

E. S. SMITH.
CARBURETER.
APPLICATION FILED MAY 27, 1911.

1,065,977.

Patented July 1, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

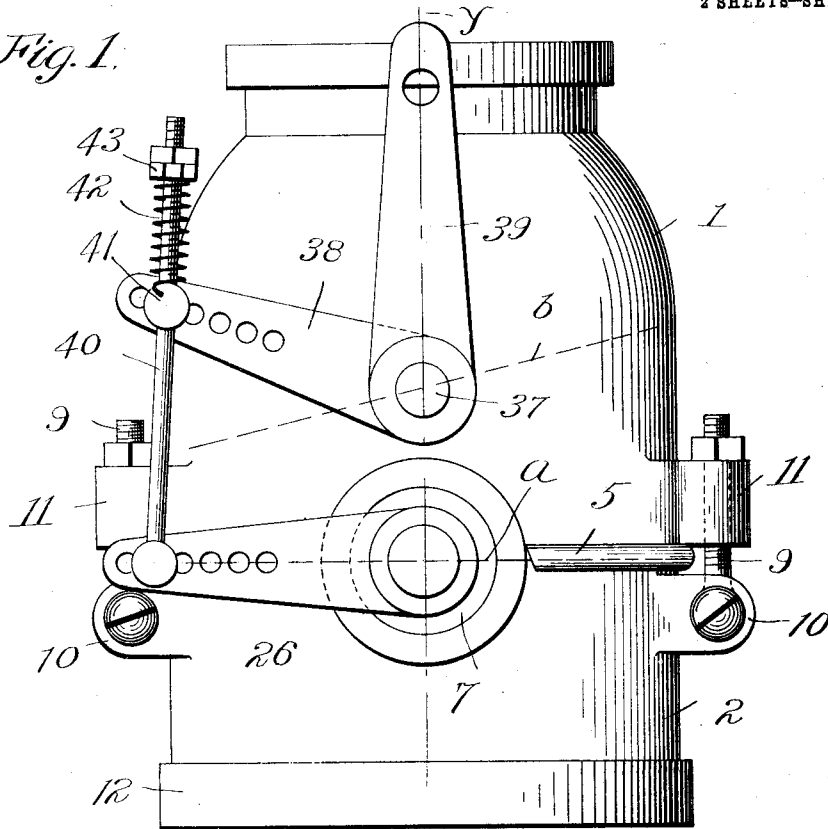
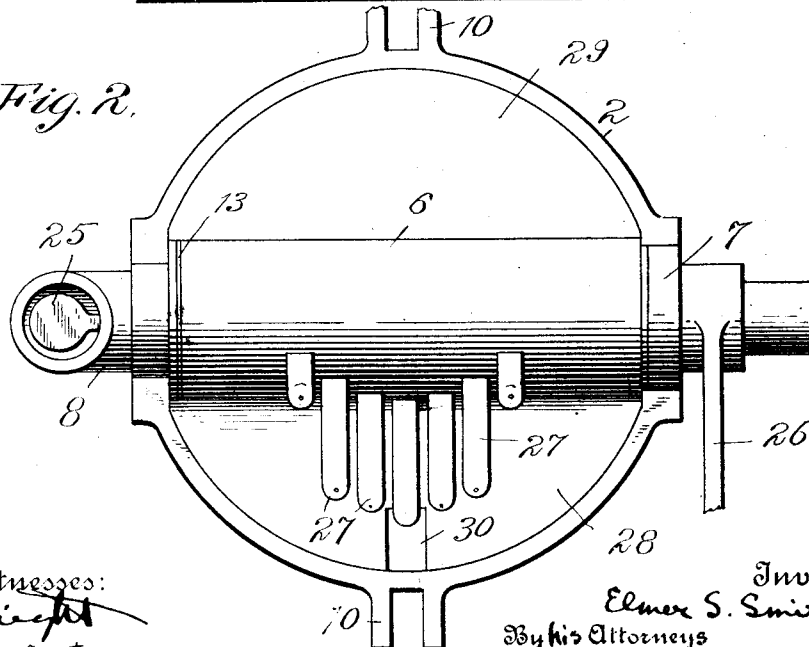


Fig. 2.



