W. SHAKESPEARE, JR. & W. SCHMID.

CARBURETER.

APPLICATION FILED DEC. 11, 1914.

1,234,227.

Patented July 24, 1917.

2 SHEETS—SHEET 1.

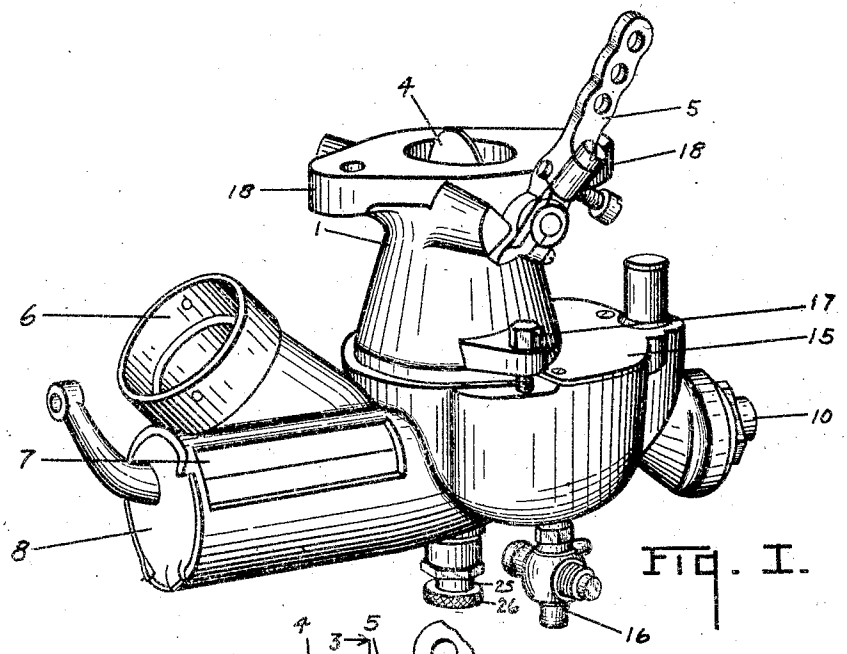


FIG. I.

