May 31, 1932. P. E. MIQUELON 1,861,352

CARBURETOR

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Fig. 1

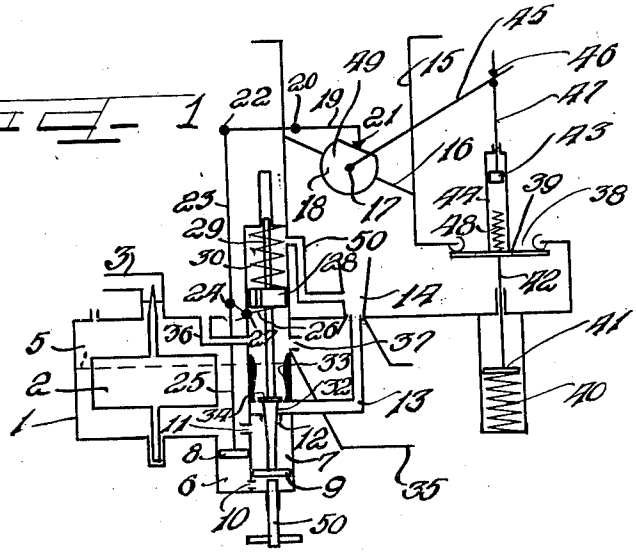
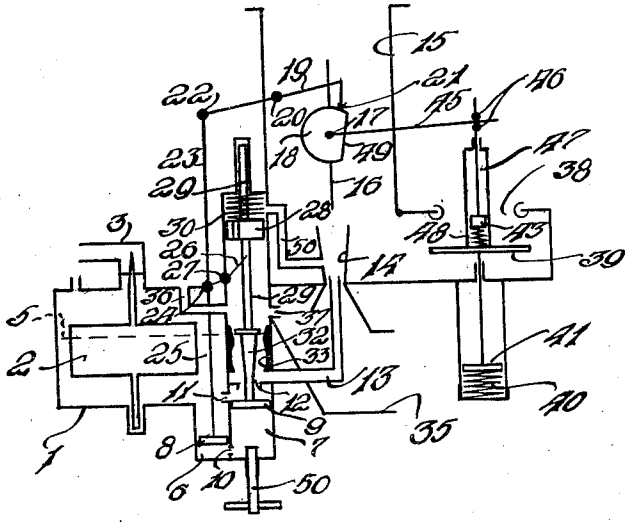


