Oct. 20, 1936. E. O. WIRTH 2,057,700

CARBURETOR

Filed Dec. 7, 1931

FIG. 1.

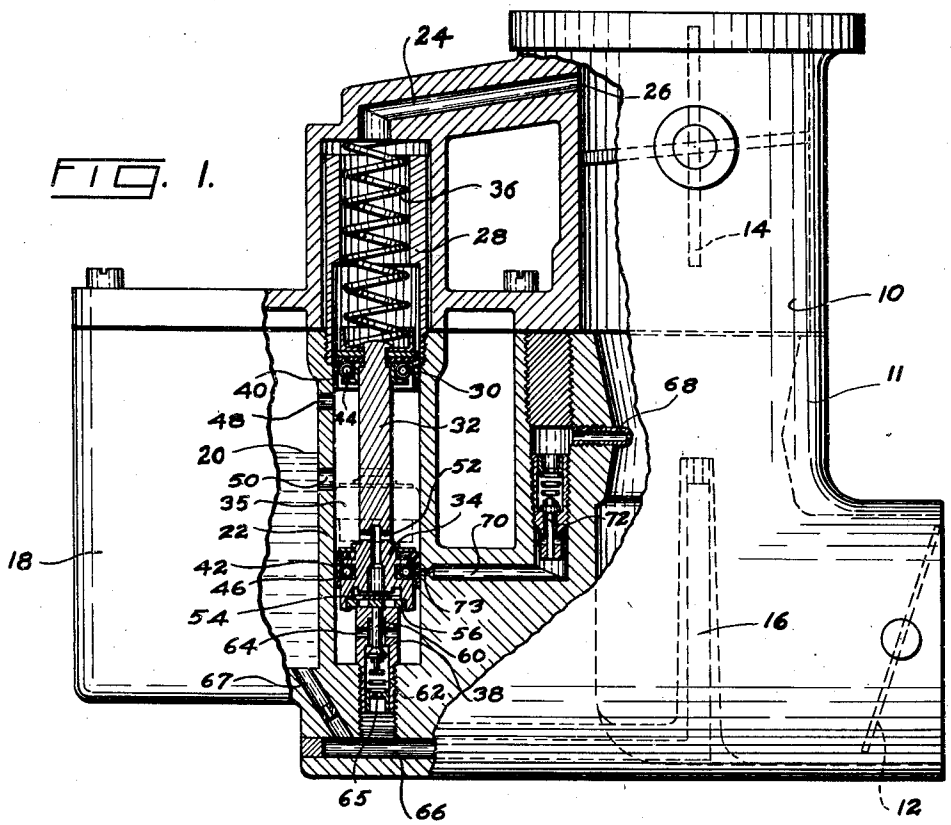


FIG. 2.

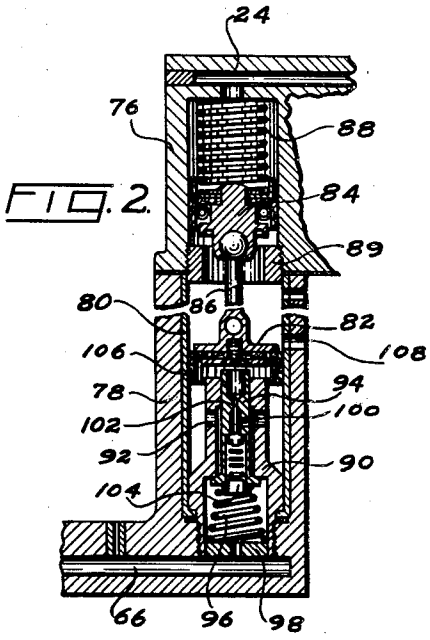


FIG. 4.

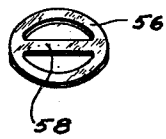




FIG. 5.

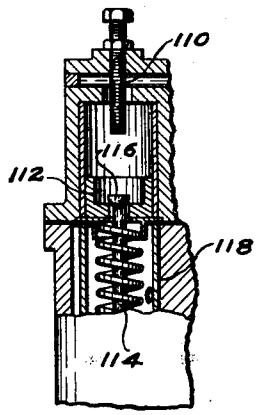


FIG. 3.

