V. E. HAAS.

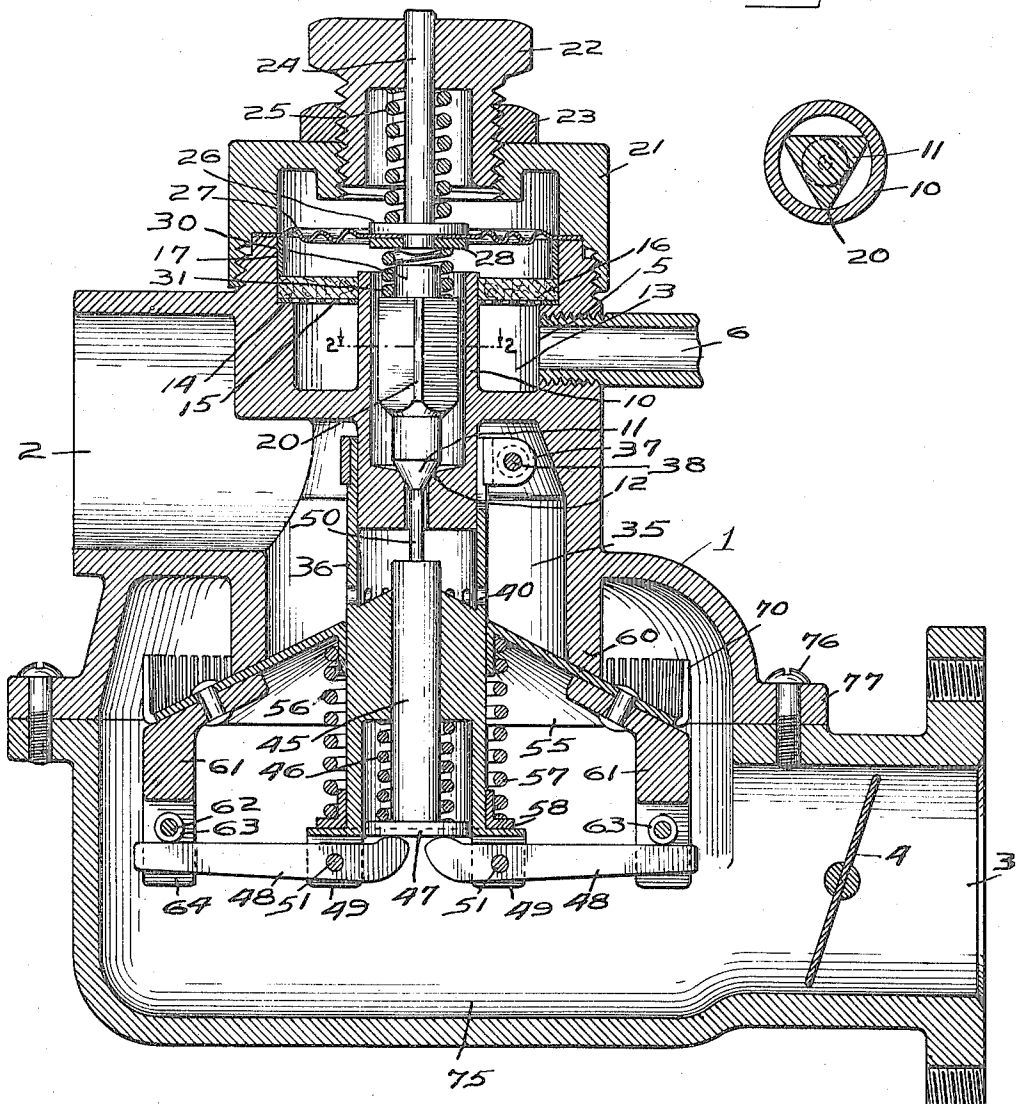
CARBURETER.

APPLICATION FILED JULY 24, 1916.

1,249,381. Patented Dec. 11, 1917.

Fig. 1.