Fig. 2



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Fig. 3

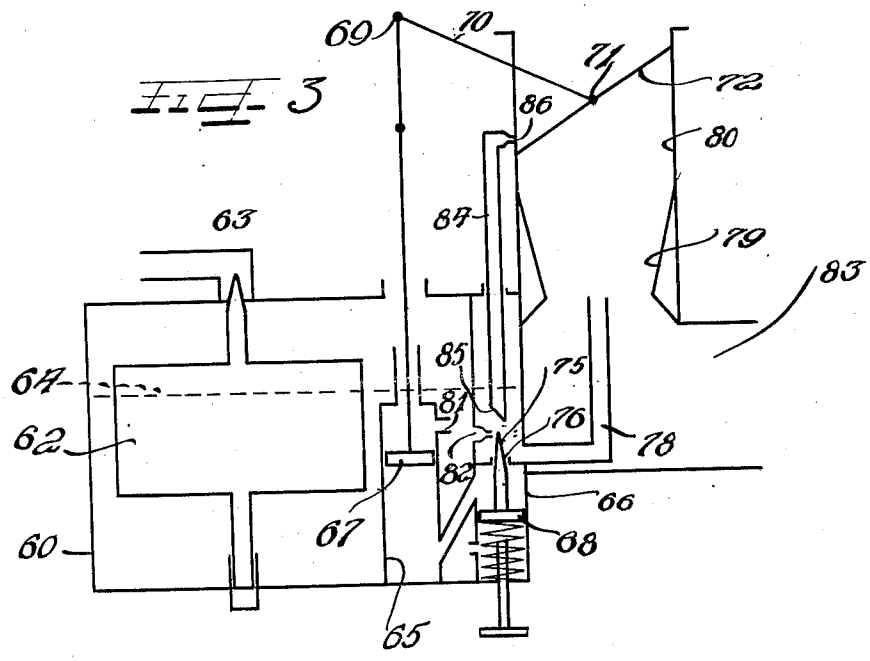
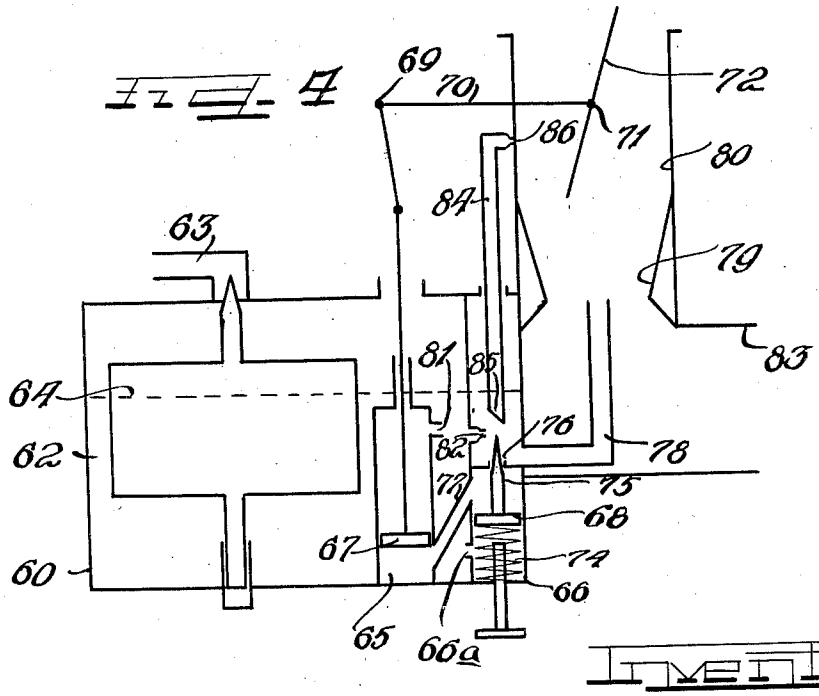


Fig. 4



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Patented May 31, 1932

1,861,352

UNITED STATES PATENT OFFICE

PANTALEON E. MIQUELON, OF CHICAGO, ILLINOIS

CARBURETOR

Application filed March 14, 1927. Serial No. 175,057.

This invention relates to a carburetor for internal combustion engines used in automobiles and the like.

It is an object of this invention to provide a carburetor which will permit a very rapid acceleration of the engine due to positive hydraulic means which are provided for supplying additional quantities of air and fuel upon the opening of the throttle valve.

It is a further important object of this invention to provide a carburetor wherein hydraulic means actuated by the throttle valve are provided to supply metered additional quantities of fuel to the engine upon the opening movement of the throttle valve.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

This invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a diagrammatic elevational view of a carburetor embodying the principles of my invention, showing the throttle valve in closed position.

Figure 2 is a similar diagrammatic elevational view showing the throttle valve in open position.

Figure 3 is a diagrammatic elevational view of a modified form of my invention, showing the throttle valve in closed position.

Figure 4 is a similar diagrammatic elevational view showing the throttle valve in open position.

As shown on the drawings:

In Figures 1 and 2 the reference numeral 1 indicates the shell of a carburetor embodying the principles of my invention adapted for use with internal combustion engines burning gasoline or similar volatile fuel. The carburetor is provided with the usual type of float 2 for controlling the flow of fuel into the carburetor through a fuel intake pipe 3. The float 2 maintains the liquid fuel in the carburetor at a normal level indicated by the dotted line 5, in accordance with well known principles.