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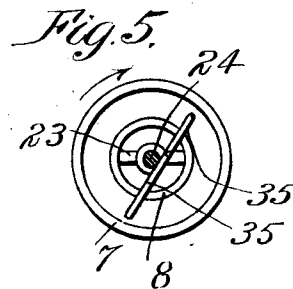
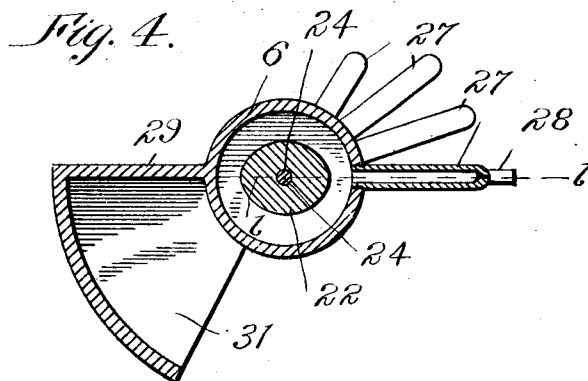
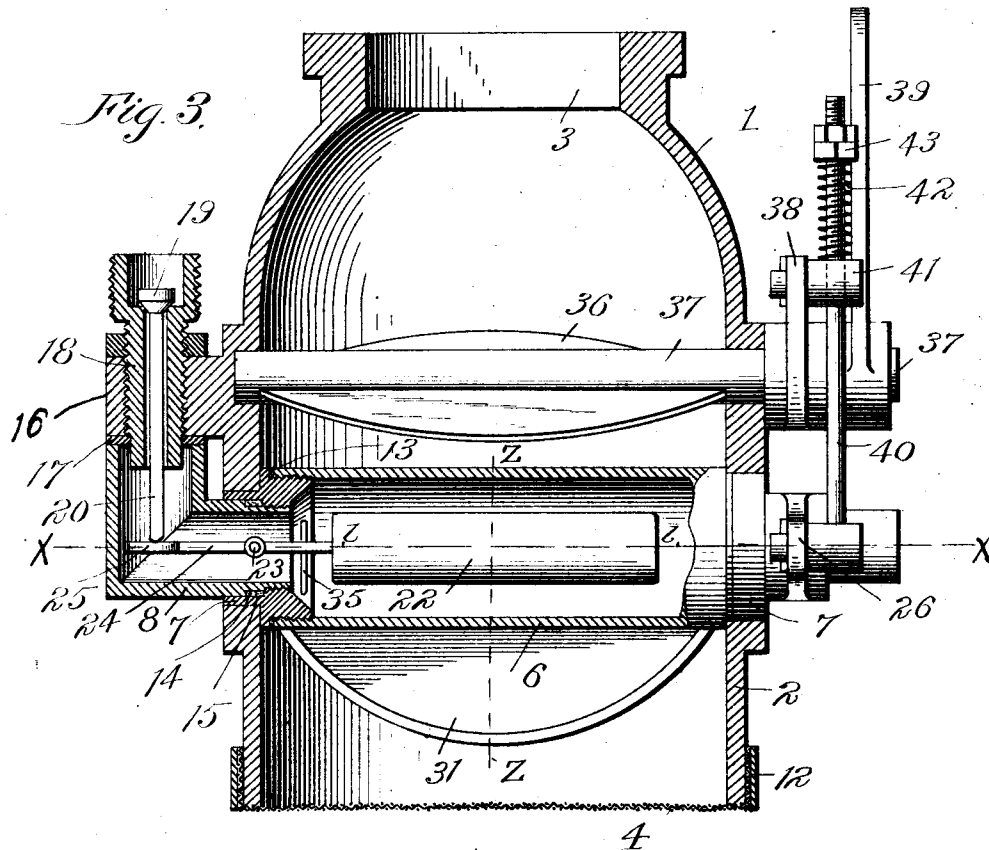
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2 SHEETS-SHEET 2.



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UNITED STATES PATENT OFFICE.

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CARBURETER.

1,065,977.

Specification of Letters Patent.

Patented July 1, 1913.

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To all whom it may concern:

Be it known that I, ELMER S. SMITH, a citizen of the United States, and a resident of Boundbrook, Somerset county, State of New Jersey, have invented certain new and useful Improvements in Carbureters for Hydrocarbon-Engines, of which the following is a full and clear specification, illustrated in the accompanying drawings, the particular novel features of the invention being more fully pointed out in the annexed claims.

The object of my invention is to provide a simple and highly efficient carbureter for automatically vaporizing carburant and mixing it with air to form a mixture of the requisite quality in accordance with the amount of work which the engine is to perform at the time to which the carbureter is attached.