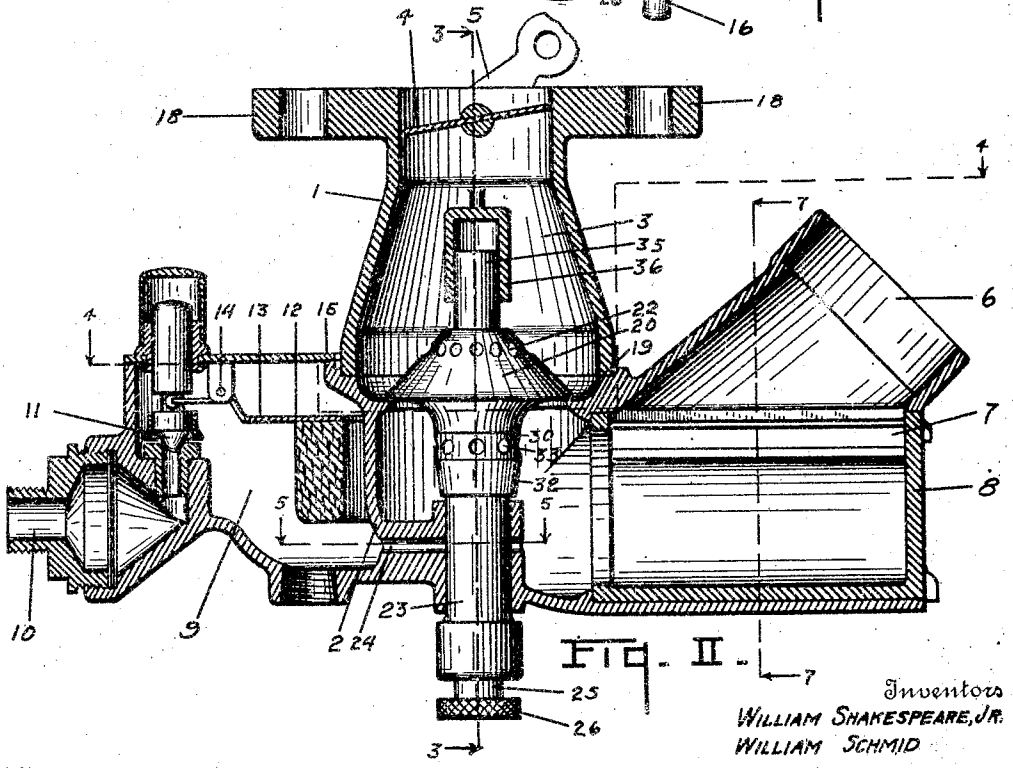


FIG. II.

Witnesses

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2 SHEETS—SHEET 2.

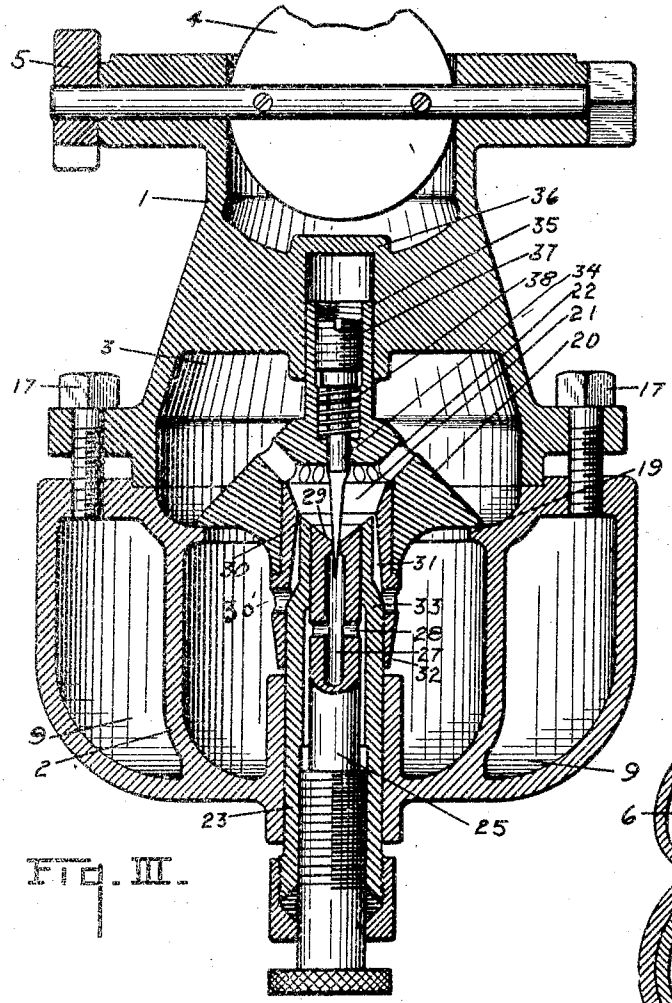


FIG. III.

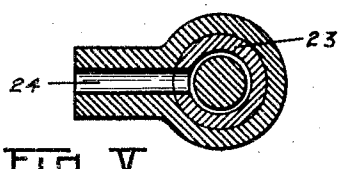


FIG. V.

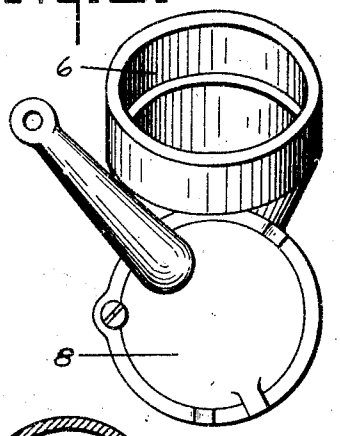


FIG. VI.

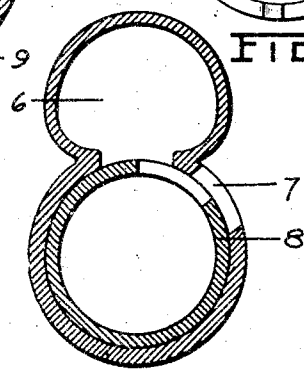


FIG. VII.