Fig. 2



INVENTOR

Victor E. Haas

by

Owen, Owen & Crampton.

UNITED STATES PATENT OFFICE.

VICTOR E. HAAS, OF TOLEDO, OHIO, ASSIGNOR OF ONE-HALF TO SAMUEL E. STARR, OF TOLEDO, OHIO.

CARBURETER.

1,249,381. Specification of Letters Patent. Patented Dec. 11, 1917.

Application filed July 24, 1916. Serial No. 110,938.

To all whom it may concern:

Be it known that I, VICTOR E. HAAS, a citizen of the United States, and a resident of Toledo, in the county of Lucas and State of Ohio, have invented a certain new and useful Carbureter; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to carbureters, and it has for its object to provide an efficient means for carbureting fuel gases for internal combustion engines. By my invention means is provided for regulating the fuel supply according to the suction produced in the engine in conjunction with efficient means for causing carbureting and mixture of the liquid fuel and air which are supplied to the engine.

The invention may be contained in different forms of carbureters. I have selected one form of carbureter which embodies my invention. The structure, however, may be modified by those skilled in the art and yet such modifications will contain my invention.

Figure 1 of the drawings illustrates a sectional view of the carbureter selected for purposes of illustration, and Fig. 2 illustrates a sectional view of the fuel valve.

1, Fig. 1, is the carbureter casing. It is provided with an air inlet 2 and an outlet 3. The outlet 3 is provided with a butterfly valve 4 of the type well known in the art. It is also provided with a fuel inlet 5, which is connected by means of a tube 6 with a source of fuel supply. In the central part of the casing and opposite the air inlet 2 is provided a cylindrical fuel valve casing 10, in which the needle valve 11 is located. The needle valve 11 is seated on a valve-seat 12 located at the bottom of the cylindrical valve casing 10. The cylindrical valve casing 10 extends well up into the chamber 13. The chamber 13 communicates with a source of fuel supply through the tube 6. The wall of the chamber 13 is provided with a shoulder 14, on which a venticular disk 15 is supported. A felt filter 16 is located on the venticular disk 15 and may be held in position by means of a ring 17. The fuel passes through the pipe 6 from the source of fuel supply into the chamber 13 and up through the venticular disk 15 and the filter pad 16 over the top of the cylindrical valve casing to the needle valve-seat. The upper end of the needle valve 11 is made triangular in cross-section having bearing parts 20 which rest against the wall of the cylindrical valve casing 15 and is guided thereby in its movements in opening and closing the valve.

The chamber 13 is closed by means of a cap 21 in which is located a plug 22. The plug 22 is threaded into the cap 21 and may be locked in its position by means of the lock nut 23. A movable rod 24 is supported in the plug 22 and is yieldingly held in position by means of a spring 25, which is located intermediate a flange 26 located on the lower end of the rod 24 and the head of the plug 22. The rod 24 extends through a diaphragm 27, which is corrugated to permit free movement of the central portion of the diaphragm. The diaphragm 27 is secured in position by being clamped between the cap 21 and the carbureter casing 1 when the cap 21 is threaded onto the case 1. A washer 28 is placed over the end of the rod 24 and by turning over the end of the rod 24 to form a head, the diaphragm and washer are clamped between the head of the rod 24 and the flange 26. The spring 25 thus operates to yieldingly hold the rod 24 and the diaphragm in the position in which they are placed above the chamber 13. The diaphragm 27 thus operates to close the chamber 13 and prevent the escape of any of the liquid fuel and also prevent the escape of any vapors that may arise from the fuel. The plug 22 being threaded into the cap 21 may be turned to adjust the position of the central portion of the diaphragm 27 as well as the tension of the spring 25. The needle valve 11 is provided with a neck 30, around which is located a spring 31, which is located intermediate the shoulder, formed on the needle valve 11 about the neck 30, and the washer 28. The plug 22 thus affords a means for adjusting the pressure of the needle valve 11 on the seat 12, which is transmitted through the spring 25, the diaphragm 27 and the spring 31 to the needle valve.

