May 7, 1940. E. OLSON 2,199,509

CARBURETOR ACCELERATING MEANS

Filed Oct. 22, 1937

Fig. 1.

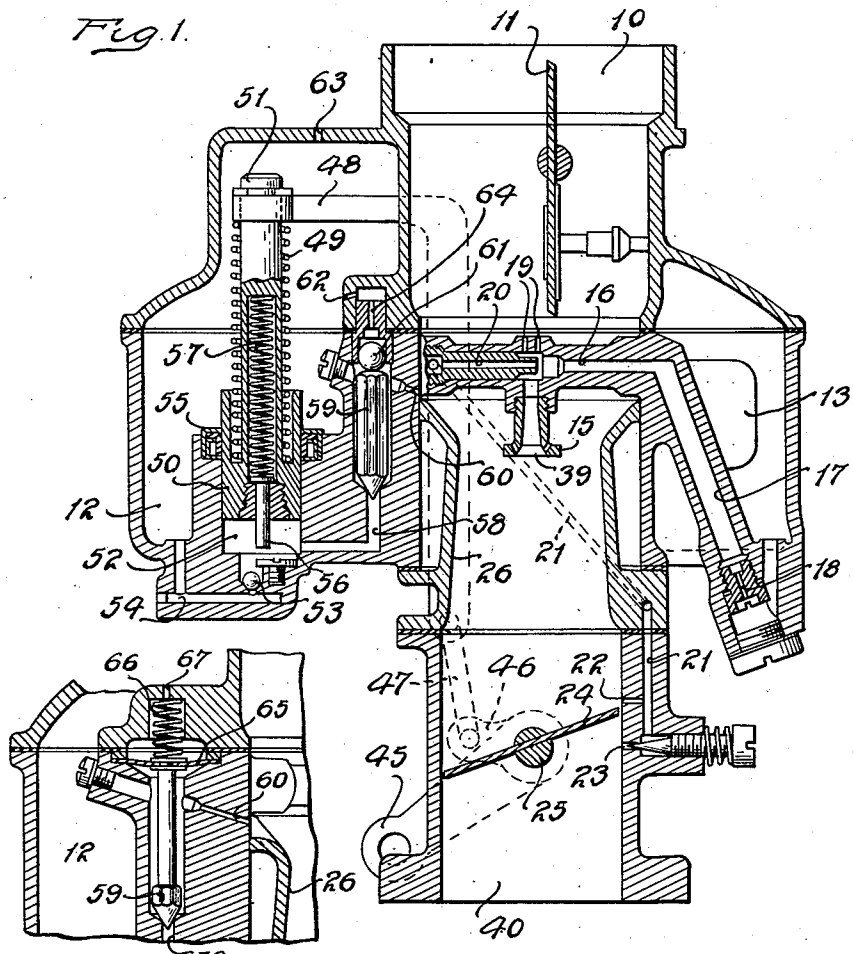


Fig. 4.

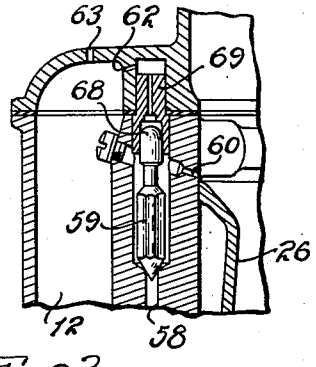
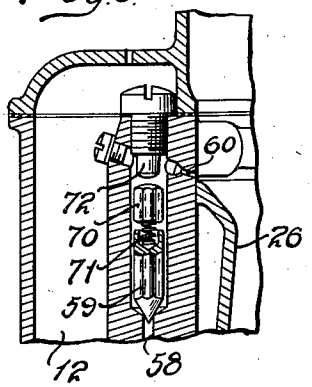


Fig. 2.

Fig. 3.



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CARBURETOR ACCELERATING MEANS

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Application October 22, 1937, Serial No. 170,459

1 Claim. (Cl. 261—34)

This invention relates to means for supplying the quantity of fuel needed for acceleration, and specifically it relates to that type of accelerating means which includes a fuel pump operated by a throttle valve. One difficulty that has been experienced with accelerating means of this type is that they continue to function after the need for extra fuel during acceleration has ended. This results in a waste of fuel. In order to counteract this waste of fuel, heavily loaded check valves are used which are only unseated by the sudden opening of the throttle. In order words, a positive pressure is required to force the fuel into the carburetor during acceleration. In order to accomplish this result, the valves are either heavy or else they are spring loaded. In either event, the valve seat is quickly damaged and a leaky valve seat results, which, of course, will discharge during a period when the accelerating means are intended to be inoperative.

The specific object of this invention, therefore, is to reduce the load on the shut off valve and at the same time, prevent this premature discharge of the fuel pump and this improved result is accomplished by utilizing the depression in the air entrance of a carburetor for positively holding the valve on its seat, so that as the engine speeds up, the valve is seated by the suction and thus a relatively light valve can be used. It is to be understood that at low engine speed with wide open throttle, there is no tendency for the fuel pump outlet to discharge prematurely because under this condition there is no depression in the air entrance, but when the engine is going at top speed, with wide open throttle, it is very possible to have a considerable depression in the air entrance due partly to velocity and partly to the air cleaner which is normally placed on the air entrance. This restriction means quite a few inches of water and of course would cause a large quantity of fuel to pass through the accelerating pump in the event that there was any leak in the seat of the shut off valve.