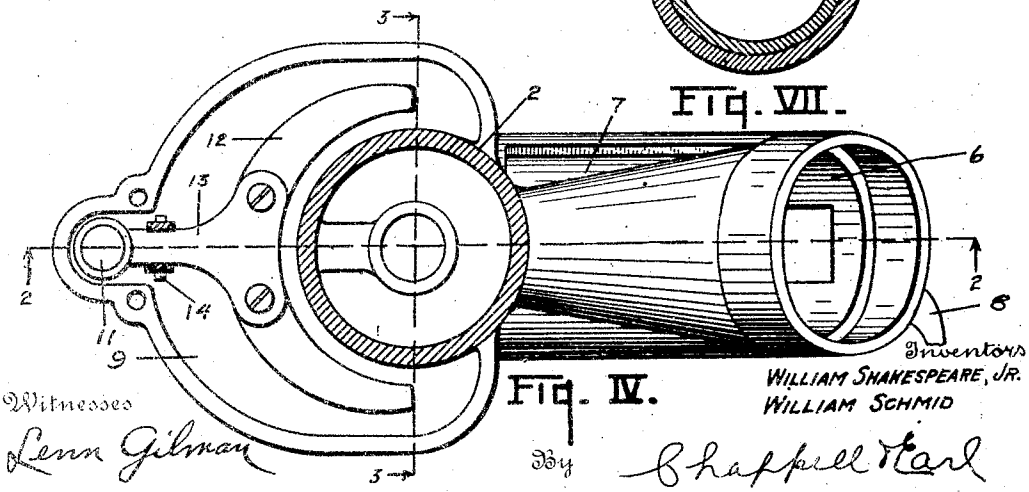


FIG. IV.

Witnesses

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UNITED STATES PATENT OFFICE.

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CARBURETER.

1,234,227. Specification of Letters Patent. Patented July 24, 1917.

Application filed December 11, 1914. Serial No. 876,626.

To all whom it may concern:

Be it known that we, WILLIAM SHAKESPEARE, Jr., and WILLIAM SCHMID, citizens of the United States, residing at Kalamazoo, Michigan, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

This invention relates to improvements in carbureters.

The main objects of this invention are:

First, to provide an improved carbureter in which the proper relative proportions of the fuel and air are automatically maintained throughout varying running conditions of the engine.

Second, to provide an improved throttle controlled carbureter in which the relative proportions of fuel and air are automatically maintained throughout the scope of the throttle adjustment.

Third, to provide in a carbureter an improved valve mechanism which is not likely to get out of repair or adjustment in use and one which is very simple in its operation.

Further objects, and objects relating to structural details, will definitely appear from the detailed description to follow.

We accomplish the objects of our invention by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claims.

A structure which is a preferred embodiment of our invention is clearly illustrated in the accompanying drawing forming a part of this specification, in which:

Figure I is a perspective view of our improved carbureter.

Fig. II is a vertical central section of our improved carbureter, parts being shown in full lines to better illustrate the same.

Fig. III is an enlarged vertical section on a line corresponding to line 3—3 of Figs. II and IV.

Fig. IV is a detail section on a line corresponding to the broken line 4—4 of Fig. II.

Fig. V is a detail section on a line corresponding to line 5—5 of Fig. II.

Fig. VI is an end view looking from the right of Fig. II.

Fig. VII is a transverse section on a line corresponding to line 7—7 of Fig. II.

In the drawing similar reference characters refer to similar parts throughout the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section lines.

Referring to the drawing, the body of our improved carbureter shown consists of the chambered members 1 and 2. The chamber in the member 1 constitutes a mixing chamber 3 and delivery passage which is controlled at its delivery end by the throttle valve 4, the valve shown being of the well known butterfly type having an arm 5 to which the operating connections are made. The passage in the body member 2 constitutes the supply or air inlet passage and is provided with a hot air inlet 6 and the cold air inlet 7 both controlled by the rotary valve 8. As the details of this valve form no part of our present invention they are not further described herein.

