Sept. 10, 1935. J. T. MOSELEY 2,013,787

CARBURETOR

Filed Dec. 11, 1933 3 Sheets-Sheet 1

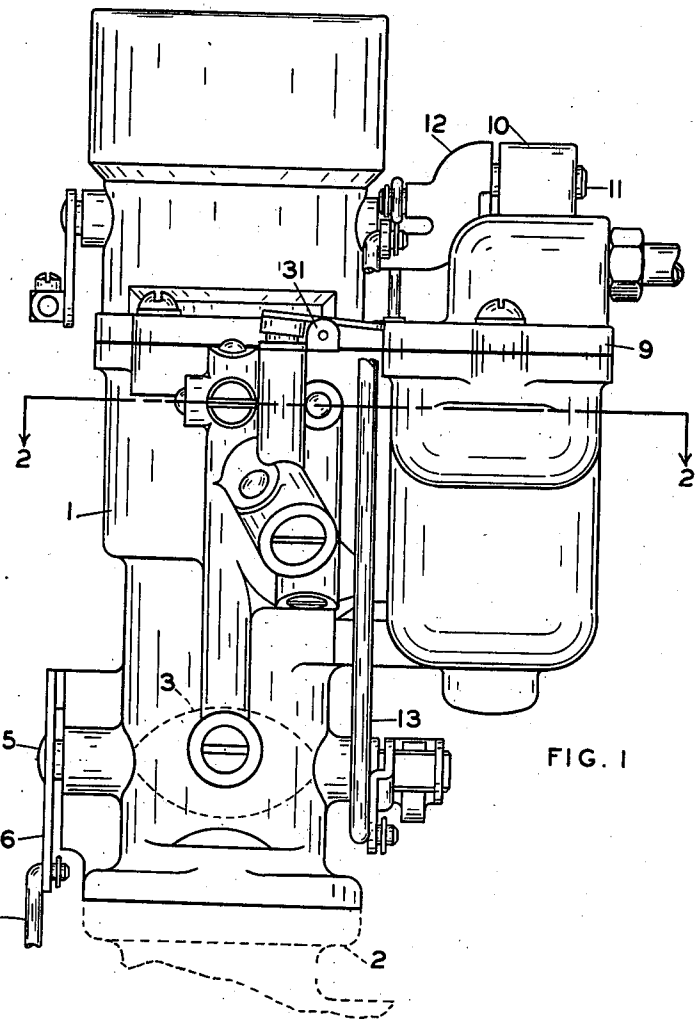


FIG. 1

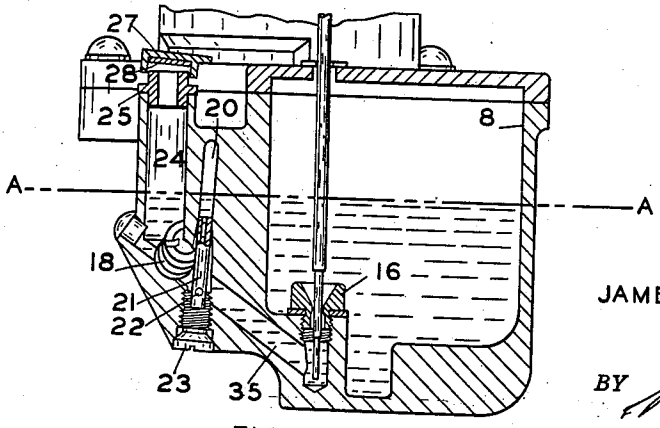


FIG. 4

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CARBURETOR

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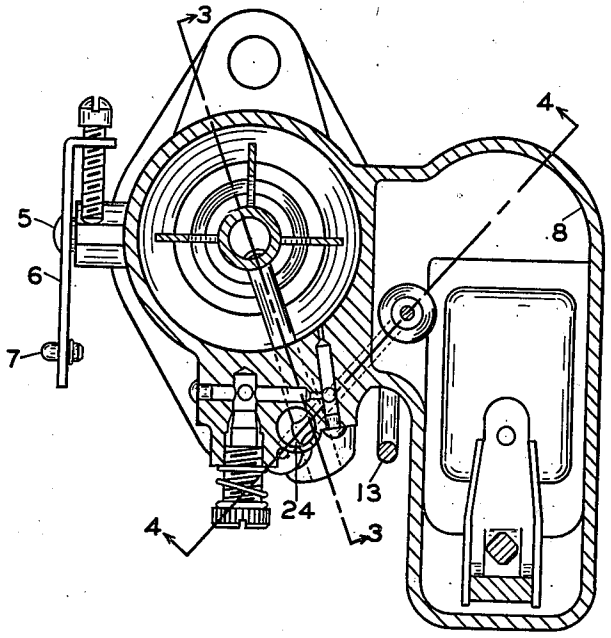