My improved carbureter is adapted for use in stationary hydrocarbon engines as well as in hydrocarbon engines used in propelling vehicles, boats, or the like.

In particular my invention relates to improvements in the carbureter described and illustrated in my copending application, Serial Number 497,646, filed May 22, 1909, and the structure illustrated in the present application is an improvement with regard to certain features which will be more clearly set forth hereinafter.

In the accompanying drawings Figure 1 is a full side view of my carbureter. Fig. 2 is a plan view of the section taken on line *a-a* in Fig. 3. Fig. 3 is a vertical section on the line *y-y* of Fig. 1, seen in the direction of the arrow. Fig. 4 is a section through the fuel receptacle on the line *z-z* in Fig. 3 seen from the left hand side. Fig. 5 is an inner view of the central portion of the fuel receptacle looking to the left in Fig. 3.

Referring now to Figs. 1, 2 and 3, 1 and 2 constitute the outer shell which is horizontally divided into two portions 1 and 2, the division line being at the bead 5 in Fig. 1. The two shell portions are held together by means of hinged bolts 9-9 hinged on diametrically opposite sides of the lower shell 2 on lugs 10, corresponding lugs 11 being provided at the upper shell 1 over which the hinged bolts are thrown so that

the two shell portions can be tightly attached to each other by means of nuts. 55 Across the opening of the lower shell 2, is stretched a wire screen 4 to prevent solid matter from being sucked into the shell. The screen may be fastened across this lower opening in any suitable manner for instance 60 by a ring 12 as shown in Figs. 1 and 3. The opening 3 of the upper shell is somewhat smaller than the lower opening so that the upper shell assumes a dome shape as shown. Within this entire outer shell just described 65 is disposed transversely a fuel receptacle 6 in such manner that it has pivotal movement on trunnions 7-7 provided at either end of the receptacle and journaled in the wall of the shell. Preferably and for obvious reasons the pivoted axis coincides with the plane on which the two shell portions 1 and 2 meet, so that when the two shell portions are separated the fuel receptacle may be easily removed therefrom. The 75 preferred construction of the fuel receptacle as may be seen from Fig. 3 is such that the right hand trunnion 7 is integral with the main body of the receptacle 6 whereas the left hand side of this receptacle is 80 open and the left hand trunnion 7 is threaded into this opening with a gasket 13 between the trunnion and the receptacle body to prevent leakage of fuel at this point.

The left hand trunnion 7 is hollow and 85 has threaded into it concentrically with receptacle 6 a fuel conduit 8 which is L shaped as shown in Fig. 3. The end of the L which is threaded into trunnion 7 is of such shape that a shoulder is formed at 14 which with 90 a corresponding inner shoulder within trunnion 7, is adapted to form an abutment for packing 15 which may be inserted into the space left between the two shoulders to prevent leakage of fuel through the joint between the L and the trunnion. The upward 95 pointing portion of the L 8 abuts against a lug 16 provided on outer shell 1, with a packing washer 17 interposed. Into lug 16 is threaded a nipple 18 which contains a 100 fuel valve 19 the upper end of which is also threaded to receive the usual pipe connection (not shown). Valve stem 20 passes centrally through nipple 18 with suitable space between the nipple boring and the 105 valve stem to permit fuel to pass through it

into the L 8 and into the fuel receptacle 6. It will be noted that the fuel pressure in the pipe line bearing upon valve 19 tends to seat this valve. Fuel receptacle 6 contains a float 22 which is pivotally fastened by means of an arm 24 in the horizontal end of the L 8 on a horizontal transverse pivot pin 23. Arm 24, as will be seen from Fig. 3, extends rearwardly into the L 8 and carries a disk 25 at this end which is in line with valve stem 20. The correlation of the elements, the valve stem, the float and disk 25, just described, is such that if the fuel is on the normal level 1-1 in receptacle 6, the float assumes the position illustrated, whereby disk 25 just touches the foot of the valve stem 20, valve 19 being seated at that time, so that no fuel can enter the receptacle. It will thus be noted that if the fuel receptacle 6 is rocked on its trunnions for the purpose which will be described hereinafter, float 22 remains stationary relatively to this pivotal motion of the receptacle, whereas of course the float 22 may have its own pivotal motion in the vertical direction on its pivot 23 when for instance fuel level 1-1 falls below the normal, so that disk 25 may lift valve 19 to admit fuel. This construction and operation of the fuel valve by means of a float is well known in the art, the particular novel feature being the independent support of the fuel receptacle which contains the float and the float receptacle, whereby both may have their own pivotal movements independently of each other.

