CARBURETOR VENTING DEVICE

Joseph T. Wentworth, Royal Oak, Mich., assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

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The present invention relates to an improved type carburetor venting device which is uniquely controlled to actuate the vent the carburetor float bowl chamber under varying engine operating conditions.

In designing automotive carburetors it is necessary to vent the float bowl in order to eliminate the vapors given off by the gasoline which otherwise generate pressures in the float bowl cavity adversely affecting normal fuel metering.

Hereinofor such venting has been accomplished generally in either of two ways. First, externally venting to the atmosphere and secondly, internally venting to the carburetor induction passage. The disadvantages of external venting are that the vented gasoline vapors contribute to air pollution, the smell of gasoline is objectionable to the occupants of the car, and the energy in the evaporated fuel is lost. On the other hand, with internally vented carburetors there is the serious disadvantage that poor idling is caused during hot weather driving as well as contributing to the difficulty of re-starting a hot engine. This latter disadvantage of internally vented carburetors occurs due to overenrichment since, under hot conditions, the density of the air decreases and at the same time the added vapors in the induction passage increase the quantity of fuel both of which factors disrupt the basic fuel-air ratio causing the undesired enrichment.

The present invention uniquely solves this venting problem by providing a float bowl vent valve which during normal engine operating conditions is internally vented to the engine but which valve externally vents the bowl during engine idling conditions. In this way a carburetor float bowl is provided which is continuously vented under all engine operating conditions in such a way as to insure accurate metering of fuel as well as substantially reducing the indiscriminate venting of fuel vapors.

The details as well as other objects and advantages of the present invention will be apparent from a perusal of the detailed description which follows.

The drawing is a diagrammatic representation of a carburetor float bowl embodying the subject invention.

A carburetor induction passage is shown generally at 2 and includes choke and throttle valves 12 and 14 rotatably disposed therein. The choke valve 12 functions in the well known manner and is preferably controlled by an automatic mechanism of the type shown in Patent 2,705,484 Jorgensen. A restriction or venturi 17 is formed in the induction passage intermediate the choke and throttle valves 12 and 14. The venturi is provided for metering the quantity of fuel supplied to the induction passage in accordance with the quantity of air flow therethrough.

The carburetor is also provided with a float bowl reservoir 16 which is adapted to maintain the fuel at a given level in the conventional manner as determined by the vertical position therein of a float 18. A fuel nozzle 20 is adapted to extend within the float reservoir 16 below the fuel level and to communicate through a passage 22 with the induction passage 20. As illustrated, conduit 22 communicates with a passage 24 formed in the induction passage wall 26. Passage 24 in turn communicates with an annular chamber 28 concentrically disposed about venturi 17. Annular fuel chamber 28 is communicated with the venturi throat by a plurality of radially extending ports 30. Thus fuel will be inducted into the passage 10 in accordance with the quantity of air flow through the venturi 17.

Underhood temperatures reach values, due either to engine operation or from the vehicle sitting in the sun, sufficient to vaporize the fuel in the fuel chamber 16. Unless the fuel vapors are suitably vented from above the level of the fuel in reservoir 16, the pressure therein will build up to a value which will interfere with the proper metering of fuel in accordance with the quantity of air flow as just described. Within such a limit, the vapor pressure above the level of the fuel in fuel reservoir 16 increases, a pressure will be created on top of the fuel tending to force fuel through the fuel nozzle 20, line 22, passage 24, and orifices 30 at a greater rate than that required by the quantity of air flow resulting in an over-enrichment of the charge being supplied to the engine.

For this reason it has become common practice to, in some way, vent the float bowl chamber to eliminate the build-up of vapor pressures therewithin. As already noted, this has been variously achieved by either internally or externally venting the float bowl chamber to the atmosphere. The problem with the previously known types of internal or external venting systems is that no means has been provided to coordinate the internal or external venting in a way as to insure that the venting will take place as desired under varying operating conditions.

In the present invention a valve means is provided for positively insuring that the carburetor will either be internally or externally vented in accordance with the operating needs of the engine. Accordingly, float bowl chamber 16 is formed to provide a raised portion 32 which defines a vent chamber 34 in the upper portion thereof. Chamber 34 includes a first opening 36 communicating the float chamber with the atmosphere. A second opening or port 38, axially aligned with port 36, communicates the reservoir with induction passage 10 through a tube 40.