FIG. 2

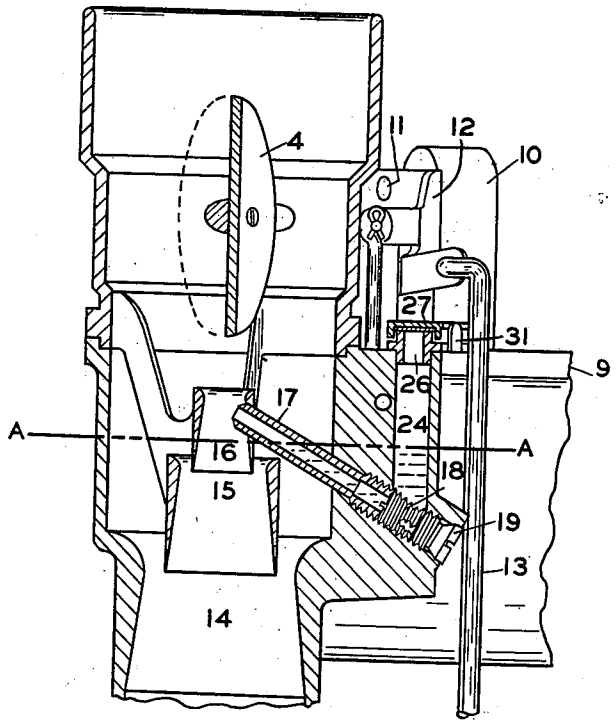


FIG. 3

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CARBURETOR

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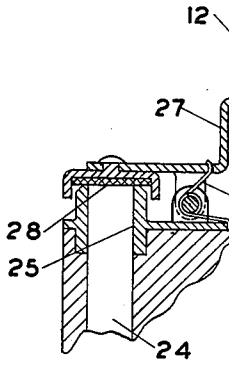


FIG. 5

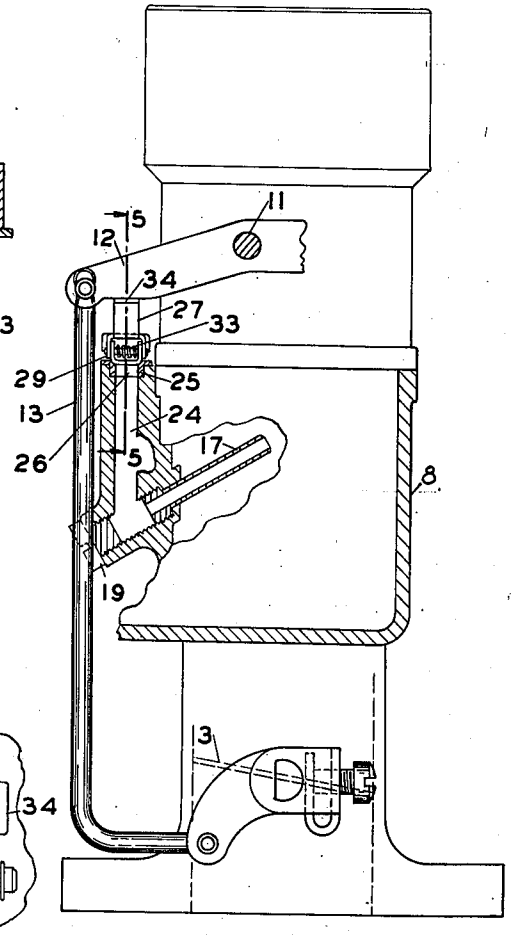


FIG. 6

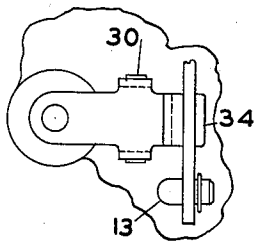


FIG. 7

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UNITED STATES PATENT OFFICE

2,013,787

CARBURETOR

James T. Moseley, Detroit, Mich., assignor to Carter Carburetor Corporation, St. Louis, Mo., a corporation of Delaware

Application December 11, 1933, Serial No. 701,765

8 Claims. (Cl. 261—60)

This invention relates to improvements in carburetors and more particularly to the prevention of a fault in carburetors which we will call percolation by reason of its analogy to the action of a coffee percolator. In downdraft carburetors, the carburetor is usually mounted directly over the exhaust manifold as well as the intake manifold, and on account of space limitations under the hood of the automobile it is usually necessary to put the carburetor in close proximity to the exhaust manifold.

