W. JAY.

CONSOLIDATED CARBURETER AND VACUUM FEED FUEL RECEPTACLE.

APPLICATION FILED JUNE 26, 1914.

1,132,942. **Patented Mar. 23, 1915.**

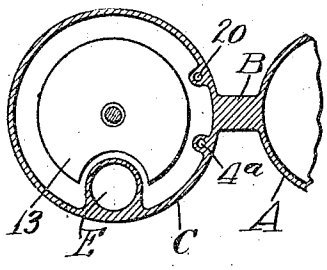


Fig. 4.

Fig. 2.

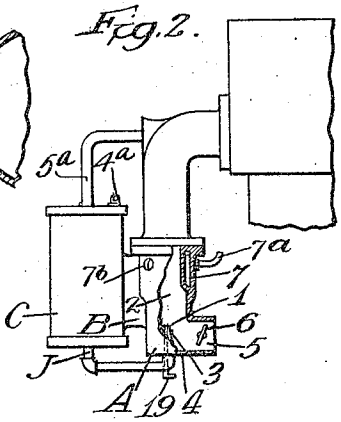
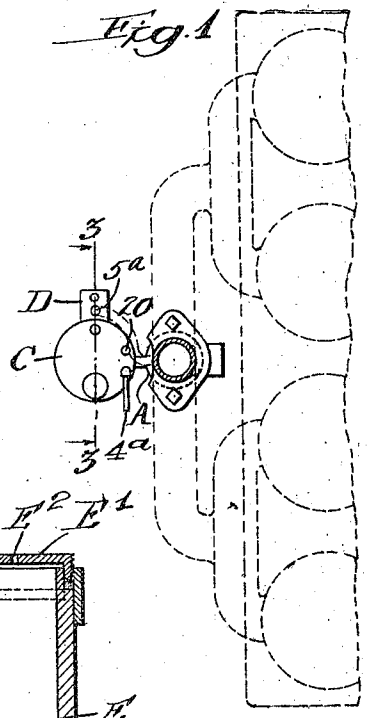


Fig. 1.



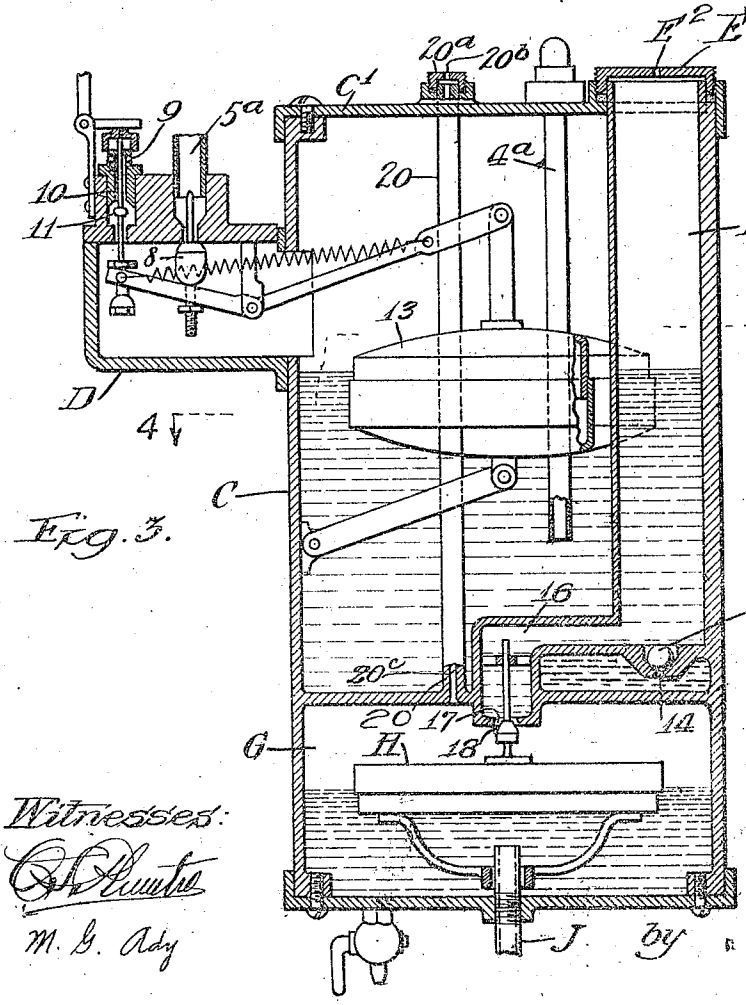


Fig. 3.

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UNITED STATES PATENT OFFICE.

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CONSOLIDATED CARBURETER AND VACUUM-FEED FUEL-RECEPTACLE.

1,132,942. Specification of Letters Patent. Patented Mar. 23, 1915.

Application filed June 26, 1914. Serial No. 847,419.