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Patented Oct. 20, 1936 2,057,700

UNITED STATES PATENT OFFICE

2,057,700

CARBURETOR

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Application December 7, 1931, Serial No. 579,539

12 Claims. (Cl. 261—34)

This invention relates to carburetors, and more particularly to means for controlling the supply of fuel to carburetors.

An object of the invention is to provide an improved acceleration pump which is accurately responsive to varying conditions within the carburetor.

A further object of the invention is to provide a suction operated acceleration pump which is dependable in action and economical to manufacture.

Further objects and advantages of the invention will be apparent from the following description, taken in connection with the appended drawing, in which:

Figure 1 is a side elevation, partly in section, of a carburetor embodying the invention;

Figure 2 is a fragmentary sectional view of a modified form of the invention;

Figure 3 is a similar view of a further modification;

Figure 4 is an enlarged view of a valve retaining member; and

Figure 5 is an enlarged view of the valve member.

The carburetor illustrated in Figure 1 is of the updraft type, and comprises a body portion 10 and venturi 11 forming a passage for fuel and air controlled by a choke valve 12 and a throttle valve 14, and supplied with liquid fuel by a main nozzle 16. The body 10 is preferably cast in upper and lower sections as shown. The carburetor also comprises a float chamber 18 provided with any suitable means (not shown) for maintaining the fuel therein substantially at the level indicated at 20.

Extending from the bottom of the float chamber upwardly to approximately the level of the throttle is a cylinder 22, which may be formed in two sections, the lower of which is cast integral with the float chamber and the lower body section of the carburetor, the upper of which is cast integral with the upper body section and includes a conduit 24 communicating, by way of a port 26, with the carbureting chamber posterior to the throttle 14.

Within the cylinder 22 is mounted a sleeve 28 the lower portion of which is machined to receive a piston 30 fixed by means of a connecting rod 32 to a lower piston 34 which may be formed integral with the connecting rod. A compression spring 36 urges both pistons toward their lowermost position shown in Figure 1, further downward movement being prevented by an economizer plug 38 which is threaded into the base of the float chamber. Both pistons preferably include leather washers 40, 42 resiliently held in operative position by coiled springs 44, 46.

The cylinder 22 is formed with ports 48, 50 located respectively above and below the fuel level 20. A duct 52 leads from the upper portion of piston 34 to the lower surface thereof and is controlled by a gravity-actuated plate 54 located in a valve cage formed by a recess in the lower surface of piston 34 and by an annular member 56 having a cross-piece 58 designed to contact with the projecting stem of an economizer valve 60. The valve 60 is urged upwardly by a coiled spring 62 and controls a port 64 leading from the cylinder 22 through a metering orifice 65 to a passageway 66 which leads to the main nozzle 16. The passageway also has communication with the float chamber through a metering plug 67.

An auxiliary nozzle 68 is positioned to discharge into the venturi 11 at about the same level as the main nozzle, and communicates with cylinder 22 through a passageway 70 controlled by a spring pressed check valve 72. The inlet end of passageway 70 is formed with a metering orifice 73 and is closed by piston 34 when the piston is in its lowermost position.

In operation, the parts remain in the position shown in Figure 1 when the motor is standing. When the motor is idling with the throttle closed the suction through conduit 24 raises pistons 30 and 34 to their uppermost positions, piston 34 being brought to the position indicated at 35 in Figure 1, in which position the economizer valve 60 is closed and orifice 73 is unobstructed. Fuel then flows through port 50, duct 52 and member 56, filling the space below piston 34. When the throttle is opened, the pressure in conduit 24 rises to almost atmospheric and pistons 30 and 34 descend under the force of spring 36, causing member 54 to seat and valve 72 to open due to the upward pressure of fuel thereon, piston 34 forcing fuel through the passageway 70 and thus acting as an accelerating pump. As piston 34 approaches the lower limit of its movement, it opens valve 60, thus permitting a continuous flow of additional fuel to the main nozzle at the higher speeds.

