and 2. At the centers of the bottoms of said vaporizing portions are fluid supply openings 11 and 12, respectively; to which passages 13 and 14, respectively, lead through the base plate 4 from a tubular valve seat 15 which is bored through the base plate transversely of the line connecting the two end seats thereof. Said valve seat 15 is conical and receives a plug valve 16, one end of which projects beneath the throttle valve 5 and receives a forked head 17 non-rotatably secured thereon. A spring 18 between said head and the bottom plate 4 normally seats the valve 16, and at the opposite end of the valve seat or boring 15 a fuel-supply pipe 191 is connected. The said plug valve 16 is hollow from its end next the supply pipe inward to a point opposite the ends of the ducts 13 and 14, and has lateral ports 19 and 20 leading outward from its longitudinal passage and adapted to register with the

said ducts 13 and 14, respectively. The port 19 for the vaporizing portion 1 is larger than the other port 20 and adapted to come first into registration with the duct 13, so that the vaporizing portion 1 is supplied with fuel in advance of the other vaporizing portion 2. In fact, the port 20 does not begin to register with the duct 14 to the vaporizing portion 2 until the vaporizing portion 1 is working sufficiently to supply fuel for low speeds.

The fuel supply opening 11 at the center of the bottom of the vaporizing portion 1 flares at its upper end to provide a seat for the lower conical end 21 of the valve stem 22 which is arranged axially of the cylindrical vaporizing portion, said conical lower end serving as a needle valve to control the supply of fuel to said vaporizing portion. Around the flared fuel supply opening is a saucer 23, which causes the air taken in through the opening 24 in the bottom plate to enter the vaporizing portion around the edges of the said saucer. Above said saucer and adjacent thereto, an annular flange 25 projects inward from the walls of the cylindrical casing 9 and has at its inner edge a downwardly-projecting rib 26. This flange 25 and its rib 26 direct the current of air passing upward around the edges of the saucer 23 inwardly toward the center of said saucer and downwardly toward the bottom of the same. Thus said air tends to most effectively vaporize the gasolene or other fluid which has escaped through the supply opening 11 into the said saucer 23. Above the flange 25 there is within the cylindrical casing 9 a slidable ring 27 which is long enough to secure a stable bearing in the cylindrical casing, and has its lower edges preferably beveled outward. At one circumferential point of its upper edge are fingers 28, 28 extending radially inward and adapted to receive between themselves a vertical plunger 29 which has fixed collars both above and below said fingers so that the ring will move up and down with the plunger. Said plunger is at its upper end made rotatably fast to the lower end of a screw 30 which is tapped into the top plate 3 and has above the same a head 31 for turning to regulate the height of the ring 27. Within the said ring 27 is a diaphragm 32 fast upon the said stem 22 and adapted to pass loosely up through the ring 27 if desired. Obviously by raising or lowering the ring 27, a greater or less space is provided for the passage of mixture around the edges of said diaphragm 32, and thus the space through which the vaporizing portion can take in air is varied. Movement of the valve stem 22 in an upward direction is limited by a screw 33 threaded into the top plate 3 of the carbureter and abutting at its inner end the top of the valve stem. A lock nut 34 holds said set screw 33 against inadvertent displacement. The cylindrical casing 9 is secured to a top disk 35 which is in turn secured to the under side of the top plate 3 as by screws 36. This disk 35 has a marginal flange 37 which holds it at a distance from the top plate, as shown, thus providing good bearings for the vertically sliding plunger and valve stem. Said disk is peripherally recessed or cut away, as at 38, see Fig. 6, to provide free access to the throttle port hereinafter to be described, and is also apertured as at 39 for the same purpose. The cylindrical casing 10 of the other vaporizing portion 2 is similarly supplied with parts like those 21 to 39 inclusive which have just been described in connection with the vaporizing portion 1, and said parts for the second vaporizing portion 2 have been designated by reference numerals 40 to 56 inclusive and are thought to need no further description here. The two vaporizing portions work in the same manner, but their rings 27 and 46 are adjusted to different positions, as shown in Fig. 5, that of the vaporizing portion 1 being low so as to admit only a little air for low speed of the engine and that of the vaporizing portion 2 being high so as to admit a greater amount of air for high speeds of the engine. Preferably the heads 31 and 50 of the screws 30 and 49 for adjusting the rings 27 and 46 have flat sides which bear against the opposite ends of a leaf spring 59 held in a bracket 60, to prevent said screws from turning inadvertently, as by jarring.