To all whom it may concern:

Be it known that I, WEBB JAY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Consolidated Carbureters and Vacuum-Feed Fuel-Receptacles, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved structure comprising a carbureter consolidated with a receptacle for liquid fuel having means for lifting the fuel supply thereinto by means of partial vacuum.

It consists of the elements and features of construction shown and described as indicated in the claims.

In the drawings:—Figure 1 is a plan view of a device embodying this invention, shown in the relation in which it is designed to be mounted in connection with the manifold of an automobile motor. Fig. 2 is a partly sectional elevation of the structure shown in Fig. 1. Fig. 3 is a section at the line 3—3 on Fig. 1. Fig. 4 is a section at the line, 4—4, on Fig. 3, the parts being shown upon a reduced scale.

In the structure shown in the drawings, the carbureter proper is of a familiar type, comprising a mixing chamber, 1, with its Venturi tube, 2; oil nozzle, 3; main air inlet, 4; secondary air inlet, 5, with any suitable form of regulating valve, as the butterfly valve, 6, shown. The mixing chamber is shown as having a heating jacket, 7, with connections, 7^a and 7^b, for any heating fluid, whether water from the cooling jacket of the engine or hot gases from the exhaust pipe. Formed integrally with the main casting, A, of this carbureter, preferably connected thereto along the height of both parts by a vertically extending web, B, is a chamber or receptacle, C, constituting the receptacle for liquid fuel to supply the carbureter and therethrough the engine cylinders. This receptacle, C, has associated with it means by which it may be kept supplied with liquid fuel lifted thereinto from a lower main supply tank by means which produce a partial vacuum in the upper part of said receptacle above the liquid level therein. The particular devices shown for this purpose are fully described and claimed in my pending application Serial No. 820,742, filed February 24, 1914, and will be only briefly mentioned here. These devices comprise a liquid supply tube, 4^a, which extends down into the receptacle, C, through the top, leading thereto by any convenient course from the main fuel supply reservoir not shown. A supplemental laterally situated chamber, D, which communicates with the chamber, C, near the upper end with a pipe connection, 5^a, leading to any means not shown for producing partial vacuum in the upper part of the receptacle, C. A valve, 8, within said supplemental chamber is adapted to close the intake from said pipe into said supplemental chamber by seating upwardly. The supplemental chamber has also in its upper side an air inlet port, 9, at which there is mounted a fitting, 10, which affords a seat for a valve, 11, to close said air intake by seating downwardly. The two valves, 8 and 11, are suitably connected with a float, 13, in the receptacle, C, so that when the float is lifted by the liquid in said chamber to a predetermined high level, the valve, 8, is closed and the valve, 11, is opened, and when the float falls below a predetermined low level, the valves are reversed, the valve, 8, being opened and the valve, 11, being closed, thus causing the chamber to be exposed alternately to atmospheric pressure and to the suction due to the partial vacuum operative through the pipe, 5^a.

The stand-pipe, E, formed integrally with the wall of the reservoir, C, extends up therein and protrudes air-tight through the cap plate, C^1, of said chamber, and outside thereof is open to atmospheric pressure, being packed at its emergence through the cap plate by the gland member, E^1, which is in the form of a cap having an air vent aperture, E^2. At the lower end of this stand-pipe it has an intake from the receptacle, C, through a port, 14, closed by a ball check valve, 15, seating downwardly, and therefore opening upwardly to admit the liquid from the receptacle, C, into said stand-pipe, wherein it will be lifted to the highest level at any time attained by the liquid in the receptacle, C, but cannot escape past the check valve back into said receptacle under any conditions. From the stand pipe above the check-valve-controlled intake, a discharge branch, 16, leads down through the bottom of the receptacle, C, into a float chamber, G, the discharge of said branch pipe into the float chamber being through a port, 17, con-

trolled by a conical valve, 18, seating upwardly in said port and connected to and operated by a float, H, in said float chamber, the float being of sufficient volume and buoyancy to hold the valve, 18, seated against the maximum pressure of the highest column of liquid which can at any time be in the stand-pipe, E. A duct, 20^c, leads from the float chamber up through a boss, 20, in the wall of the receptacle, C, and the end of the boss extending above the upper edge of said wall protrudes air-tight through the cap-plate, C^1, being packed at its emergence by the gland member, 20^a, which is in form a cap having an air vent aperture, 20^b, whereby it admits atmospheric pressure to the float chamber, G. From the float chamber, G, an oil discharge pipe, J, which has its intake mouth a short distance above the bottom of the float chamber so as to form a water-trap space in the bottom of the chamber, leads to the oil nozzle, 3, of the carbureter, the flow of oil therethrough being subject to control by a valve, 19, in the usual manner of controlling carbureter oil supply passages.