During the normal operation of the automobile engine, a draught of air flows through the carburetor at comparatively high speed and effectively cools it. However, when the engine is stopped after being thoroughly heated up, there is no cooling draught of air to counteract the heat which is transferred from the exhaust manifold to the carburetor, and boiling of the fuel in the constant level chamber will occur. The constant level chamber is provided with small passages leading to the fuel nozzles and these passageways necessarily reach the boiling point more quickly than the fuel in the main part of the constant level supply chamber.

The passageways leading from the constant level supply chamber to the main fuel nozzle and idling port necessarily convey the fuel upwardly from a point substantially below the level of fuel in the constant level chamber to a point in the mixing conduit at a level at least slightly above the level of fuel in the constant level supply chamber. As the lower boiling constituents of the gasoline in the fuel passages begin to vaporize and form bubbles, they naturally tend to rise and follow the upwardly directed passageways to the fuel nozzles with the result that the fuel begins to percolate or overflow from the outlets of the main fuel nozzle. This action may be referred to as percolation as it is also very similar to the action of a coffee percolator.

It frequently happens that the constant level supply chamber is completely emptied in a few minutes after the motor is stopped on a hot day. In the downdraft carburetor this is particularly objectionable because the fuel is emptied into the intake manifold from which it drains downwardly into the cylinders of the engine, or else forms puddles in the intake manifold which will be swept into the engine during the cranking operation thereby preventing a proper starting of the engine, and also introducing a large amount of dilution into the crank case oil.

I have found that percolation originates in the small fuel passages to which heat is transferred from the exhaust manifold thru the path of least resistance. This, of course, means the shortest path as well as the path containing the largest mass of metal. The percolation naturally occurs first where the volume of fuel is small in comparison with the heated metal surface with which it is in contact.

My invention relates to means for preventing the discharge of fuel into the intake manifold by reason of the above described percolation. Briefly stated, the problem is solved by providing a passageway leading from a point at which the percolation originates and extending in a direction which is more directly upward than the direction of the passages leading to the nozzle and terminating at a point above the normal fuel level of the constant level chamber. Such a passageway would ordinarily constitute an air bleed to the nozzle and there are conditions under which such an air bleed is objectionable.

It will be understood, of course, that the air bleed is not, in all cases, objectionable but for use under conditions where the admission of air cannot be permitted I provide a device in the nature of a valve for closing the passage thru which the air would be admitted except when the throttle is in substantially closed position. It will be understood that the throttle will ordinarily be in substantially closed position whenever the motor is standing idle and that is the condition under which the percolation occurs.

For the purpose of illustrating one embodiment of my invention, reference may be had to the accompanying drawings in which:

Figure 1 is a side elevation of a carburetor embodying my invention.

Figure 2 is a sectional plan view of the carburetor shown in Figure 1, the section being taken along the lines 2—2 of Figure 1.

Figure 3 is a partial sectional elevation of the carburetor shown in Figures 1 and 2, the section being taken along the lines 3—3 of Figure 2 looking in the direction of the arrows.

Figure 4 is a sectional view showing the part of the carburetor shown in Figures 1, 2 and 3, the section being taken along the lines 4—4 of Figure 2 looking in the direction of the arrows.

Figure 5 is a detail sectional view showing the valve and associated parts.

Figure 6 is a somewhat diagrammatic elevation of the device, parts being broken away and others shown in section.

Figure 7 is a detail plan view of the parts shown in Figure 5.

The reference numeral 1 indicates the main

body of a carburetor of the downdraft type adapted to be mounted on the combined intake and exhaust manifold of an engine indicated by the dotted line 2. The carburetor is provided with the usual throttle valve 3 (indicated in dotted lines in Figure 1) and the usual choke valve 4. The throttle valve is mounted on a shaft 5 which is provided with any suitable operating means such as the lever 6 and operating latch 7.

