A. G. McCALEB.

CARBURETER.

APPLICATION FILED APR. 30, 1914.

1,260,273.

Patented Mar. 19, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

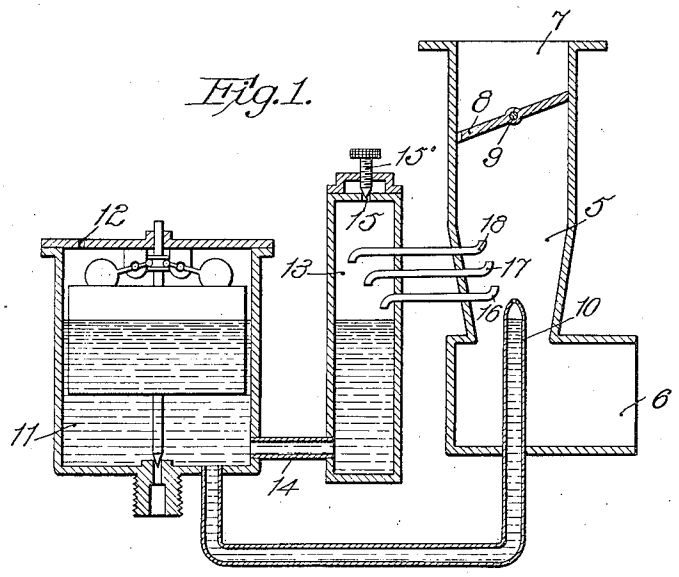


Fig. 3.

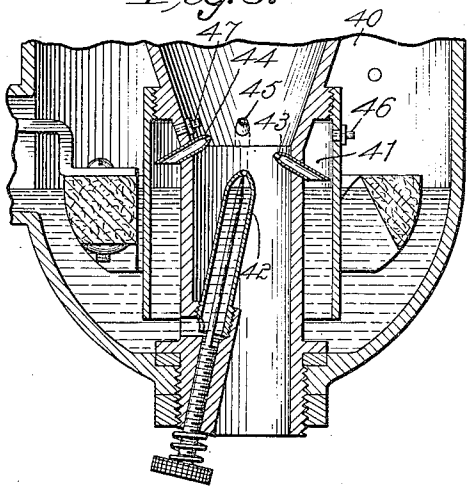
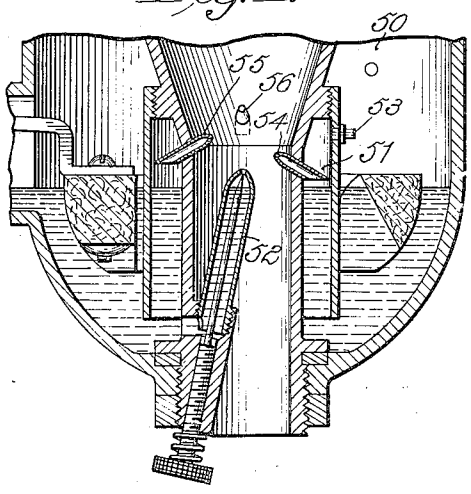


Fig. 4.



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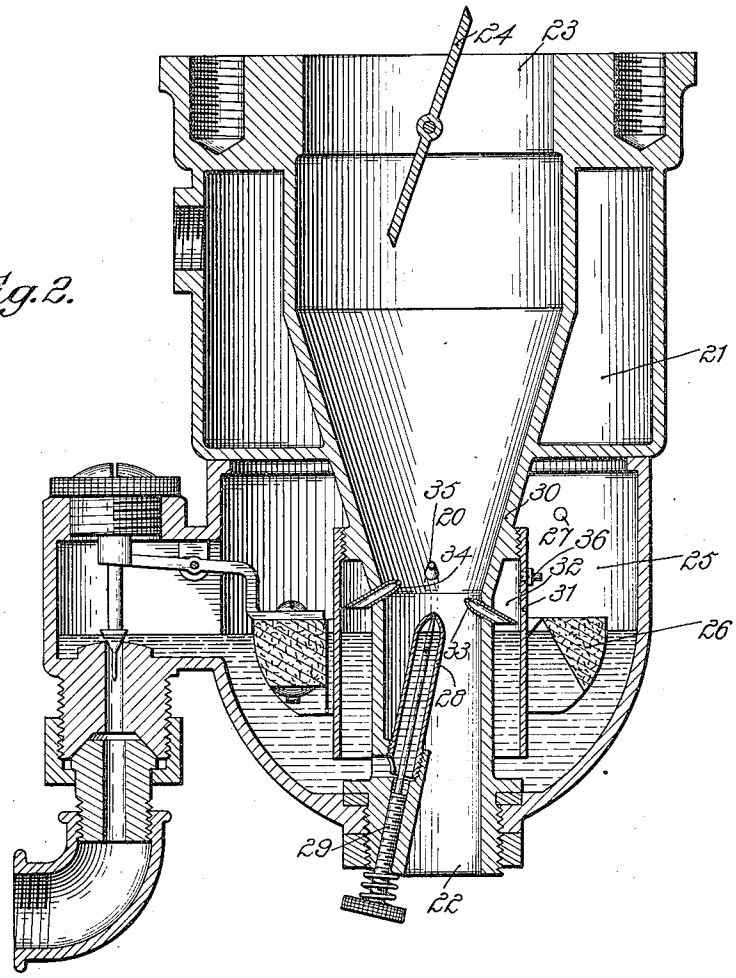
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2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