The needle valve is opened by the suction

produced in the engine as hereinafter described. Its degree of opening varies according to the degree of the vacuum, that is, the reduction of the air pressure that is produced in the engine and consequently the reduction of air pressure produced in the lower part of the carbureter casing 1, which communicates with the engine but which is also modified and controlled by the butterfly valve 4.

The cylindrical valve casing 10 also protrudes into the chamber 35. A split-sleeve member 36 is slipped over the lower end of the cylindrical valve casing 10. It is clamped together by a suitable clamp-ring 37, which may be tightened about the split-sleeve 36 by means of a screw 38 in the manner well known in the art, and consequently, the sleeve 36 may be securely fastened on the lower end of the valve casing 10. Beneath the lower end of the cylindrical casing 10 the sleeve 36 is provided with openings 40, which connect the interior of the sleeve 36 with the chamber 35, in which the sleeve 36 is located. The chamber 35 communicates with the air inlet 2. The cross-sectional area of the chamber 35 less the cross-sectional area of the sleeve 36 is preferably less than the cross-sectional area of the air inlet 2 and also less than the cross-sectional area of the outlet 3 of the carbureter so that there will be produced in the annulus around the sleeve 36 a rush of current as the air passes from the inlet to the lower part of the carbureter casing 1. This rush of air will draw and take from the interior of the cylinder 36 the liquid fuel that is fed between the needle valve 11 and the seat 12.

The needle valve is opened according to the rush of air about the cylinder 36 and consequently past the openings 40. The valve is opened by the movement of a pin 45, which is supported for longitudinal movements in the central portion of the sleeve 36. A spring 46 is supported intermediate the bearing part of the sleeve 36 in which the rod 45 is located and a head 47 formed on the rod 45 for yieldingly pressing the rod 45 downward with respect to the sleeve 36. A plurality of levers 48 having ends bearing upon the head 47 of the rod 45 are pivotally supported in lugs 49 formed on the lower end of the sleeve 36 by pins 51. The lugs 48 operate to lift the rod 45 against the tension of the spring 46 and against the stem 50 located on the lower end of the needle valve 11 and so as to raise the needle valve 11 from the seat 12 to allow the liquid fuel to pass to the interior of the sleeve 36, whence it flows through the openings 40 to the chamber 35 and is caught up by the air which rushes through the chamber. A plate 55 surrounds the sleeve 36. The plate 55 is provided with a depending flange 56, which forms a guide bearing on the sleeve 36 for vertical movements of the plate 55 along the sleeve 36. The plate 55 is supported on a spring 57, which is located intermediate a flanged collar 58, which may be secured in position by the lugs 49 formed on the lower end of the sleeve. The wall of the chamber 35 terminates in a seat 60, against which the plate 55 may be pressed. The plate 55 is located beneath the openings 40 so that as the fuel passes from the interior of the sleeve 36 it will be spread out on the plate 55 and be carbureted and taken up by the air moving radially beneath the seat 60. The plate 55 is provided with depending arms 61, in which are located transverse pins 62 having rollers 63 located in slots 64 formed on the lower ends of the arms 61. The rollers 63 rest upon the outer ends of the levers 48 and thus the plate 55 is supported on the outer ends of the levers 48. The pressure produced by the weight of the plate 55 is thus carried by the upward pressure of the spring 57 and the downward pressure of the spring 46, which presses against the head 47 and the short arms of the inner ends of the levers 48. When, however, the rod 45 is moved a small distance, the pressure caused by the weight of the plate 55 and difference in pressure caused by the suction of the engine is balanced not only by the springs 46 and 56, but also by the springs 31 and 25, which are adjusted by the plug 22. When a difference of pressure is produced between the lower part of the casing 1 and the atmospheric pressure, the plate 55 is pressed downward by the atmospheric pressure, and the levers 48 operate to lift the rod 45 and the needle valve 11 a distance considerably less than that in which the plate 55 is moved but a distance which is proportional to the movement of the plate 55. Thus the fuel is supplied proportional to the decrease of pressure within the lower end of the carbureter, which, however, is controlled by the butterfly valve 4. The plate 55 is preferably made conical so as to direct the air, the liquid and the vapor peripherally to beneath the circular seat 60.