The body member 2 is provided with a fuel reservoir 9 having an inlet connection 10 controlled by the valve 11. This valve is controlled by the float 12 carried by the float lever 13 which is pivoted at 14 and adapted to engage the stem of the valve 11. The reservoir is provided with a removable cover plate 15 and with a draw off cock 16 through which any sediment collected in the reservoir may be drawn off by flushing the reservoir.

The body sections are connected by suitable screws 17. The body section is provided with perforated ears 18 by means of which the carbureter may be attached to the manifold as is common in internal combustion engine practice The body member 2 is provided with an annular shoulder-like valve seat 19, the chamber above the seat constituting the mixing chamber 3.

Within the body is an automatically actuated member 20, the member being supported so that it is actuated by the suction within the carbureter. This member 20 is adapted to seat on the valve seat 19 and constitutes an air valve for the mixing chamber 3. The member 20 is chambered to provide a carbureting chamber 21 which has a plurality of delivery openings 22 delivering into the mixing chamber 3.

The tubular nozzle member 23 projects into the carbureting chamber and is connected to the reservoir by the passage 24. The fuel nozzle 25 is threaded into the member 23 for adjustment therein, the nozzle being pro-

vided with a knurled finger piece 26 at its outer end. The nozzle has a longitudinal passage 27 and lateral passage 28 connecting its longitudinal passage with the nozzle member 33.

At its upper end the fuel nozzle 26 has a fuel valve seat 29. The carbureting chamber valve 30 is annular to embrace the upper end of the fuel nozzle and has a conical portion 31 coacting with the upper end of the fixed nozzle member 23 and a sleeve-like portion 32 slidably embracing the nozzle member. This sleeve-like portion has air inlet openings 30′ opening into the air inlet passage of the carbureter below the mixing chamber valve. The fuel valve 34 is of the needle type, its point coacting with the fuel nozzle as shown in Fig. III.

The valve member 20 is provided with a stem-like plunger 35 coacting with the dash pot 36 which is disposed in the mixing chamber or on the inner side of the valve member so that it is subject to the variations in the air pressure or degree of vacuum in the mixing chamber. It is found quite satisfactory in practice to permit the air to escape from the dash-pot around the plunger. The plunger 35 serves as a guide stem for the valve member 20. The plunger 35 is hollow to receive the stem of the fuel valve, and is provided with an adjusting screw 37 for the fuel valve, the fuel valve being held against its adjusting screw by means of the coiled spring 38.

It is intended that the fuel valve shall be adjusted to its proper place when the carbureter is assembled and it is not intended for adjustment by the user as that is not necessary. Such operating adjustment as is required is effected by the adjustment of the fuel nozzle.

The dash-pot for the valve member 20 prevents chattering and fluttering of the valves.

By locating the dash-pot of the suction actuated member in the mixing chamber it is subject to all variations of air pressure therein due to throttle or engine control and the running conditions of the engine, which renders the suction actuated member very sensitive and quick acting and quickly responsive to the throttle control and the running conditions of the engine.

Were the dash-pot subject at all times to atmospheric air pressure or to any air pressure other than that of the mixing chamber, there would be, under ordinary running conditions, a constant variation between such air pressure and that acting upon the suction actuated member thereby preventing evenness in the movement or action of the suction actuated member under the varying suctions or degrees of vacuum in the mixing chamber, and where a liquid dash-pot is provided the same variations occur. When, however, the dash-pot is in the mixing chamber and subject to the variations of air pressure therein these conditions are overcome and the actuated member is very sensitive and quick in its action.

A further advantage of arranging the dash-pot in the mixing chamber is that it is easy to locate it so that it constitutes an effective guide for the suction actuated member. Further, it is entirely inclosed and cannot be distorted by carelessness when the carbureter is assembled in an automobile or from accidental blows or the like while in use.

A still further advantage is that where the dash-pot is open to atmospheric air it is likely to draw in dust and dirt and become clogged thereby. When located in the mixing chamber, any dust that enters the mixing chamber with the incoming air is not likely to pass to the dash-pot, but is, owing to the velocity of the air, drawn past the dash-pot into the manifold.