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CARBURETER.

1,260,273. Specification of Letters Patent. Patented Mar. 19, 1918.

Application filed April 30, 1914. Serial No. 835,350.

To all whom it may concern:

Be it known that I, ALBERT G. McCALEB, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Carbureters, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to carbureters for association with internal combustion engines, and the object of my invention is to produce a highly improved device of this class. My invention provides means whereby the combustible mixture supplied to the internal combustion engine with which the carbureter is associated is automatically adapted to the different requirements of the engine.

The embodiments of my invention hereinafter described accomplish this desirable result without employing any moving parts other than a manually operated throttle.

In the accompanying drawings illustrating my invention—

Figure 1 is a diagrammatic representation of the carbureter embodying my invention;

Fig. 2 is a vertical axial sectional view of a carbureter embodying my invention, this last-mentioned carbureter comprising an annular float chamber;

Fig. 3 is a fragmentary sectional view of a carbureter generally similar to the carbureter shown in Fig. 2, a slightly modified arrangement of fuel nozzles being employed, however, and

Fig. 4, in a view similar to Fig. 3, illustrates another arrangement of fuel nozzles.

Similar reference numerals refer to similar parts throughout the several views.

The carbureter illustrated in Fig. 1 comprises a casing forming a carbureting chamber 5, an air inlet 6 and a mixture outlet 7. At 8 I have illustrated a throttle valve mounted upon a transverse shaft 9. The main fuel inlet for the carbureter is illustrated in the form of a nozzle 10 connected with a constant level fuel chamber 11. The constant level fuel chamber may be of any suitable construction and is provided with an atmosphere inlet 12.

At 13 I have illustrated what may be termed an auxiliary fuel chamber having the bottom thereof connected with the constant level fuel chamber through an unrestricted passage 14. By saying that the passage 14 is "unrestricted," I mean that the passage is of sufficient cross-section to permit the fuel to flow readily from the consant level fuel chamber 11 to the auxiliary fuel chamber 13 to permit the fuel level within said auxiliary chamber to rise under the engine suction, as will presently be pointed out.

The auxiliary fuel chamber 13 is provided with an atmosphere inlet 15 and a needle valve 15′ for restricting or entirely closing said inlet 15 as desired.

Leading from the auxiliary fuel chamber 13 to the carbureting chamber 5 are the auxiliary fuel nozzles 16, 17 and 18. One end of each of said auxiliary fuel nozzles terminates within that portion of the carbureting chamber known as the Venturi tube, and the other end of each of said auxiliary fuel nozzles terminates in the auxiliary fuel chamber 13 above the normal fuel level therein. Attention is directed to the fact that the auxiliary fuel nozzles terminate in the auxiliary fuel chamber at different distances above the normal fuel level therein.

As the engine with which the carbureter shown in Fig. 1 is associated approaches high speed, the suction within the carbureting chamber 5 increases and air within the chamber 13 is withdrawn through the tubes or nozzles 16, 17 and 18, thus causing the fuel level within the chamber 13 to rise. As the engine speed becomes higher and higher, the level of the fuel within the chamber 13 reaches the intake ends of the tubes or nozzles 16, 17 and 18, thus bringing said nozzles into operation one after another to supply auxiliary fuel to the carbureting chamber 5.

The carbureter shown in Fig. 2 comprises

a casing forming a carbureting chamber 20 and an annular water jacket 21. The air inlet is illustrated at 22, the mixture outlet at 23, and the throttle valve at 24. At 25 is shown a constant level fuel chamber provided with an annular float 26 arranged to control the admission of fuel to said chamber 25 to maintain a substantially constant fuel level therein. The fuel within the constant level or float chamber is subject to atmospheric pressure through an opening 27. The main fuel nozzle is shown at 28, the orifice of said nozzle being controlled by a needle valve 29.

