Oct. 11, 1938. L. H. MESSINGER, JR 2,133,033

CARBURETOR

Filed Dec. 12, 1935

Fig. 1.

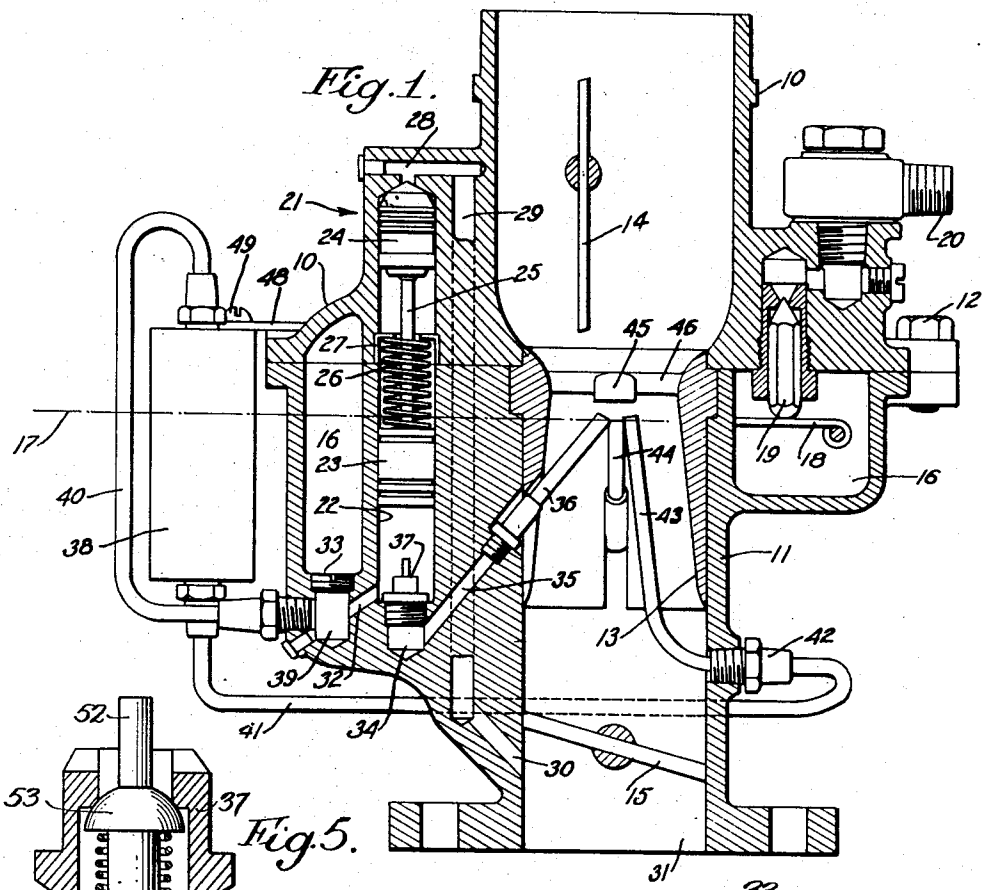
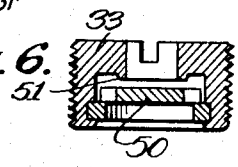


Fig. 5.

Fig. 6.



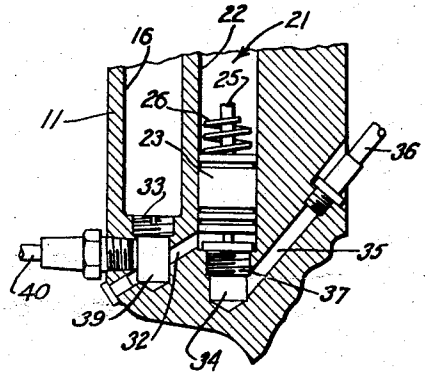


Fig. 4

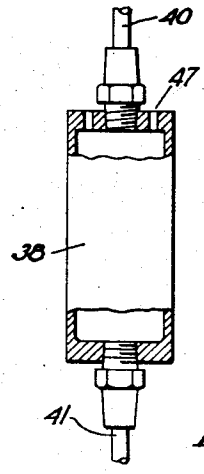


Fig. 3

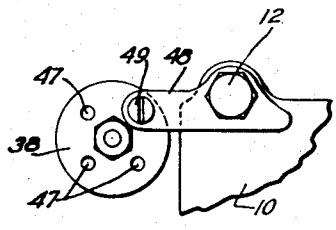


Fig. 2

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2,133,033

CARBURETOR

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Application December 12, 1935, Serial No. 54,033