In the modification shown in Figure 2, the cylinder is formed in an upper section 76 and a lower section 78, the lower section being provided with a sleeve 80 which may be accurately machined to receive the lower piston 82. The upper piston 84 is connected to the lower piston by a rod 86 having a ball and socket connection

to the upper piston and a pivoted connection with the lower piston, and both pistons are urged downwardly by a compression spring 88. An annular stop member 89 is threaded into the lower portion of section 76. A plug 90 is seated in the lower portion of sleeve 80 and is provided with a central bore communicating with the interior of the sleeve by transverse ports 92 and forming a guide for a reciprocating valve member 94 which is formed with a projecting upper end and an enlarged lower end seating against the lower end of the central bore and urged upwardly by a spring 96. Spring 96 is held in place by plug 98 having a port therein for the passage of fuel. The valve member 94 also has a central bore communicating with ports 92 by a port 100 and having a spring pressed check valve 102 and a metering plug 104.

In the arrangement shown in Figure 2 the upper section 76 need not be accurately alined with the sleeve 80, since any misalinement of the upper piston is accommodated by the ball and socket and pivoted connections between the pistons. When the piston 82 is in its lowermost position the gasket 106 thereof is loose enough to permit the flow of fuel through port 108 past the gasket through ports 102 and plug 98 to passageway 66, the valve member 94 being depressed by contact with the piston 82. During the downward movement of the pistons, fuel which has entered through port 108 from the float chamber is forced through ports 92 and 100 where it forces valve member 102 open and passes through plug 104 to a passageway 66.

The modification shown in Figure 3 is provided with an adjustable stop member in the form of a screw 110 adapted to contact with the upper piston 112. Piston 112 is pivotally connected to the connecting rod 114 by an aperture formed in the piston of such size that the rod fits loosely therein. The rod is formed with a rounded enlarged head 116 designed to reduce the friction when pivotal movement occurs between the rod and the piston. In this embodiment both pistons reciprocate in the sleeve 118, the upper section of which is seated in the float chamber cover and the lower section of which extends through the float chamber and is spaced from the walls thereof. The operation is similar to that described in connection with Figures 1 and 2.

While illustrative embodiments of the invention have been described, it is not my intention to limit the invention to those embodiments, or otherwise except in accordance with the following claims.

I claim:

1. In a carburetor having a main nozzle, an auxiliary nozzle, and separate fuel conduits leading thereto; a suction operated piston, a pump piston pivotally connected to the suction operated piston and adapted to force fuel to the auxiliary nozzle, and a check valve in the conduit leading to the auxiliary nozzle, said last mentioned conduit being adapted to be obstructed by the pump piston when near the end of its stroke.

2. In a carburetor having a main nozzle, an auxiliary nozzle spaced from the main nozzle, separate fuel conduits leading to the nozzles and an acceleration pump supplying acceleration fuel to the auxiliary nozzle and having a piston operative to increase the flow to the main nozzle, said piston when so operative obstructing the flow to the auxiliary nozzle.

3. In a carburetor, an acceleration pump comprising a suction operated piston and a pump piston, a universal connection between the pistons, a pressure-responsive valve member in the pump piston comprising a cage member, and an outlet valve in said pump positioned to be opened by said cage member.

4. In a carburetor, a venturi, a main nozzle, an acceleration pump comprising a cylinder and a piston movable therein to supply fuel under pressure to the carburetor, an outlet from said cylinder positioned to be obstructed by said piston at the end of its pumping stroke, an acceleration fuel nozzle discharging at the ttroat of said venturi, a fuel conduit connecting said outlet and said nozzle, an economizer valve positioned in the bottom of said cylinder designed to be held permanently open by the piston when in one extreme position and connecting means between the economizer valve and the main nozzle.

5. In a carburetor, a main carbureting passage, a main fuel nozzle, means for supplying fuel thereto including a fuel reservoir, an acceleration fuel jet discharging into said main carbureting passage and subject to suction existing therein, an acceleration pump comprising a cylinder and a piston therein, an outlet in the cylindrical wall of the cylinder positioned to be obstructed by the piston at the end of its pumping stroke, a fuel conduit leading from said outlet to said jet, an auxiliary fuel conduit leading from the fuel reservoir to the main nozzle, and a valve in said auxiliary conduit controlled by said piston.