Formed integral with that portion of the carbureter casing forming the carbureting chamber is an annular shoulder 30 having threaded thereon a tube 31 forming an annular fuel chamber 32 communicating at its lower end with the constant level fuel chamber 25. Extending into the carbureting chamber from points in the chamber 32 above the normal fuel level therein, are the fuel nozzles 33, 34 and 35, each of which has a bore of comparatively large cross-section but a comparatively small discharge orifice. At 36 is illustrated a nut having a bore therethrough affording restricted communication between the chamber 32 and the atmosphere. The nut 36 is the full equivalent of a needle valve, inasmuch as a nut having any desired bore may be utilized.

The operation of the device shown in Fig. 2 is substantially like the operation of the carbureter shown in Fig. 1, the auxiliary fuel nozzles 33, 34 and 35 being brought into service at the higher engine speeds. By having the auxiliary fuel chamber 32 annular and located close to the carbureting chamber and middle of the constant level fuel chamber, the device is particularly adapted to automobile work where hill climbing to a certain extent affects the level of the fuel within the float chamber.

In Fig. 3 I have illustrated in fragmentary section a carbureter generally similar to the carbureter shown in Fig. 2. In this view, the constant level float chamber is indicated at 40. The annular auxiliary fuel chamber is shown at 41. The main fuel nozzle is shown at 42, and the auxiliary fuel nozzles are illustrated at 43, 44 and 45. Attention is directed to the fact that the orifice of the auxiliary fuel nozzle 45 is smaller than the orifice of the nozzle 44, and the orifice of the nozzle 44 is smaller than the orifice of the nozzle 43.

The fuel nozzles 43, 44 and 45 are brought into operation one after another, as pointed out. The amount of auxiliary fuel supplied to the carbureting chamber will at the higher engine speeds be less in proportion to the amount of air passing through the carbureting chamber. A nut 46 having a bore therethrough affords restricted communication between the auxiliary fuel chamber 41 and the atmosphere, and a nut 47 having a bore therethrough affords an auxiliary restricted communication between the carbureting chamber and the auxiliary fuel chamber.

The carbureter illustrated in fragmentary section in Fig. 4 is generally similar to the carbureters shown in Figs. 2 and 3. In this view, the constant level fuel chamber is shown at 50. The annular auxiliary fuel chamber is shown at 51. The main fuel inlet is shown at 52, and the nut affording restricted communication between the auxiliary fuel chamber and the atmosphere is illustrated at 53. The auxiliary fuel nozzles are shown at 54, 55 and 56. The auxiliary fuel nozzles have discharge orifices of the same size. Attention is directed to the fact that the distance between the intake end of the auxiliary nozzle 55 and the intake end of the nozzle 54 is considerably greater than the distance between the intake end of the nozzle 54 and the normal fuel level within the auxiliary fuel chamber 51. Moreover, the distance between the intake end of the auxiliary fuel nozzle 56 and the intake end of the auxiliary fuel nozzle 55 is greater than the distance between the intake ends of the fuel nozzles 54 and 55.

I have illustrated my invention as applied to simple carbureter constructions. I appreciate the fact that the structure shown in the drawings may be modified considerably, and I therefore do not limit myself to the constructions herein shown and described, but desire to claim broadly any equivalent constructions coming within the terms and spirit of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is:—

1. A carbureter comprising in combination with air intake and combustible mixture outlet ports, a Venturi tube intermediate said ports, a constant level fuel supply chamber, an auxiliary fuel supply chamber located outside of and adjacent the carbureting chamber, a passage between the constant level fuel supply chamber and the auxiliary fuel supply chamber, a fuel passage between the Venturi tube and the auxiliary fuel supply chamber above the normal fuel level in the latter, and a regulable restricted atmosphere inlet for said auxiliary fuel supply chamber.

2. The combination with a carbureter comprising a carbureting chamber, air inlet and combustible outlet ports therefor, a constant level fuel supply chamber, an annular auxiliary fuel supply chamber disposed around and co-axially with the carbureting chamber, a passage between the constant level fuel supply chamber and the auxiliary fuel supply chamber and a passage leading to the

carbureting chamber from the auxiliary fuel supply chamber above the normal fuel level in the latter.