10 Claims. (Cl. 261—34)

This invention relates to new and useful improvements in carburetors.

The invention provides means whereby the fuel discharged by a vacuum operated accelerating pump of a carburetor is forced by the pump into a receptacle and is drawn from said receptacle into an engine fed by the carburetor only while the carburetor throttle valve is open and there is a suction in the engine.

The objects and advantages of the invention will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawing wherein there is shown a satisfactory embodiment of the invention. However, it is to be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

In the drawing:—

Fig. 1 is a vertical sectional view through a carburetor embodying the features of the invention;

Fig. 2 is a top plan view of one corner portion of the carburetor and showing the invention;

Fig. 3 is a view partly in elevation and partly in section showing a receptacle employed;

Fig. 4 is a detail sectional view showing the carburetor fuel pump in discharged position;

Fig. 5 is a detail sectional view of the economizer valve; and

Fig. 6 is a detail sectional view of a check valve.

Referring in detail to the drawing a carburetor of the down-draft type is shown and the same comprises upper and lower sections 10 and 11 secured together by screws 12. Within the carburetor is any or the usual venturi 13 between the strangler valve 14 and the throttle valve 15. In the float chamber 16 the fuel is maintained at the level indicated by the line 17 by means of a float (not shown) having an arm 18 located to operate a valve 19 controlling the admission of gasoline from any source through the connection 20.

The carburetor includes a vacuum operated fuel pump generally designated 21 and comprising a chamber 22 forming the pump cylinder. Within said cylinder there is arranged pistons 23 and 24 connected by a rod 25 about which is a coil spring 26 bearing at its respective ends against the piston 23 and a collar 27. In Fig. 1 spring 26 is compressed and the pistons 23 and 24 are in the positions occupied by them when the pump is loaded while in Fig. 4 the spring is expanded and the pump discharged. The spring constantly tends to maintain the pistons in the positions of Fig. 4 and to return them to such positions when moved therefrom.

By means of a cross passage 28 the upper end of the pump cylinder 22 is placed in communication with the upper end of a vertical passage 29 which through a lateral branch 30 communicates with the fuel passage 31 below the throttle valve 15. Through the described passages suction from the engine, while the latter is operating, will serve to exhaust air from above the piston 24 and the piston assembly, including pistons 23 and 24 and the rod 25, will be drawn upwardly compressing the spring 26 bringing about loading of the pump.

A lateral passage 32 from the lower end of the pump cylinder communicates through a one way valve 33 with the float chamber 16. Valve 33 (see Fig. 6) is a flap valve including a valve proper 50 opening downwardly and normally is open to permit of the flow of fuel from the float chamber into the chamber 22. On downward movement of the piston 23 under the urging of the spring 26 pressure is applied to the fuel in the chamber 22 and the passage 32 and valve 50 moves upwardly against its seat 51 preventing the fuel in the pump from being forced back into the float chamber.

Below the pump cylinder is a well 34 communicating through a passage 35 with a fuel jet or nozzle 36 which in the present case is the power jet of the carburetor. An economizer valve 37 is arranged to close off communication between the jet 36 and the pump when the pump is in loaded position. This valve 37 includes a stem 52 carrying a valve proper 53 and the lower end portion of such stem is guided by a spider 54. Between the spider and the valve 53 a spring 55 is disposed about the stem 52 and under normal conditions is effective for maintaining valve 53 against its seat. The arrangement of the valve 37 is such that if there is no other escape for fuel as the pump discharges then the valve is forced open and the fuel is discharged through the nozzle or jet 36.