Beneath the pipe 6 which leads from the carbureter to the engine is an extension 61 from the upper parts of the cylinders 9 and 10, and into which passages 62 and 63 lead from said cylinders, respectively. The throttle valve 5 is located in said extension, in axial alinement with the pipe 6, as shown, and controls the passages 62, 63 from the two vaporizing portions. Preferably the extension 61 is a casting, as shown, secured to the top plate 3 by means of lugs 64, 64, and having above said lugs an annular rim 65 which fits into a recess 66 of the top plate, referring more especially to Fig. 9 of the drawings. The cylindrical throttle valve 5 has at its lower end a stem which projects through the bottom of the extension 61 and has fast upon itself an arm 67 for turning the throttle valve. The passages 62 and 63 of the extension 61 fit nicely into openings 68 and 69 cut in the sides of the cylinders 9 and 10, respectively, and adjacent to the ports thus formed are the recesses 38 and 57 of the top disks 35 and 54, already described, which secure the full capacities of the ports.

The throttle valve 5 has in its side wall two ports 70 and 71 which are adapted to register with the passages 62 and 63, re-

spectively, when the throttle is thrown into fully opened position, as shown in dotted lines in Fig. 4. When the throttle is closed, however, both ports 70 and 71 lie against closed portions of the walls of the throttle casing and the walls of the throttle cover the passages 62 and 63, as shown in full lines in Fig. 4. Furthermore, when the throttle commences to open, its port 70 first begins to register with the passage 62, and not until this passage 62 has been opened to practically the full capacity of the vaporizing portion 1 does the other port 71 of the throttle begin to register with its passage 63 leading to the vaporizing portion 2. The vaporizing portions are thus opened up by the throttle valve in sequence and not simultaneously.

The turning head 17 of the plug valve 16 which opens and closes the supply of gasolene or other hydro-carbon fluid is connected to the arm 67 which swings the throttle valve 5, so that the movements of said throttle valve control also the said plug valve. This connection is preferably made by an auxiliary lever 72 which is pivoted at one end in the fork of the head 18 and at its other end has a ball 73 fitting in a socket 74 at the under side of the arm 67. The proportion and relation of the parts are such that as the arm 67 is swung to operate the throttle valve, the plug valve 16 opens or closes the gasolene supply accordingly. For instance, when the throttle is closed entirely, as shown in Fig. 4, the feed valve is also closed, but as the throttle begins to open the passage 62 to the vaporizing portion 1, the feed valve 16 admits gasolene to said vaporizing portion 1. So long as the passage 63 to the vaporizing portion 2 remains closed by the throttle valve 5, the feed valve 16 does not admit any gasolene to said vaporizing portion 2, but when said passage 63 begins to open in addition to the passage 62, the feed valve 16 admits gasolene to the vaporizing portion 2, its port to the vaporizing portion 1 also remaining open at the same time.

It will be understood that the plug valve 16 is only a positive shut-off to prevent the gasolene feed being left running when the engine is stopped, and that the conical valves 21 and 40 automatically control the feeding of fuel to the vaporizing portions, the diaphragms 32 and 51 raising said needle valves according to the suction. In order therefore to initially open the automatic valve 32 I provide upon the stem of said valve a stop 75 beneath which normally lies loose the fork 76 of a sliding rod 77 which extends up through the top plate 3 and is provided above the same with a handle 78. Obviously by pulling this handle up, the valve 21 is opened to admit gasolene, but at other times the fork 76 does not interfere with automatic movement of the valve and its stem 21. Stops, as shown at 79 and 80 may be employed to suitably limit movement of the lever 67 in either direction as it is swung.

Having thus described the invention, what I claim is:

1. In a carbureter, the combination with a base plate, a top plate, vaporizing portions between said base plate and top plate, the base plate having a fuel duct branching to said vaporizing portions, a plug valve in said fuel duct adapted to open and close said branches, an outlet through said top plate at one side of said vaporizing portions, an upright cylindrical throttle valve adapted to connect said vaporizing portions with said outlet, a crank arm upon the lower end of said throttle valve adapted to swing in a plane substantially parallel to the bottom plate above the same into and out of a position substantially parallel to said plug valve, and a radial arm for said plug valve having its outer end forming a ball-and-socket joint with said crank arm intermediate of its ends and at its under side.

2. In a vaporizer, the combination of a casing adapted to receive air and fuel at its lower part, means for supplying air and fuel to said casing, a diaphragm in said casing above the air and fuel inlets adapted to be moved longitudinally of the casing by suction therethrough, a ring above said diaphragm slidably engaging the walls of the casing and having its lower edge beveled downwardly outward, and means for sliding said ring toward and away from the diaphragm and holding it in fixed relation thereto.

3. In a vaporizer, the combination of a casing adapted to receive air and fuel at its lower part, means for supplying air and fuel to said casing, a diaphragm in said casing above the air and fuel inlets adapted to be moved longitudinally of the casing by suction therethrough, a ring in said casing slidable upon the inner walls thereof toward and away from said diaphragm to vary the suction space therearound, said ring having at one circumferential point of its upper edge inwardly projecting fingers, a plunger extending longitudinally of the casing between the said fingers and having lateral projections above and below said fingers adapted to engage the same, and a screw threaded through the top of the casing and connected rotatably fast to said plunger, whereby said ring may be adjusted and held at any desired point.