The parts are constructed and proportioned so that the float, H, seats the valve, 18, and cuts off the supply of fuel from the stand-pipe, E, to the float chamber when the oil in the float chamber is at the level of the top of the nozzle. The stand-pipe, E, is calculated to contain a sufficient quantity of liquid fuel when filled to the predetermined low level at which the float, 13, reverses the valves, 7 and 11, to supply the engine while the chamber, C, is being refilled to the high level by the operation of the partial vacuum which is produced therein by the reversal of the valves mentioned as occurring at the said low level, and thereby the oil will be maintained in the float chamber always substantially at the level of the nozzle, as is the purpose and mode of operation of carbureters equipped with a float chamber. It will be observed, also that the construction shown, although being such that the liquid in the receptacle, C, is alternately exposed to atmospheric pressure and to the lower or partial vacuum pressure, so that alternately the liquid tends to flow out of it into the stand-pipe, and into it through the supply pipe, I^a, yet there is no variation in the pressure upon the liquid in the float chamber, said float chamber being at all times exposed to atmospheric pressure through the pipe, 20.

It will be understood that it is important in any means by which liquid fuel supply to a carbureter is maintained, that the level of the supply shall be at all times approximately the level of the discharge mouth of the oil nozzle in the carbureter, so that there shall not fail to be a charge of oil down through the nozzle at each suction stroke of the piston, and also so that the charge thus taken shall not be excessive, as would be liable to happen if the oil level were materially above the top of the nozzle. For this purpose, the float chamber is desirably located laterally with respect to the carbureter, rather than in front of or behind it, because when thus located the oil level in the float chamber is not changed relatively to the nozzle by the inclination of the vehicle in travel up hill and down. The relative change of level which will occur by a vehicle traveling on a side hill is of comparatively negligible importance. In view of the construction shown and the mechanical relation of the float chamber to the receptacle, C, which for simplicity requires the float chamber to be directly below said receptacle, the above-stated relation of the float chamber to the carbureter involves the location of the receptacle, C, laterally with respect to the carbureter as shown.

I claim:—

1. A structure adapted to be applied as a unit to an internal combustion engine, comprising a carbureter which is adapted for attachment to the engine manifold; a fuel supply receptacle which is supported by rigid connection with the carbureter, and a float chamber which is supported by rigid connection with the fuel supply receptacle for directly supplying the carbureter; means connected with the fuel receptacle for alternately producing partial vacuum and atmospheric pressure therein, and for causing gravity discharge therefrom into the float chamber during the presence of atmospheric pressure in the fuel supply receptacle; means for affording atmospheric pressure continuously to the float chamber; a valve which controls said discharge into the float chamber, and a float in the float chamber operatively connected with the said valve for seating it to prevent such discharge when the liquid is at the proper level in the float chamber for supplying the carbureter.

2. The combination with a carbureter of a fuel supply receptacle, and a float chamber auxiliary to both the fuel supply receptacle and the carbureter and which receives the fuel directly from the receptacle, and is connected with the carbureter for discharging thereto by gravity; the fuel supply receptacle having means for alternating suction and atmospheric pressure therein, for alternately drawing the liquid thereto and permitting gravity discharge therefrom into the float chamber; the float chamber having float-operated means for preventing such discharge when the liquid in the float chamber is at a pre-determined level suitable for supplying the carbureter.

3. The combination with a carbureter of a fuel supply receptacle and a float chamber auxiliary thereto, adapted for discharge connection with the carbureter for supplying the latter by gravity; a passage by which

the receptacle discharges its liquid contents into the auxiliary chamber; a valve in said passage which is normally seated and adapted to be opened by the flow of liquid therethrough toward the auxiliary chamber; a second valve controlling said passage at its discharge into the chamber, and a float in said chamber connected to said second valve for seating the same to prevent such discharge when the liquid in the float chamber is at a pre-determined level suitable for supplying the carbureter.

4. In combination with a float chamber, a liquid supply receptacle above the float chamber, a liquid supply connection leading into the receptacle; means for producing alternately atmospheric pressure and partial vacuum in the upper part of the receptacle; a stand-pipe communicating with the receptacle at the lower part and extending above the pre-determined high liquid level thereof and continuously exposed to atmospheric pressure; a check valve controlling communication of said stand-pipe with the receptacle, adapted to admit liquid from the receptacle to the stand-pipe and prevent its return to the receptacle, connections from the stand-pipe above the check valve leading into the float chamber, and a float-controlled valve in said chamber for controlling the discharge from the stand-pipe into the float chamber.

5. In combination with an internal combustion engine of an automobile, a structure comprising a carbureter adapted for mounting in fixed position in connection with the manifold, a liquid fuel receptacle mounted fixedly with respect to the carbureter so as to be supported thereby in substantially the same vertical plane transverse to the length of the vehicle as the carbureter nozzle, and a float chamber which is connected with the fuel supply receptacle and with the carbureter for receiving the liquid fuel on its way from the fuel receptacle to the carbureter.

In testimony whereof, I have hereunto set my hand, at Chicago, Illinois, this 24th day of June, 1914.

WEBB JAY.

Witnesses:
EDNA M. MACINTOSH,
LUCY I. STONE.