6. In a carburetor, a venturi, a main nozzle, an acceleration pump comprising a cylinder and a piston movable therein to supply fuel under pressure to the carburetor, an outlet from said cylinder positioned to be obstructed by said piston at the end of its pumping stroke, an acceleration fuel nozzle discharging at the throat of said venturi, a fuel conduit connecting said outlet and said nozzle, an auxiliary fuel conduit leading from the cylinder to the main nozzle, and a valve in said auxiliary conduit controlled by said piston.

7. In a carburetor, a venturi, a main nozzle, an acceleration pump comprising a cylinder and a piston movable therein to supply fuel under pressure to the carburetor, an outlet from said cylinder positioned to be obstructed by said piston at the end of its pumping stroke, an acceleration fuel nozzle discharging at the throat of said venturi, a fuel conduit connecting said outlet and said nozzle, an auxiliary fuel conduit leading from the cylinder to the main nozzle, and a normally closed valve in said auxiliary conduit arranged to be opened by the piston at the end of its pumping stroke.

8. In a carburetor, a main carbureting passage, a venturi, a throttle valve, a fuel reservoir, a main fuel nozzle communicating therewith, an acceleration pump comprising a cylinder and a vacuum actuated piston therein, an auxiliary piston actuated by the vacuum actuated piston, yielding means urging the pistons toward one extreme position, an acceleration fuel discharge nozzle communicating with the carbureting passage at the restricted section of the venturi, an outlet in the walls of the cylinder designed to be obstructed by the auxiliary piston in one extreme position, connecting means between the outlet and the acceleration nozzle, an economizer valve in the acceleration pump cylinder designed to be held permanently open by the auxiliary piston at the end of its pumping stroke, and connecting means between the economizer valve and the main fuel nozzle.

9. In a carburetor, an induction passage, a venturi, an auxiliary fuel discharge nozzle communicating with the induction passage at the restricted section of the venturi, an acceleration pump comprising a cylinder and a vacuum actuated piston, yielding means urging the piston toward one extreme position, a fuel outlet in the walls of the cylinder designed to be closed by the piston in one extreme position, connecting means between the outlet and the auxiliary fuel nozzle, a pressure responsive economizer valve in the cylinder and an actuating stem extending above the valve and designed to be held open by the piston at the end of its pumping stroke to permit the flow of fuel through the cylinder.

10. In a carburetor having an induction passage, a throttle valve controlling the induction passage, a source of suction beyond the throttle, a venturi, a main nozzle, an auxiliary nozzle having its outlet subjected to pressures at the throat of said venturi, a fuel reservoir, a fuel conduit interconnecting the fuel reservoir and the main nozzle, an acceleration pump comprising a cylinder and a piston movable therein in accordance with variations in pressure in the induction passage beyond the throttle, connecting means between the fuel reservoir and the auxiliary nozzle comprising said cylinder and an inlet from the cylindrical wall of the cylinder to the fuel conduit leading to the auxiliary nozzle so positioned as to be obstructed by the piston at the end of its pumping stroke, and a pressure responsive check valve positioned in the conduit leading to the auxiliary nozzle to interrupt the flow of fuel to the auxiliary nozzle in the absence of a predetermined differential of fluid pressure.

11. In a carburetor having a fuel reservoir, an induction passage, a throttle valve controlling the induction passage, a venturi, a main fuel nozzle, an auxiliary fuel nozzle positioned to discharge at the most restricted section of the venturi, an acceleration pump comprising a cylinder, a plurality of pistons slidable within the cylinder, connecting means between said pistons, yielding means urging the pistons in one direction, connecting means between a portion of the cylinder and the induction passage posterior to the throttle valve whereby the pistons are moved against the yielding means upon the existence of a predetermined vacuum in the induction passage, connecting means between a portion of the cylinder and the auxiliary fuel nozzle, an economizer valve comprising cooperating valve members normally yieldingly urged to the closed position interconnecting a portion of the cylinder and the main fuel nozzle, actuating means including a stem projecting above the economizer valve adapted to be engaged by one of the pistons to open the economizer valve when said piston is in one extreme position, and a bypass including a gravity actuated valve through said piston.

12. The invention defined in claim 11 wherein the connecting means between a position of said cylinder and the auxiliary fuel nozzle is closed and the economizer valve is moved to the open position when the pistons are moved to one extreme position.

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