A valve member 42 is provided and is suitably mounted within casing portion 32 so as to be axially movable on a line-of-centers between the openings 36 and 38. Valve 42 includes faces 44 and 46 adapted, respectively, to cooperate with vent openings 36 and 38. A washer or seat member 48 is mounted on valve 42 and provides a seat for a spring element 50, the other end of which seats against the reservoir casing 40 in such a way as to normally bias the valve in a position in which the valve face 44 blocks the external vent port 36 and in which valve face 46 uncovers port 38 permitting the reservoir to be vented to the induction passage 10.

A lever 52 is pivotally mounted at 51 on reservoir casing 40. An adjustable stop member 53 is articulated to one end of lever 52 and is adapted to abuttingly engage face 44 of valve 42. The other end of lever 52 is articulated through links 53, 55 and 57 to a lever 54 fixed to the throttle valve 14. With throttle valve 14 in a closed position, as shown in the drawing, face 44 of the valve element 42 will be engaged by end 53 of lever 52 and shifted to the right against the force of spring 50 in the position shown to externally vent the float reservoir 17 through port 36 at the same time causing face 46 to block port 38. As the throttle valve opens the levers 54 and 52 will be moved to the left per-
mitting spring 50 to bias the valve element 42 to a position blocking the external vent 36 and at the same time opening the internal vent 38.

In this way it will be seen that a positively controlled vent mechanism is provided in which, when the engine is idling the float reservoir 16 will be externally vented to the atmosphere through port 36 preventing fuel vapors from passing into the induction passage and thus eliminating rough idling operation or engine flooding. At the same time, the throttle 14 is adapted to control the valve 42 so as to block the external vent 36 and open the internal vent when the throttle valve is open whereby the fuel vapors are prevented from being discharged into the engine compartment and are otherwise utilized in producing power within the engine. It is the concept of positively controlling the internal and external vent ports which represents the improvement of the present device over previous types of float bowl venting mechanisms.

It is apparent that various structural modifications of the present invention are possible within the intended scope thereof and that the drawings and description are for the purpose of illustrating one practical way of achieving the object of the present invention.

1 claim:

1. A carburetor comprising an air intake passage, a fuel reservoir, means for supplying fuel from said reservoir to said air passage in accordance with the quantity of air flow through said passage, a throttle valve in said air passage controlling the quantity of combustible charge flowing therethrough, a first port means in said fuel reservoir for venting the reservoir to the atmosphere, a second port in said reservoir, a tube connecting said second port with said induction passage, valve means mounted in said reservoir for selectively opening one of said ports and at the same time closing the other of said ports, throttle control means for actuating said valve means to open said first port and block said second port when the throttle is in an idling position, and means normally biasing said valve means to a position in which said first port is blocked and said second port is uncovered.

2. A carburetor comprising an air intake passage, a fuel reservoir, means for supplying fuel from said reser-

voir to said air passage in accordance with the quantity of air flow through said passage, a throttle valve in said air passage controlling the quantity of combustible charge flowing therethrough, a first port means in said fuel reservoir for venting the reservoir to the atmosphere, a second port in said reservoir disposed in axially spaced relation to said first port, a tube connecting said second port with said induction passage, valve means mounted in said reservoir intermediate said ports for selectively opening one of said ports and at the same time closing the other of said ports, throttle control means for actuating said valve means to open said first port and block said second port when the throttle is in an idling position, and means normally biasing said valve means to a position in which said first port is blocked and said second port is uncovered.

3. A carburetor comprising an air intake passage, a fuel reservoir, means for supplying fuel from said reservoir to said air passage in accordance with the quantity of air flow through said passage, a throttle valve in said air passage controlling the quantity of combustible charge flowing therethrough, a first port means in said fuel reservoir for venting the reservoir to the atmosphere, a second port in said reservoir disposed in axially spaced relation to said first port, a tube connecting said second port with said induction passage, valve means mounted in said reservoir for axial movement between said ports, said valve means including axially spaced faces adapted to respectively coat with said ports for alternatively controlling the flow of fuel vapors through the respective ports, throttle control means for actuating said valve means to open said first port and block said second port when the throttle is in an idling position, and means normally biasing said valve means to a position in which said first port is blocked and said second port is uncovered.

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