The main body member of the carburetor is provided with a float chamber 8 in which the fuel is normally maintained substantially at the level A—A as indicated in Figures 3 and 4. The conventional float mechanism for maintaining the fuel level is fully understood by those skilled in the art and is not shown. The float chamber is provided with a cover 9 on which is mounted a pillow block 10. A rock shaft 11 is rotatably mounted in the pillow block and the rocker arm 12 is carried by the shaft 11. The rocker arm is connected to the throttle by means of the link 13 which is pulled downwardly as the throttle is closed for a purpose hereinafter to be described.

The main body member of the carburetor is provided with the usual mixing conduit having the venturis 14, 15 and 16 into which the main nozzle 17 discharges. It will be noted that the outlet of the main nozzle 17 is just slightly above the fuel level A—A maintained in the float chamber. Fuel is admitted to the main nozzle thru the main jet 16 which feeds into the upwardly inclined passageway 35, the upper end of which connects with a chamber 18 into which the nozzle 17 is screw-threaded as indicated in Figure 3. The lower end of the chamber 18 is closed by means of a threaded plug 19.

Another upwardly directed passageway 20 communicates with the chamber 18 by means of the tube 21 which is perforated at its lower end as indicated at 22. The lower end of the passage 20 is also closed by a screw-threaded plug 23.

It is clear that the comparatively small amount of gasoline contained in and around the chamber 18 may quickly be heated whenever heat is applied to the metal body of the carburetor. This is, of course, due to the small volume of gasoline contained in comparison with the pieces of metal surrounding it. The internal screw threads serve to increase the amount of metal surface in contact with the liquid and thereby assist the transfer of heat. It is here that the percolation or boiling originates and the bubbles would normally pass up thru the nozzle 17 carrying gasoline out with them into the venturi 16 from which they would fall into the intake manifold. To prevent this I provide the upwardly directed passageway 24 leading from the top of the chamber 18 to the atmosphere. The main part of the passageway 24, at least to a point substantially above the fuel level, should be of sufficient size to easily receive the bubbles and permit them to pass up thru the gasoline. This size should be in the order of $\frac{3}{16}$ of an inch in diameter.

For mechanical convenience in making a tight closure, the upper part which forms the valve seat may be somewhat restricted. In this case I have provided a valve seat member 25 in which is formed the opening 26. The opening 26 should not be much smaller than $\frac{1}{16}$ of an inch in diameter, but it may be larger provided a tight closure of the valve can be obtained.

The valve is indicated at 27 and is provided with a soft and pliable sealing member 28. Valve member 27 is provided with downwardly turned lugs 29 which are pivoted by means of a pin 30 to a pair of upstanding lugs 31 which, in this case, are formed integrally with an extension 32 of the valve seat member 25. A spring 33 is coiled around the pin 30 and extended over the valve member 27 to normally hold it in closed position.

In operation, when the throttle is closed the rocker arm 12 will be moved downwardly to contact the end 34 of the pivoted valve member 27 thereby opening the valve and permitting free communication of the upper part of the chamber 24 with the atmosphere. Any bubbles which are formed by boiling of fuel in the chamber 18 will then readily find their way upward thru the passage 24 to the atmosphere and no pressure will be developed in the chamber 18 to force out thru the nozzle 17. In constructions where an air bleed to the main nozzle is desirable, it is, of course, not necessary to provide in a valve for closing of the outlet of the chamber 24. It will be understood, however, that the opening 26 will be calibrated to suit the particular requirements for admission of air to the nozzle of that carburetor.

Normally it is desirable to prevent the admission of air to the main nozzle, particularly in a triple Venturi carburetor such as that illustrated. As long as the throttle is in closed position the valve 27 will be opened, but as long as the throttle is in closed or substantially closed position, the amount of suction that can be built up in the mixing conduit and venturi 16 is not sufficient to cause fuel to flow rapidly from the nozzle 17 and the level of fuel in the chamber 24 will not fall low enough to permit air to be bled into the nozzle 17. As soon as the throttle is opened wide enough to start a substantial flow of fuel from the main nozzle 17, the valve 27 will be closed thereby positively preventing the admission of air thru the opening 26 to the chamber 24 and to the main nozzle.

It will be understood that the invention is susceptible of many modifications, and, accordingly, I do not wish to be limited in my protection, except as set forth in the accompanying claims.