In order to produce a good mixture of the liquid fuel which is fed proportionate to the suction produced by the engine and which is particularly of value in cold weather or when the carbureter is cold, a plurality of teeth is disposed on the plate around the seat 60. In the form of the construction shown the plate 55 is furnished by a row of teeth 70, which are turned upward so as to disturb the flow of the fuel gas and the air and particularly to distribute and increase the area of the contact of air with the liquid fuel which may escape without carburization beneath the seat 60. The liquid fuel is caused to be carbureted and the air and the vapor are caused to be mixed when it

enters the lower part of the carbureter by means of the teeth 70.

The lower part of the casing 1 is closed by the cap 75 at one end of which is located the outlet 3 and in which is located the butterfly valve 4. The cap 75 may be secured to the carbureter casing 1 by means of the screws 76 located in the flange or lugs 77. The cap 75 also forms a chamber for collecting any of the fuel that may leak from the cylinder 36, particularly when the engine is shut off. The fuel may be retained in the cap 75 and may be picked up by the air as it passes into the engine.

What I claim is:

1. A carbureter having a main passage and a liquid fuel passage, a valve normally closing said fuel passage and having a stem projecting therefrom, means forming a chamber in communication with said fuel passage past said valve and having openings leading to said main passage, a conical plate movably closing said main passage at one side of said openings, levers connecting said valve stem and plate for communicating an opening movement to the valve from an opening movement of said plate, and means yieldingly retaining said valve and plate in closed positions.

2. A carbureter having a main passage therethrough and a fuel passage, a valve normally closing said fuel passage and having its stem projecting into said main passage, a stationary member surrounding said stem and forming a guide therefor, said member having a chamber in communication with said fuel passage past said valve and having multiple opening communication with said main passage, a conical plate slidingly mounted on said member at the outlet side of the communication between said chamber and main passage with respect to said main passage and normally closing said main passage, and means yieldingly connecting said valve stem and plate to impart predetermined opening movements to the valve from opening movements of the plate and vice versa.

3. A carbureter having an inlet and an outlet and a mixing chamber, a needle valve opening centrally with respect to the mixing chamber, a sleeve surrounding the needle valve and having a plurality of openings located below the valve, a conical plate having its upper end surrounding the sleeve and located below the openings, a spring for yieldingly supporting the conical plate, a lever operated by the conical plate, and a rod located in the cylinder and operated by the lever, the rod operating on the needle valve to lift the needle valve.

4. A carbureter having an inlet and an outlet and a mixing chamber, a needle valve opening centrally with respect to the mixing chamber, a sleeve surrounding the needle valve and having a plurality of openings located below the valve, a conical plate having its upper end surrounding the sleeve and located below the openings, a spring for yieldingly supporting the conical plate, a lever operated by the conical plate, a rod located in the cylinder and operated by the lever, the rod operating on the needle valve to lift the needle valve, and a plurality of teeth arranged around the wall of the mixing chamber for disturbing the gas currents issuing from the mixing chamber.

5. A carbureter having an inlet and an outlet and a mixing chamber, a needle valve opening centrally with respect to the mixing chamber, a sleeve surrounding the needle valve and having a plurality of openings located below the valve, a conical plate having its upper end surrounding the sleeve and located below the openings, a spring for yieldingly supporting the conical plate, a lever operated by the conical plate, a rod located in the cylinder and operated by the lever, the rod operating on the needle valve to lift the needle valve and means for adjusting the pressure of the needle valve on the seat and pressure of the needle valve on the rod and lever.

In testimony whereof I have hereunto signed my name to this specification.

VICTOR E. HAAS.