The right hand trunnion 7 of the float receptacle protrudes beyond the outer shell 1-2 and a rocking arm 26 shown more clearly in Fig. 1, is fastened to it so that by means of this arm the fuel receptacle may be rocked in either direction. I will now shortly describe the purpose of this pivotal movement of the float receptacle which has been fully set forth in my aforesaid application.

The receptacle 6 is provided with fuel passages in its wall into which are inserted as shown tubular extensions 27. Fine fuel nozzles 28 are provided at the ends of these tubes. While this particular form of leading the fuel from the inside of receptacle 6 to the outside by means of tubes 27 is of particular advantage in this form of carbureter, illustrated, it is obvious that the length of tubes 27 may be varied even to such extent that the fuel nozzle 28 is in the wall of the receptacle 6. As will appear from Fig. 4 tubes 27 of different length are shown as disposed at different distances from the normal gasoline level 1-1 in the receptacle. Also as will be seen from Fig. 2, the discharge tubes 27 are divided over a considerable portion of the receptacle 6 in longitudinal axial direction in order to di-

vide the fuel discharge through the tubes as evenly as possible over the total semicircular area in which they are located.

Integral with receptacle 6 is a disk 29 which is located substantially in the plane through the fuel level 1-1 and which is of such size that when in horizontal position it substantially closes the air passage through the outer shell 1, 2, save for a small cut out portion 30, shown in Fig. 2, through which air may be admitted at any time to the upper portion of the shell which I shall hereinafter term the mixing chamber. It will also be noted that one of the discharge tubes 27 is located within this cut out portion 30 as shown in Figs. 2 and 3. Now if arm 26, which controls the movement of receptacle 6 is rocked downward more or fewer discharge tubes 27 are brought in line with the fuel level 1-1 or below this level, according to the degree to which arm 26 is rocked, so that fuel is discharged through these tubes from the interior of the receptacle. It will be seen that if this occurs when the engine to which the upper end of the carbureter is connected draws in air, the air in rushing past the fuel nozzles will pick up finely divided fuel which is mixed with the air in the mixing chamber thereby and forms the desired explosive mixture. It will be noted from Figs. 3 and 4, that the air can not pass from the lower to the upper portion of the outer shell at the side of disk 29, opposite to that side where the fuel nozzles are provided on account of a lower extension 31 of quarter sphere, preferably integral with disk 29 which quarter sphere conforms substantially with the inner adjacent wall of the outer shell. If the receptacle is tilted into the opposite direction it will be noted that all the fuel discharge passages are elevated above the gasoline level 1-1 so that no fuel can emanate therefrom and simultaneously disk 29 will admit air to the upper part of the outer shell on both sides of its pivotal axis. The detail features of this construction have been clearly explained in my above named copending application so that further description thereof may be omitted from the present case.

From the preceding description of the float operation and its manner of support, it clearly appears that whenever the fuel level 1-1 falls below the normal through the discharge of fuel through the fuel passages, disk 25 is raised thereby and lifts valve 19 which thus admits fuel to restore the normal level in the receptacle. Now, while the fuel receptacle is tilted so that all fuel discharge tubes are elevated above the normal level, no fuel being required at that time, I find it convenient to have means by which the control of the float over valve 19 is withdrawn by locking the float in such position that disk 25 cannot touch the foot of valve stem

20. I obtain this effect in the following manner: The inner rim of the left hand trunnion 7, Fig. 3, is beveled and across this cone-shaped portion of trunnion 7 a rod 35 is placed and fastened at both ends to the trunnion so that it must rotate with the latter when the receptacle is rocked. In normal position of the receptacle 6 which is shown for instance in Figs. 3 and 4, this rod 36 as will be noted from Fig. 5, is set at an angle to the horizontal and close to arm 24 of float 22, without however, touching it in this position. Now, if in Fig. 5, the trunnion 7 is rocked with the receptacle counter-clockwise (which in Fig. 4 means clockwise) rod 35 is moved out of the downward path of arm 24 so that in case the float level falls below the normal, the float with its arm is free to tilt downward to restore the fuel level to normal. If, on the other hand, trunnion 7 is rotated in the direction of the arrow, it will be noted that rod 35 moves to the underside of arm 24 and slightly lifts this arm and thus the float, so that thereby disk 25 at the rear end of arm 24 is depressed and brought out of contact with the valve. In order to cause rod 35 to lift arm 24, it is necessary that at the point where rod 35 touches arm 24, the central axis of arm 24 be slightly below the pivotal axis of the fuel receptacle or also the size of rod 24 may be slightly enlarged at the underside where rod 35 touches which obviously has the same effect. Thus so long as the receptacle is tilted backward whereby all fuel discharge nozzles are elevated above the level of the fuel, the float is locked and thus the control of the float over the valve withdrawn. Upon tilting the receptacle 6 back to the normal position or below the normal position in which more or less fuel nozzles are brought into operation as described, the control over the valve is restored to the float by rod 35 moving out of the downward path of arm 24.