A still further advantage is that when positioned within the mixing chamber it is subject to the vapors therein so that in practice it is effectively lubricated. This accomplishes a double purpose,—that of preventing wear and friction and, further, the moisture forms a suitable packing so that a free sliding fit may be had between the parts without objectionable leakage past the plunger. In fact, practical use of the structure has demonstrated that the action is very superior to that in structures in which the dash-pot is subject to atmospheric air or to structures in which the dash-pot is of the oil or liquid type.

With the parts thus arranged we provide a structure in which the relative proportions of air and fuel are automatically maintained throughout varying running conditions of the engine and throughout the throttle adjustment, the carbureter being controlled for normal operation entirely by the engine throttle.

Our present improvements are an adaptation and in some respects an improvement upon the structure illustrated and described in Letters Patent No. 1107713, issued to us August 18, 1914, and that shown in our Letters Patent, No. 1,183,125, issued to us May 16, 1916.

We have illustrated and described our present improvements in the form in which we have embodied the same in practice. We have not illustrated or described various modifications which we contemplate as we believe the disclosure made will enable those skilled in the art to embody our improvements as conditions may dictate. We desire, however, to be understood as claiming our improvements specifically in the form illustrated as well as broadly within the scope of the appended claims.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. In a carbureter, the combination of a body having an annular air valve seat therein, the chamber above the said valve seat constituting a mixing chamber, a suction actuated member constituting a mixing chamber valve coacting with said valve seat and having a carbureting chamber therein delivering to said mixing chamber, a fixed nozzle member projecting into said carbureting chamber, a fuel nozzle disposed within said nozzle member and threaded for adjustment therein, an annular carbureting chamber valve carried by said suction actuated member and having a conical portion coacting with the upper end of said nozzle member and a sleeve portion slidably embracing said nozzle member and provided with air inlets, a hollow plunger on the inner side of said suction actuated member, a dash-pot for said plunger disposed within said mixing chamber, and a needle fuel valve arranged in said plunger to coact with said fuel nozzle.

2. In a carbureter, the combination of a body having an annular air valve seat therein, the chamber above the said valve seat constituting a mixing chamber, a suction actuated member constituting a mixing chamber valve coacting with said valve seat and having a carbureting chamber therein delivering to said mixing chamber, a fixed nozzle member projecting into said carbureting chamber, a fuel nozzle disposed within said nozzle member and threaded for adjustment therein, an annular carbureting chamber valve carried by said suction actuated member and having a conical portion coacting with the upper end of said nozzle member, and a needle fuel valve mounted on said suction actuated member.

3. In a carbureter, the combination of a body having an annular air valve seat therein, the chamber above the said valve seat constituting a mixing chamber, a suction actuated member constituting a mixing chamber valve coacting with said valve seat and having a carbureting chamber therein delivering to said mixing chamber, a fuel nozzle delivering to said carbureting chamber, an annular carbureting chamber valve carried by said suction actuated member and embracing the upper end of said nozzle, a needle fuel valve carried by said suction actuated member to coact with said fuel nozzle, and an adjusting screw for said fuel valve, said fuel valve being held against said adjusting screw by a spring.

4. In a carbureter, the combination of a body having an annular air valve seat therein, the chamber above the said valve seat constituting a mixing chamber, a suction actuated member constituting a mixing chamber valve coacting with said valve seat and having a carbureting chamber therein delivering to said mixing chamber, an adjustable fuel nozzle delivering to said carbureting chamber, an annular carbureting chamber valve carried by said suction actuated member and embracing the upper end of said nozzle, a dash pot for said suction actuated member disposed within said mixing chamber, a needle fuel valve carried by said suction actuated member and coacting with said fuel nozzle.

5. In a carbureter, the combination of a body provided with a mixing chamber, a suction actuated member constituting a mixing chamber valve and having a carbureting chamber therein delivering to said mixing chamber, a fuel nozzle delivering to said carbureting chamber, a carbureting chamber valve carried by said actuated member, a fuel valve coacting with said nozzle and carried by said actuated member, means for adjusting said nozzle from the outside of the body.