I claim:

1. In a downdraft carburetor, means forming a constant level fuel chamber, a main nozzle having a discharge outlet at a point slightly higher than the normal level of fuel in said chamber, a passage connecting said nozzle with said chamber, a throttle for said carburetor, a vent connected with said passage at a point below the fuel level therein, and means for closing said vent whenever the throttle is in open or partially open position.

2. In a downdraft carburetor for internal combustion engines, means forming a mixing conduit, means forming a constant level liquid fuel chamber, a fuel nozzle, a passageway connecting said fuel nozzle with said constant level chamber, said nozzle terminating at a point above the level of fuel normally maintained in said constant level chamber, and said passageway being connected with said constant level chamber at a point substantially below said level, at least a part of said nozzle being upwardly inclined, a vent passage connected with said passageway, said vent passage extending more directly upward than the upwardly directed part of the nozzle and passageway, said vent passage from a point substantially above the normal liquid fuel level to its junction with said passageway being of larger diameter than the passage-

way through said nozzle, a throttle valve controlling said mixing conduit, a valve controlling said vent passage and connections between said throttle and said valve for closing said valve whenever said throttle valve is moved a substantial distance toward open position.

3. In a downdraft carburetor, means forming a mixing conduit, means forming a constant level fuel supply chamber, an upwardly inclined fuel nozzle discharging into said mixing conduit, said nozzle being connected to receive fuel from said constant level chamber, a vent passage connected to said nozzle at a point below the normal fuel level and extending more directly upward therefrom than does said nozzle, a throttle valve controlling said mixing conduit, said vent passage being provided with a valve and connections between said throttle and said valve, said connections being constructed and arranged to cause said vent passage to be closed whenever said throttle is substantially displaced from its closed position.

4. In a downdraft carburetor, means forming a mixing conduit, means forming a constant level fuel supply chamber, an upwardly inclined fuel nozzle discharging into said mixing conduit, said nozzle being connected to receive fuel from said constant level chamber, a vent passage connected to said nozzle at a point below the liquid fuel level and extending more directly upward therefrom than does said nozzle, a throttle valve controlling said mixing conduit, said vent passage being provided with a valve and connections between said throttle and said valve, said connections being constructed and arranged to cause said vent passage to be closed whenever said throttle is substantially displaced from its closed position, that part of the vent passage which extends from its connection with the nozzle to a point substantially above the normal fuel level being of larger diameter than the nozzle.

5. In a downdraft carburetor, means forming a mixing conduit, means forming a constant level liquid fuel supply chamber, passageways in series including a nozzle connected to receive fuel from said supply chamber and to discharge into said mixing conduit, said passageways having a fuel metering restriction therein, a throttle valve controlling said mixing conduit, a vent passage connected with said passageways at a point below the normal fuel level and between said restriction and said nozzle, a valve for controlling said vent passage and connections between said throttle and said valve for opening said valve only when said throttle is in or near its closed position, said vent valve being moved to fully closed position early in the opening movement of the throttle and remaining in such closed position until the throttle is again moved to substantially closed position.

6. In a downdraft carburetor, means forming a mixing conduit, means forming a constant level liquid fuel supply chamber, passageways in series including a nozzle connected to receive fuel from said supply chamber and to discharge into said mixing conduit, a throttle valve controlling said mixing conduit, a vent passage connected with said nozzle at a point below the normal fuel level, a valve for controlling said vent passage, spring means for closing said valve, and a loose connection between said throttle and said valve for opening said valve against the force of said spring only when the throttle is in substantially closed position.

7. In a downdraft carburetor, a constant level supply chamber, a mixing conduit, a throttle valve for controlling said mixing conduit, a fuel nozzle for feeding fuel to said mixing conduit, a vent passage connected with said nozzle at a point below the normal fuel level, a valve for said vent passage, means for moving said valve to open position whenever said throttle valve is closed and for completely closing said vent valve early in the opening movement of the throttle, said vent valve remaining fixed in closed position until said throttle is again moved to substantially closed position.

8. In a downdraft carburetor, means forming a constant level fuel chamber, a main nozzle having a discharge outlet at a point slightly above the normal level of fuel in said chamber, a throttle for said carburetor, passages connecting said constant level fuel chamber with said main nozzle, a vent leading directly upwardly from a point in said connecting passage between the inlet of the nozzle and the constant level chamber, a valve for controlling said vent, and means operated by said throttle for opening said valve whenever the throttle is in its closed position and for quickly closing said valve whenever the throttle is displaced from closed position.

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