In my aforesaid application I have shown and described how the fuel receptacle with its valve disk 29 may be thrown into operative position in which it supplies fuel to the air passing through the outer shell, either by hand or through the suction of the engine. I find it a great advantage to provide another valve member above the fuel receptacle which opens and closes with the increase or decrease respectively of fuel discharge of receptacle 6 this effect being obtained by interconnecting the two valves so that they move in fixed relation to each other. I have shown in Figs. 1 and 3 a convenient form of such double valve construction. Above disk 29 and receptacle 6 and in parallel to its pivotal axis, is mounted a throttle valve 36 which has its pivotal bearings in upper casing 1 as shown. The right hand end of the valve trunnion 27

protrudes through the casing and an arm 38 is attached to this free end by which the valve can be opened and closed. Another arm 39 is fastened on trunnion 37 adjacent to arm 38 by which this valve system may be connected to the throttle lever near the operator's seat. Arm 38 of valve 36 and arm 26 of valve disk 29 are linked together by means of rod 40, these two valves being set relatively to each other such that when disk 29 assumes its normal horizontal position as shown in Fig. 4, and also in Fig. 1, by the dash line *a*, throttle valve 36 is already slightly open as shown in Fig. 3 and in Fig. 1 by a dash line *b*. Now, if with reference to Fig. 1, controlling arm 39 is thrown to the left, arms 26 and 38 are both thrown downward to admit mixture to the engine. Arms 26 and 38 are yieldably connected with each other by having rod 40 pass through stud 41 pivotally attached to arm 38 and by having a spring 42 connected at its two ends with stud 41 and nut 43 respectively, the nut being threaded to the upper end of rod 40. By adjusting nut 43 any lost motion of arm 38 relatively to arm 26 may be obtained. This I consider at times an advantage because it enables me to move valve 36 farther than any stops which may limit the throw of valve 29 and receptacle 6 (stops not shown) will allow.

What I claim is:

1. The combination with a carbureter, of a revolubly mounted fuel receptacle and a float pivotally supported in said receptacle independently of the receptacle, whereby both may have their own pivotal movement independently of each other.

2. The combination with a carbureter, of a revolubly mounted fuel receptacle and a float pivotally supported in said receptacle independently of the receptacle, whereby both may have their own pivotal movement independently of each other, and means controlled by the pivotal movement of said float for supplying fuel to said receptacle.

3. A carbureter having a fuel receptacle rotatably disposed to discharge fuel through its wall, a float located in said receptacle and pivotally supported independently of the receptacle and stationary relatively to the rotation thereof and means controlled by the pivotal movement of said float for supplying fuel to said receptacle.

4. A carbureter having an outer shell forming a passageway for air and fuel mixture, a fuel receptacle pivotally disposed therein and adapted when rotated to discharge fuel into said shell through passages provided in its wall, said receptacle containing a float, stationary with relation to the pivotal movement of the receptacle, and means controlled by said float for admitting fuel to said receptacle.

5. A carbureter having an outer shell

forming a passageway for air and fuel mixture, a fuel receptacle pivotally disposed therein and adapted when rotated to discharge fuel into said shell through passages provided in its wall, said receptacle containing a float pivotally supported at one end to swing in a vertical plane, but stationary with relation to the pivotal movement of the receptacle, and means controlled by said float for admitting fuel to said receptacle.

6. A carbureter having an outer shell forming a passageway for air and fuel mixture, a fuel receptacle pivotally disposed therein and adapted when rotated to discharge fuel into said shell through passages provided in its wall, a stationary fuel supply pipe leading into said receptacle having suitable packing at the junction with the receptacle, a float pivotally attached by an arm within and to said supply pipe and having its main portion located in said receptacle and being stationary relatively to the rotation of said receptacle and a fuel valve in said supply pipe controlled by the pivotal movement of the float arm for supplying fuel to the receptacle.