6. In a carbureter, the combination of a body provided with a mixing chamber, a suction actuated member constituting a mixing chamber valve and having a carbureting chamber therein delivering to said mixing chamber, a fuel nozzle delivering to said carbureting chamber, a fuel valve coacting with said nozzle and carried by said suction actuated member and adapted to regulate the fuel, and a carbureting chamber valve carried by said suction actuated member and adapted to regulate the air admitted to the carbureting chamber.

7. In a carbureter, the combination of a mixing chamber, a suction actuated member constituting a mixing chamber valve and having a carbureting chamber therein delivering to said mixing chamber, a fuel nozzle delivering to said carbureting chamber, a carbureting chamber valve carried by said suction actuated member, a needle fuel valve carried by said suction actuated member and coacting with said nozzle, and a dash-pot for said suction actuated member disposed within said mixing chamber.

8. In a carbureter, the combination of a mixing chamber, a suction actuated mixing chamber valve, a carbureting chamber delivering to the said mixing chamber, a fuel nozzle delivering to said carbureting chamber, a carbureting chamber valve carried by said suction actuated member, a fuel valve coacting with said nozzle carried by said suction actuated member, and a dash pot for said suction actuated member disposed so that it is subject to the variations of pressure on the inner side of the mixing chamber valve.

9. In a carbureter, the combination of a mixing chamber, a carbureting chamber delivering to said mixing chamber, a throttle valve for said mixing chamber, a suction actuated inlet valve for said mixing cham-

ber, carbureting chamber and fuel valves carried by said suction actuated valve, and a dash-pot for said mixing chamber valve disposed between it and said throttle and subject to the variations of pressure on the inner side of said mixing chamber valve.

10. In a carbureter, the combination of a body provided with a mixing chamber, a suction actuated member constituting a mixing chamber valve and having a carbureting chamber therein delivering to said mixing chamber, a fuel nozzle delivering to said carbureting chamber, a carbureting chamber valve carried by said suction actuated member, and adapted to uniformly vary the air delivered to said carbureting chamber, and a fuel valve carried by said suction actuated member and coacting with said nozzle.

11. In a carbureter, the combination of a chambered body provided with an annular shoulder-like valve seat, the chamber above said valve seat constituting a mixing chamber and that below an air supply chamber, a suction actuated member coacting with said valve seat and constituting a mixing chamber valve, said suction actuated member having a carbureting chamber therein delivering to said mixing chamber above said valve seat, a fuel nozzle delivering to said carbureting chamber, a carbureting chamber air inlet valve coacting with said nozzle to vary the air delivered to the carbureting chamber with the opening and closing of said mixing chamber valve, and a fuel valve carried by said suction actuated member to coact with said fuel nozzle.

12. In a carbureter, the combination of a chambered body provided with an annular valve seat, the chamber above the seat constituting a mixing chamber and that below an air inlet chamber, a mixing chamber valve coacting with said mixing chamber valve seat providing when open an unobstructed annular port, a carbureting chamber delivering to said mixing chamber centrally above its said port, a fuel nozzle disposed to deliver centrally to said carbureting chamber, an annular tapered carbureting chamber air inlet valve surrounding said nozzle providing when open an unobstructed annular air inlet port for said carbureting chamber to which said fuel nozzle delivers centrally, and a fuel valve extending into the delivery orifice of said fuel nozzle to provide an annular fuel port delivering centrally to said annular carbureting chamber air inlet port, said mixing and carbureting chamber valves and fuel valve being operatively associated for simultaneous operation by the air passing to the mixing chamber valve, said fuel nozzle being adjustable to regulate the fuel feed.

13. In a carbureter, the combination of a chambered body provided with an annular valve seat, the chamber above the seat constituting a mixing chamber and that below an air inlet chamber, a mixing chamber valve coacting with said mixing chamber valve seat providing when open an unobstructed annular port, a carbureting chamber delivering to said mixing chamber centrally above its said port, a fuel nozzle disposed to deliver centrally to said carbureting chamber, an annular carbureting chamber air inlet valve surrounding said nozzle providing when open an unobstructed annular air inlet port for said carbureting chamber to which said fuel nozzle delivers centrally, and a fuel valve extending into the delivery orifice of said fuel nozzle to provide an annular fuel port delivering centrally to said annular carbureting chamber air inlet port, said mixing and carbureting chamber valves and fuel valve being operatively associated for simultaneous operation by the air passing to the mixing chamber valve.