Arranged at one side of the body of the carburetor is a small tank or receptacle 38 adapted to receive the fuel discharged by the pump as will later be fully set forth. While this tank or receptacle is shown outside the body of the carburetor it will become apparent as the description proceeds that it might equally well comprise a chamber formed within the body of the carburetor. Therefore, while in subsequent portions of the description and in the claims the tank or re-

ceptacle 38 is referred to as a "receptacle" it is to be understood that such word is used as including a separate tank as shown or a compartment or chamber formed in the main body of the carburetor or at any other convenient location.

The passage 32 communicates with a well 39 at the lower side of the valve 33 and also communicating with the well is one end of a tube 40 forming a passage between said well and the interior of the receptacle 38 at the upper end thereof. Since tube 40 connects with well 39 it places the receptacle in communication with the float chamber 16 through the valve 33 and with the pump through the lateral passage 32. When the piston 23 is drawn to its upper position by suction on the piston 24 the pump is loaded with fuel drawn from the float chamber through the valve 33.

Thereafter on the suction or vacuum being reduced the spring 26 acts and the piston 23 descends to discharge the pump. At this time the valve 37 is closed and the pressure on the fuel forces valve 33 closed and the fuel is discharged by the pump through the tube 40 into the receptacle 38. Since the fuel has an escape through the tube 40 sufficient pressure to force open the valve 37 is not generated and such valve remains closed until its stem is engaged by the piston 23 as in Fig. 4 when the valve is forced and held open.

Heretofore in carburetors of the type shown the pump 21 discharged only through the nozzle 36. The arrangement was such that the pump was operated to loaded position while there was suction in the engine equipped with the carburetor and then on reduction of the suction or vacuum as by opening the throttle valve the spring 26 of the pump would act to discharge it and the fuel would be forced through the nozzle 36.

With such an arrangement the pump would discharge through nozzle 36 when the engine ignition was cut off and the engine stopped and the discharged fuel would simply run into the intake manifold and then into the engine when not needed. Also if the engine was equipped with an air inlet valve as shown in my Patent 2,017,914 of October 22, 1935 the pump if in loaded position would discharge through nozzle 36 each time the valve opened at which times it is desirable that no fuel be fed to the engine. To overcome these difficulties and prevent waste of fuel I provide the receptacle 38 and the connections thereto so that each time the pump discharges the fuel passes to the receptacle and is taken therefrom at such times as the fuel is required by the engine.

A tube 41 has one end connected with the interior of the receptacle adjacent the lower end thereof and as shown such tube is attached to a wall of the fuel passage 31 by a fitting 42 and extending through said wall has its other end portion inclining upwardly forming a nozzle 43. Nozzles 36 and 43 together with the usual cap jet 44 extend under the usual deflector 45 supported by a cross piece 46 spanning the venturi 13.

Fuel discharged into the receptacle 38 remains therein while the throttle is closed or while the air inlet valve of my patent above referred to is open. Assuming such air inlet valve to be closed or absent from the engine, on opening of the throttle valve while the engine is operating there is an increase in the suction or degree of vacuum in the venturi of the carburetor and fuel is drawn from the receptacle 38 through the tube 41 and into the engine. As the engine operates under conditions imposing a high degree of vacuum in the venturi portion of the carburetor fuel is drawn through the tube 41 until the supply in the receptacle is exhausted.

Receptacle 38 is of such capacity in its portion below the fuel level indicated by the line 17 as to be capable of containing that volume of fuel representing several discharges of the pump 21. In its upper portion above the fuel level the receptacle is provided with holes or perforations 47 for the admission of air. Owing to the presence of these holes when the fuel is exhausted from the receptacle air is drawn through the tube 41 and nozzle 43 and a siphonic action cannot be set up through the tube 41, receptacle 38 and tube 40 to the float chamber of the carburetor. While the receptacle may be supported by the tubes 40 and 41 it is preferred to attach it to the main body of the carburetor as by a strap 48 secured to the receptacle by a screw 49 and to the carburetor by one of the screws 12.