3. A carbureter comprising in combination with a carbureting chamber having air inlet and combustible mixture outlet ports, a constant level fuel supply chamber, a second fuel supply chamber closed at the top except for comparatively small atmosphere inlet and disposed adjacent the carbureting and constant level fuel supply chambers, a passage between the constant level fuel supply chamber and the second fuel supply chamber, and a passage leading from the second fuel supply chamber above the normal fuel level therein to the carbureting chamber, said last mentioned passage arranged to supply a small quantity of air to the carbureting chamber at low engine speeds and a considerable quantity of fuel at higher engine speeds.

4. A carbureter comprising a Venturi tube, a constant level fuel supply chamber surrounding the lower end of said tube, an auxiliary fuel supply chamber communicating with the constant level fuel supply chamber and disposed adjacent the Venturi tube, an atmosphere inlet for the auxiliary fuel chamber above the fuel therein, a fuel delivery tube having one end terminating in the Venturi tube and extending through the latter to a point above the normal level of fuel in said auxiliary fuel chamber, whereby at low engine speeds air passes through the opening in the top of the auxiliary fuel chamber and through said delivery tube from the top of the auxiliary fuel chamber.

5. A carbureter comprising a carbureting chamber, an annular fuel chamber surrounding the carbureting chamber and arranged to contain a fuel column of considerable cross section, a passage leading to the carbureting chamber from a point above the normal fuel level in said fuel chamber, and a restricted air inlet for said annular fuel chamber.

6. A carbureter comprising a carbureting chamber, an annular float chamber disposed around said carbureting chamber, an annular auxiliary fuel chamber encircling said carbureting chamber, said float chamber open to the atmosphere, a restricted atmosphere inlet for said auxiliary fuel chamber, means affording unrestricted communication between said float chamber and auxiliary fuel chamber, and a fuel passage leading to the carbureting chamber from a point in the auxiliary fuel chamber above the normal fuel level therein.

7. A carbureter comprising a carbureting chamber, an annular float chamber disposed around said carbureting chamber, an annular auxiliary fuel chamber encircling the carbureting chamber, said float chamber open to the atmosphere, a restricted atmosphere inlet for said auxiliary fuel chamber, means affording unrestricted communication between said float chamber and auxiliary fuel chamber, and a plurality of fuel passages leading to the carbureting chamber from said auxiliary fuel chamber and arranged to be brought into service one after another as the fuel level within said auxiliary fuel chamber rises.

8. A carbureter comprising a carbureting chamber, a constant level fuel chamber, an annular fuel chamber encircling said carbureting chamber, a main fuel nozzle fed from said constant level fuel chamber, means affording unrestricted communication between the constant level fuel chamber and the annular fuel chamber, said constant level fuel chamber open to atmospheric pressure, a restricted atmosphere inlet for said annular fuel chamber, and a fuel passage leading to the carbureting chamber from a point in the annular fuel chamber above the normal fuel level therein.

9. In combination with a carbureter comprising air inlet and combustible mixture outlet ports, a Venturi tube interposed between said inlet and outlet ports, a constant level fuel supply chamber, an auxiliary fuel chamber arranged to contain a fuel column of considerable cross-section having unrestricted communication with said constant level fuel supply chamber, and a passage leading from a point above the normal fuel level in said auxiliary fuel chamber to the Venturi tube whereby said passage is brought into service as a fuel outlet when the pressure within said Venturi tube reaches and remains below a predetermined point.

10. In combination with a carbureter comprising air inlet and combustible mixture outlet ports, a Venturi tube interposed between said inlet and outlet ports, a constant level fuel supply chamber, an auxiliary fuel chamber arranged to contain a fuel column of considerable cross-section having unrestricted communication with said constant level fuel supply chamber, and a passage leading from a point above the normal fuel level in said auxiliary fuel chamber to the Venturi tube whereby said passage is brought into service as a fuel outlet when the pressure within said Venturi tube reaches and remains below a predetermined point, together with regulable means for affording restricted communication between said auxiliary fuel chamber and the atmosphere.

11. A carbureter comprising, in combination with air inlet and combustible mixture outlet ports, a Venturi tube interposed between said ports, a constant level fuel sup-

ply chamber, a main fuel inlet in said Venturi tube fed from said constant level supply chamber, an auxiliary fuel chamber fed from said constant level fuel supply chamber and arranged to contain a fuel column of considerable cross-section, and a passage leading from a point above the normal fuel level in said auxiliary fuel chamber to the Venturi tube arranged to be brought into service as an auxiliary fuel outlet port when the pressure within the said Venturi tube falls to a predetermined point under the engine suction.

In witness whereof, I hereunto subscribe my name this 28th day of April, A. D. 1914.

ALBERT G. McCALEB.

Witnesses:
ALBIN C. AHLBERG,
ROBERT F. BRACKE.