4. In a carbureter, the combination of two vaporizing portions, a common outlet for said vaporizing portions, a throttle adapted to open and close said vaporizing portions in succession, a fuel supply duct, a single valve adapted to connect and dis-

connect the vaporizing portions with said fuel duct in succession, and means for operating said throttle and valve together.

5. In a carbureter, the combination of two vaporizing portions, an outlet for said vaporizing portions, a throttle adapted to connect first one of the vaporizing portions and then both of them with said outlet, a fuel supply duct, a single valve adapted to connect first one of the vaporizing portions and then both of them with said fuel duct, and means for operating said throttle and valve together.

6. In a carbureter, the combination of two vaporizing portions, an outlet for said vaporizing portions, means adapted to connect first one of the vaporizing portions and then both of them with said outlet and to disconnect them in reverse order, a fuel supply duct, a single valve adapted to connect first one of the vaporizing portions and then both of them with said fuel duct and to disconnect them in reverse order, and means for operating said throttle and valve together.

7. In a vaporizer, the combination of a cylindrical casing adapted to receive air at its bottom, a fuel saucer arranged in said bottom, means for admitting liquid fuel through the center of said saucer, means for directing air over the said saucer, a diaphragm above said saucer, a fuel control valve connected to said diaphragm, and means adapted to slide in said cylinder above said diaphragm toward and away from the same to vary the suction space therearound.

8. In a vaporizer, the combination of a cylindrical casing adapted to receive air at its bottom, a fuel saucer arranged in said bottom, means for admitting liquid fuel through the center of said saucer, a flange projecting from the inside of said casing over the edges of said saucer, a diaphragm above said flange, a fuel-control valve connected to said diaphragm, and means adapted to slide in said cylinder above said diaphragm toward and away from the same to vary the suction space therearound.

9. In a vaporizer, the combination of a cylindrical casing adapted to receive air at its bottom, a fuel saucer arranged in said bottom, means for admitting liquid fuel through the center of said saucer, means for directing air over the said saucer, a diaphragm above said saucer, a fuel control valve connected to said diaphragm, a ring in said cylinder above said diaphragm projecting from the walls of the cylinder for sliding said ring in said cylinder.

10. In a vaporizer, the combination of a cylindrical casing adapted to receive air at its bottom, a fuel saucer arranged in said bottom, means for admitting liquid fuel through the center of said saucer, means for directing air over the said saucer, a diaphragm above said saucer, a fuel control valve connected to said diaphragm, a ring in said cylinder above said diaphragm projecting from the walls of the cylinder and having its lower edge beveled outwardly downward, and means for sliding said ring in said cylinder.

11. In a vaporizer, the combination of a cylindrical casing adapted to receive air at its bottom, a fuel saucer arranged in said bottom, means for admitting liquid fuel through the center of said saucer, means for directing air over the said saucer, a needle-valve adapted to control said central feed inlet of the saucer and having a stem extending up into the cylindrical casing, a diaphragm fast on said stem, and means adapted to slide in said cylinder above said diaphragm toward and away from the same to vary the suction space therearound.

12. In a carbureter, the combination of a base plate, a top plate, cylinders extending between said base plate and top plate, the base plate having between said cylinders a fuel duct branching to said cylinders, a valve in said fuel duct adapted to open and close said branches, vaporizing mechanisms in said cylinders, an outlet duct projecting from said top plate, a throttle adapted to connect and disconnect said vaporizing portions with said outlet in succession, and means for operating said throttle and fuel valve.

13. In a carbureter, the combination of a base plate, a top plate, cylinders extending between said base plate and top plate, the base plate having between said cylinders a fuel duct branching to said cylinders, a valve in said fuel duct adapted to open and close said branches, vaporizing mechanisms in said cylinders, an outlet duct, a throttle valve casing connecting said outlet with said cylinders, a throttle valve in said casing adapted to open one or both of said vaporizing portions, and means for operating said throttle valve and fuel valve together.

14. In a carbureter, the combination of a base plate, a top plate, cylinders extending between said base plate and top plate, the base plate having between said cylinders a fuel duct branching to said cylinders, a valve in said fuel duct adapted to open and close said branches, vaporizing mechanisms in said cylinders, an outlet duct projecting from said top plate, a throttle adapted to connect and disconnect said vaporizing portions with said outlet in succession, and means for operating said throttle and fuel valve together.

15. In a carbureter, the combination of a base plate, a top plate, cylinders extending between said base plate and top plate, the base plate having between said cylinders a fuel duct branching to said cylinders, a valve in said fuel duct adapted to open and

close said branches, vaporizing mechanisms in said cylinders, an outlet duct projecting from said top plate at one side of the line of said cylinders, a throttle valve casing beneath said outlet and connecting the same with said cylinders, a throttle valve in said casing adapted to open one or both of said vaporizing portions, and means for operating said throttle valve and fuel valve together.

WILLIAM H. RATCLIFF.

Witnesses:
JAMES H. MARKEY,
DAVID B. MULCAHY.