It will be apparent that on the fuel in the receptacle reaching the level indicated by the line 17 should any additional fuel be forced into the receptacle the excess will flow out of the upper end of the nozzle 43. Therefore the receptacle cannot be filled up to the inlet opening or to the vent openings so that the latter may always function to admit air and prevent the setting up of a siphonic action from the nozzle 43 back through the receptacle to the float chamber of the carburetor.

The invention is not limited to carburetors of the type or construction shown and obviously changes may be made without departing from the spirit of the invention or the scope of the appended claims.

Having thus set forth the nature of my invention what I claim is:—

1. In a carburetor including a venturi, a fuel chamber, a nozzle for supplying fuel from said chamber to said venturi, a pump communicating with said chamber and including vacuum operated means to move it to loaded position and spring means to operate it to discharge fuel on reduction of vacuum on said means, a receptacle, a passage connecting the receptacle, pump and nozzle, a valve in said passage in position to cut off the nozzle whereby as the pump discharges it forces fuel into the receptacle, said valve arranged to be held off its seat by the pump when the latter is in discharged position, and a passage connecting said receptacle with the venturi for the passage of fuel from the receptacle to an engine fed by the carburetor.

2. In a carburetor including a venturi, a fuel chamber, a nozzle for supplying fuel from said chamber to said venturi, a pump comunicating with said fuel chamber and including vacuum operated means to move it to loaded position and spring means to operate it to discharge fuel on reduction of vacuum on said means, a receptacle, a passage connecting the receptacle, pump and nozzle, a valve in said passage in position to cut off the nozzle whereby as the pump discharges it forces fuel into said receptacle, means whereby the valve is held off its seat while the pump is in discharged position, and a passage connecting said receptacle with the venturi for the passage of fuel from the receptacle to an engine fed by the carburetor.

3. In a carburetor including a venturi, a fuel chamber, a nozzle in the venturi, a pump communicating with said fuel chamber and including

vacuum operated means to move it to loaded position and spring means to operate it to discharge fuel on reduction of vacuum on said means, a receptacle, a passage connecting the discharge of the pump with the upper end portion of the receptacle whereby on each discharge of the pump fuel is delivered to the receptacle, and a passage connecting the lower end portion of the receptacle with said nozzle for the passage of fuel from the receptacle to an engine fed by the carburetor.

4. In a carburetor including a venturi and a nozzle in the venturi, a fuel chamber, a vacuum operated fuel pump, a receptacle, a passage connecting said chamber, receptacle, pump and nozzle, a valve to cut off communication between the passage and chamber when there is a pressure on the fuel in the passage, a valve in the passage to cut off the nozzle whereby as the pump discharges it forces fuel through the passage into the receptacle and as the pump moves to loaded position it draws fuel from the chamber through the first valve, means whereby the second valve is held off its seat while the pump is in discharged position, and a passage from the receptacle to the venturi whereby fuel is drawn from the receptacle under conditions of high vacuum in the venturi.

5. In a carburetor including a venturi, a fuel chamber, a nozzle in the venturi, a pump communicating with said fuel chamber and including vacuum operated means to move it to loaded position and spring means to operate it to discharge fuel on reduction of vacuum on said means, a receptacle, means connecting the receptacle with said nozzle for the passage of fuel from the receptacle to an engine fed by the carburetor, said connecting means and receptacle arranged and constructed whereby fuel is drawn into the engine from the receptacle only when there is a suction on said nozzle, and means whereby on reduction of vacuum on said pump due to operation of means other than the throttle and at different times from normal breaking of the vacuum by opening of the throttle all fuel discharged by the pump is delievered to and retained by said receptacle whereby to prevent waste of fuel when the vacuum pump discharges while there is no suction on said nozzle and whereby to have such fuel available to the engine through said nozzle on suction being again applied to the nozzle.