14. In a carbureter, the combination of a chambered body provided with an annular valve seat, the chamber above said seat constituting a mixing chamber and that below an air inlet chamber, a suction actuated member constituting a mixing chamber valve coacting with said seat and providing when open an unobstructed annular port, said suction actuated member being provided with a carbureting chamber delivering to said mixing chamber centrally above said port, a fuel nozzle disposed to deliver centrally to said carbureting chamber, an annular carbureting chamber air inlet valve carried by said suction actuated member for actuation therewith and surrounding said nozzle providing an annular air inlet port for said carbureting chamber, and a fuel valve carried by said air actuated member and extending into the delivery orifice of said fuel nozzle to provide an annular fuel port delivering centrally into said carbureting chamber air inlet port.

15. In a carbureter, the combination of a chambered body provided with an annular valve seat, the chamber above said seat constituting a mixing chamber and that below an air inlet chamber, a suction actuated member coacting with said seat and constituting a mixing chamber valve and providing when open an annular port, said suction actuated member being provided with a carbureting chamber arranged to deliver to said mixing chamber, a fuel nozzle disposed to deliver to said carbureting chamber, a carbureting chamber air inlet valve mounted on said suction actuated member to coact with said nozzle providing an air inlet port for said carbureting chamber, and a fuel valve carried by said suction actuated member to coact with said fuel delivery nozzle.

16. In a carbureter, the combination of a chambered body provided with an annular

valve seat, the chamber above the seat constituting a mixing chamber, a suction actuated member coacting with said valve seat and constituting a mixing chamber valve providing when open an annular port, said suction actuated member being provided with a carbureting chamber delivering to said mixing chamber centrally above its said port, a fuel nozzle disposed to deliver to said carbureting chamber, an annular carbureting chamber air inlet valve carried by said suction actuated member and surrounding said nozzle providing when open an annular air inlet port for said carbureting chamber, and a fuel valve carried by said suction actuated member extending into the delivery orifice of said fuel nozzle providing an annular fuel port delivering to said carbureting chamber centrally of said carbureting chamber air inlet port.

17. In a carbureter, the combination of a chambered body provided with an annular valve seat, the chamber above the seat constituting a mixing chamber, a suction actuated member coacting with said valve seat and constituting a mixing chamber valve, said air actuated member being provided with a carbureting chamber delivering to said mixing chamber, a fuel nozzle disposed to deliver to said carbureting chamber, a carbureting chamber air inlet valve carried by said suction actuated member, a fuel valve carried by said suction actuated member coacting with said fuel nozzle, a throttle valve, and a dash pot for said suction actuated member disposed between said suction actuated member and throttle, said suction actuated member constituting one member of the dash pot.

18. In a carbureter, the combination of a mixing chamber, a suction-actuated member constituting a mixing chamber valve having a carbureting chamber therein delivering to said mixing chamber, a fuel nozzle delivering to said carbureting chamber, an air valve for said carbureting chamber carried by said suction actuated member, and a dashpot for said suction actuated member disposed centrally within the mixing chamber so that it is subject only to the variations of pressure in the mixing chamber.

19. In a carbureter, the combination of a mixing chamber, a throttle valve therefor, a suction actuated air inlet valve for said mixing chamber, a fuel valve carried thereby, and a dashpot for said suction-actuated valve disposed centrally within the mixing chamber and so that it is subject only to the variations of pressure in the mixing chamber.

In witness whereof, we have hereunto set our hands and seals in the presence of two witnesses.

WILLIAM SHAKESPEARE, JR. [L. S.]
WILLIAM SCHMID. [L. S.]

Witnesses:
LUELLA GREENFIELD,
NELLIE M. HOPKINS.