7. A carbureter having an outer shell forming a passageway for air and fuel mixture, a fuel receptacle pivotally disposed therein and adapted when rotated to discharge fuel into said shell through passages provided in its wall, said receptacle containing a float, stationary with relation to the pivotal movement of the receptacle, and means controlled by said float for admitting fuel to said receptacle, means connected to said receptacle for permitting free movement of said float when the receptacle is rotated in one direction, but preventing such movement when the receptacle is rotated in the other direction.

8. A carbureter having an outer shell forming a passageway for air and fuel mixture, a fuel receptacle pivotally disposed therein and adapted when rotated to discharge fuel into said shell through passages provided in its wall, a stationary fuel supply pipe leading into said receptacle having suitable packing at the junction with the receptacle, a float pivotally attached by an arm within and to said supply pipe and having its main portion located in said receptacle and being stationary relatively to the rotation of said receptacle and a fuel valve in said supply pipe controlled by the pivotal movement of the float and for supplying fuel to the receptacle, and a rod disposed transversely in said receptacle adjacent to the point where said supply pipe enters and adjacent to said float arm, said rod when turned into vertical line by rotation of the receptacle in one direction permitting free movement of said float to control its valve and when gradually turned into horizontal line by the receptacle rota-

tion in the other direction, tending to arrest the movement of said float to prevent its valve control.

9. A carbureter having a fuel receptacle rotatably disposed to discharge fuel through its wall, a float located in said receptacle and pivotally supported independently of the receptacle and stationary relatively to the rotation thereof, means controlled by the pivotal movement of said float for supplying fuel to said receptacle and means connected with said receptacle for permitting free movement of said float when the receptacle is rotated in one direction but preventing such movement when the receptacle is rotated in the other direction.

10. A carbureter having a fuel receptacle rotatably disposed to discharge fuel through its wall, a float located in said receptacle and carried by an arm pivotally supported independently of the receptacle, whereby said float remains stationary relatively to the rotation of said receptacle, means controlled by the pivotal movement of said float for supplying fuel to said receptacle and an arresting member fixed to said receptacle and located adjacent to said arm permitting free movement of said arm when the receptacle is rotated in one direction, but arresting said arm and float in inoperative position relatively to said fuel control when the receptacle is rotated in the opposite direction.

11. A carbureter having an outer shell provided with an air inlet and a mixture outlet, a movable valve element normally obstructing the passage through said shell and including a fuel container adapted to supply fuel through its wall into said shell when rotated from normal position, and a second valve element disposed independently of and between said first element and the said mixture outlet and pivotally mounted in said shell, and suitable connection between said two valve elements whereby they may be simultaneously operated in either direction.

12. A carbureter having an outer shell provided with an air inlet and a mixture outlet, a movable valve element normally obstructing the passage through said shell and including a fuel container adapted to supply fuel through its wall into said shell when rotated from normal position, and a second valve element disposed independently of and between said first element and the said mixture outlet and pivotally mounted in said shell, and a yielding connection between said two valve elements whereby they may be simultaneously operated in either direction within predetermined limits but which connection permits said second named element to move in either direction beyond said predetermined limit.

13. In a carbureter of the character described the combination with a shell having

an air and mixture passage and formed of two separable members, a fuel receptacle having its wall apertured to discharge fuel into said shell and having pivotal supports 5 between said two members, a float located in said receptacle pivotally supported independently thereof, and stationary relatively to the rotation of said receptacle and means controlled by the pivotal movement of said 10 float for supplying fuel to said receptacle.

14. In a carbureter of the character described, the combination with a shell having an air and a mixture passage and formed of two separable members, a fuel receptacle 15 having its wall apertured to discharge fuel into said shell and having pivotal supports between said two members, a stationary fuel conduit leading into said receptacle and

joined therewith to permit rotation of the receptacle, a float located in said receptacle 20 and pivotally supported independently of the receptacle and stationary relatively to the rotation thereof, said shell having a valve-controlled fuel supply passage normally closed by its valve and joining said 25 conduit at its free end, the valve in said supply passage being controlled by the pivotal movement of said float to supply fuel to the receptacle and automatically closing said supply passage when the re- 30 ceptacle and float are removed from said shell.

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Witnesses:

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