6. In a carburetor including a throttle, a fuel pump adapted to be operated to charged position by vacuum, spring means to operate the pump to discharged position, a receptacle, an outlet from the receptacle and through which fuel is drawn into an engine fed by the carburetor, said outlet and receptacle arranged and constructed whereby fuel is drawn into the engine from the receptacle only while there is a suction in the engine, and means whereby on reduction of vacuum on said pump due to operation of means other than the throttle and at times different from normal breaking of the vacuum by opening of the throttle all fuel discharged by the pump is delivered to and retained by said receptacle whereby to prevent waste of fuel when the vacuum pump discharges and there is no suction in said engine and whereby to have such fuel available to the engine through said outlet on reestablishment of suction in the engine.

7. In a carburetor, a fuel pump adapted to be operated to charged position by vacuum and other means to operate the pump to cause it to discharge fuel, a receptacle of a capacity to contain several complete discharges of said pump, means connecting the receptacle with the carburetor for the passage of fuel therethrough from the receptacle to an engine fed by the carburetor, said connecting means and receptacle arranged and constructed whereby fuel is drawn into the engine from the receptacle only when the engine is exerting a suction pressure on the carburetor, and means whereby on reduction of vacuum on said pump due to operation of means other than the throttle and at different times from normal breaking of the vacuum by opening of the throttle all fuel discharged by the pump is delivered to and retained by said receptacle whereby to prevent waste of fuel when the vacuum pump discharges and there is no suction on said carburetor and whereby to have such fuel available the engine through said connecting means on reestablishment of suction in the carburetor.

8. In a carburetor including a venturi and a throttle valve below the venturi, a fuel chamber, a pump communicating with the fuel chamber and including vacuum operated means to move it to loaded position and other means to operate it to discharge fuel on reduction of vacuum on said means, a receptacle, a passage connecting the receptacle with the Venturi portion of the carburetor for the passage of fuel from the receptacle through said venturi to an engine fed by the carburetor said passage and receptacle arranged and constructed whereby fuel is drawn into the engine from the receptacle only on opening of said throttle valve while there is a suction in the engine, and means whereby on reduction of vacuum on said pump due to operation of means other than the throttle and at different times from normal breaking of the vacuum by opening of the throttle all fuel discharged by the pump is delivered to and retained by said receptacle whereby to prevent waste of fuel when the vacuum pump discharges and there is no suction in the engine and whereby to have such fuel available to the engine through said passage on reestablishment of suction in the engine.

9. In a carburetor including a throttle, a fuel pump adapted to be operated to charged position by vacuum, spring means to operate the pump to discharged position, a receptacle, an outlet from the receptacle and through which fuel is drawn into an engine fed by the carburetor, said outlet and receptacle arranged and constructed whereby fuel is drawn into the engine from the receptacle only on opening of said throttle while there is a suction in the engine, means whereby on reduction of vacuum on said pump due to operation of means other than the throttle and at different times from normal breaking of the vacuum by opening of the throttle all fuel discharged by the pump is delivered to and retained by said receptacle whereby to prevent waste of fuel when the vacuum pump discharges and there is no suction in the engine and whereby to have such fuel available to the engine through said outlet on reestablishment of suction in the engine, and said receptacle vented in its upper portion to prevent the setting up of a siphonic action through the receptacle on exhausting of the fuel therefrom.

10. In a carburetor having a venturi and a nozzle in the venturi, a fuel supply chamber, a vacuum operated fuel pump communicating with said chamber, a receptacle vented above the fuel level in said chamber, said receptacle below said level having a capacity to hold several discharges from said pump, a passage connecting the recep-

tacle to said nozzle whereby to exhaust fuel from the receptacle, said passage and receptacle arranged and constructed whereby fuel is drawn into the engine from the receptacle only under high suction in the venturi, and means whereby on reduction of vacuum on said pump due to operation of means other than the throttle and at different times from normal breaking of the vacuum by opening of the throttle all fuel discharged by said pump is delivered to and retained by said receptacle whereby to prevent waste of fuel when said pump discharges in the absence of high vacuum in the venturi and whereby to have such fuel available to the engine through said venturi on suction being reestablished therein.

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