In the figures:

Figure 1 shows a cross sectional elevation showing all the elements of my invention.

Figure 2 shows a modification of the novel feature of my invention.

Figure 3 shows a second modification.

Figure 4 shows a third modification.

In the figures, 10 indicates the air entrance; 11 is the choke valve located therein, which is of the well known type, but has no bearing on this invention except that when it is partly closed, it would cause the fuel pump outlet to operate at a time when the carburetor is adjusted to function without the discharge from the fuel pump. The air flows past the choke valve to the venturi 26. In the throat of this venturi is located a fuel nozzle 39 which is provided with a shoulder 15. This shoulder, by reason of its location within the throat of the venturi 27, induces the fuel to flow up the passage 17 across the horizontal passage 16. By this means, the fuel flows from the float chamber 12 through the restriction 18 which is the master metering nozzle of the carburetor.

The fuel level in the float chamber 12 is maintained on a constant level by means of the float 13 and by means of float mechanism which is not shown. The fuel discharge from the fuel outlet 16 is atomized by air admitted through small air orifices 19 forming an emulsion. The fuel for low speed is obtained from this emulsion and is drawn off through the horizontal passage 20 down the inclined passage 21 and discharges into the mixture outlet 40 through the low speed valve outlets 22 and 23. These outlets are located one above and one below the throttle valve 24 which is mounted on the throttle valve shaft 25. The orifice 23 is adjusted by a needle valve to take care of slight differences between engines and for other reasons. This particular form of low speed is of a well known type and forms no part of this invention.

The throttle shaft 25 is operated by the throttle lever 45 and is connected through another lever 46 to the link 47 to an L-shaped link 48. This link 48 is guided in the main body of the float chamber casting and engages with a shoulder 51 on the end of a piston 50. The piston 50 is slidable through the link 49 and the head 51 engages with the link 48 by reason of the compression of the spring 49. The piston 50 is sealed by means of a cylinder ring 55. A spring 57 inside the piston 50 engages with a loose pin 56. When the pump piston 50 descends, the pin 56 strikes the bottom wall of the cylinder 52 and the spring 57 is thereafter compressed so that the pumping effect of the piston 50 is delayed and the discharge of the fuel occupies an appreciable period of time. This is the follow up pump principle which is the subject of my co-pending patent application Serial No. 81,696, filed May 25, 1936. The fuel flows through the passage 54 from the float chamber 12 into the cylinder 52 past the check valve 53. Fuel is discharged from the cylinder 52 through the passage 58 past the check valve 59 and discharges into the mixing chamber through the passage 60.

All the parts so far mentioned belong to the

prior art. The improvement which I have made results from the addition of the following parts. The ball 61 is arranged to rest on the valve 59. Suction is applied to the lower side of this ball because it communicates through the opening 60 with the air entrance leading to the venturi 26. This suction increases as the air flow increases. Atmospheric pressure is applied to the upper side of the ball 61 through the passage 62 and the passage 64. The ball acts as a piston in a cylinder which carries the opening 64. The atmospheric pressure is admitted to the float chamber through opening 63. Obviously as the speed of the engine increases, the depression acting on the ball 61 also increases and thus the valve 59 is firmly pressed on its seat. I have further discovered that I can substitute aluminum for brass for this needle valve 59 and the light weight valve does not damage the seat as quickly as a heavier valve will, but the light weight valve is just as effective for the reason that the pressure of the atmosphere acting on the ball 61 is a substitute for the weight of a heavy brass needle 59.

In place of the rather bulky valve 59 in Fig. 1, I can substitute in Fig. 2 a rather smaller valve 59 and make it of brass and increase the weight by means of the piston 68 which is made integral with the valve 59. Again the atmospheric pressure is applied through the opening 63 to the opening 62 and through the opening in the center of the cylinder 69 in which the piston 68 reciprocates.

In Figure 3 there is a slightly different solution. In this the cylinder valve 59 is cut down in weight by being shortened. A loose piece 70 is supported on a spring 71 and acts as a cushion so that when the valve 59 is raised from its seat, the spring 71 is compressed. A set screw 72 is arranged to limit the travel of the spring supported weight 70. By this means the exact opening of the valve 59 can be limited. When the car is riding on a rough road, instead of the full weight of the valve 59 pounding on the seat every time the car hits a bump, the weight of the valve is partially spring supported and of course, that portion of the valve supported by the spring 71, that is to say, the portion 70, does not damage the valve seat as rapidly as would be the case if the valve were made all in one piece.

In Figure 4 the principle of operation is more similar to that shown in Figures 1 and 2. A diaphragm 65 takes the place of the piston 68 in Figure 2. This diaphragm is connected to the valve 59. On the lower side it is subjected to the depression existing in the entrance to the venturi 26. On its upper side it is subjected to atmospheric pressure admitted through the opening 67. A spring 66 supplies the necessary pressure to prevent the valve leaking.

What I claim is:

In a carburetor having an air entrance, a mixing chamber, a mixture outlet, a throttle valve therein, an accelerating fuel pump, a fuel outlet therefrom discharging into the air entrance of the carburetor, a two part check valve in said fuel outlet, the lower portion being adapted to close the outlet, the upper portion being adapted to engage with the lower portion and to act as a piston responsive on the lower side to the suction in the air entrance on the atmospheric side of the throttle valve, and on its upper side to atmospheric pressure whereby the atmospheric pressure is adapted to supplement the weight of the lower portion of the check valve in order to overcome the effect of the suction in the air entrance.

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