The carburetor shell 1 is so formed as to provide adjacent cylinders 6 and 7, in which are mounted for reciprocating movement plungers 8 and 9 respectively. A calibrated lower port 10 forms a communicating passage between said cylinders 6 and 7, and a port 11 affords communication between the fuel chamber and the cylinder 7. A top port 12 in the cylinder 7 communicates with a fuel discharge line 13 leading to the constricted portion of a Venturi nozzle 14. The Venturi nozzle 14 opens into a mixing chamber 15 leading to the engine.

Within the mixing chamber 15 there is positioned a butterfly type of throttle valve 16 such as is commonly used in carburetors. On the axis 17 of said throttle valve 16 there is mounted a cam 18 lying outside of the carburetor shell. A lever 19 pivoted as at 20 is provided at one end with a shoe 21 adapted to ride upon the surface of the cam 18. The other end of said lever 19 is pivotally connected as at 22 to a vertical link 23, which in turn is connected as at 24 to the plunger arm 25 of the plunger 8. A bell crank lever 26 pivoted as at 27 is connected at one end to the point 24 on the link 23. The other end of said bell crank lever 26 normally rests against the lower surface of a plunger 28 secured to the shaft 29 of the plunger 9. Above the plunger 28 there is mounted a helical spring 30, normally held under slight compression between the plunger 28 and the upper end of the cylinder 7. The shaft 29 also carries a tapered valve plug 32 adapted, as shown in Figure 1, to partially close the valve port 12. Above the valve port 12 in the cylinder 7 there is provided a varyingly constricted portion 33 through which air may normally pass to the nozzle 13. The flow of air through the constricted portion 33 is further controlled by means of a disk 34 on the shaft 29.

The main air supply is through a pipe 35 leading to the base of the Venturi nozzle 14. A certain amount of air is however constantly admitted through a pipe 36 opening to the atmosphere communicating through the walls of the cylinders 7 above the fuel level by means of a port 37 with the pipe 35. An auxiliary air supply is also provided, com-

prising a valve port 38 controlled by a valve 39. Said valve 39 is normally held in closed position by means of a helical spring 40 confined beneath the lower end 41 of the valve stem 42. Means for opening the valve 39 comprise a plunger 43 within the cylinder 44, the plunger 43 being operated from the throttle valve 16 by means of a lever arm 45. Said lever arm 45 extends between rollers 46 carried by the stem 47 of the plunger 43. In the lower portion of said cylinder 44 there is provided a helical spring 48 to dampen the stroke of the plunger 43.

When the throttle valve 16 is closed, as shown in Figure 1, the shoe 21 rides upon a flattened portion 49 of the cam 18. The plunger 8 is therefore in raised position and the plunger 9 in its lowermost position resting substantially against a lower adjustable stop 50. In this position, the auxiliary air valve 39 is also closed. Fuel accordingly enters the nozzle 13 through the port 11 and the partially closed port 12. Air enters the Venturi nozzle 14 through the main air pipe 35 and through the passage 36 and opening 37.

As soon as the throttle valve 16 is opened, as shown in Figure 2, the shoe 21 rides up upon the curved surface of the cam 18, thus elevating that end of the lever 19. The vertical link 23 is thereby depressed causing a downward displacement of the plunger 8 in the cylinder 6. The fuel in said cylinder 6 is thus expelled through the calibrated port 10 into the cylinder 7 where it exerts an upward pressure against the plunger 9 to raise the same. Upward movement of the plunger 9 effects the displacement of a measured quantity of additional liquid through the port 12 and nozzle 13. This quantity, as will be obvious is governed by the calibration of the passages and by the pressure differential existing by virtue of the head existing between the fuel level 5 and the pipe 13. At the same time the plunger 28 works against the compression of the spring 30 to displace a measured quantity of air from the space above the plunger 28 out through a pipe 50 into the Venturi nozzle 14 above its constricted portion. This additional amount of fuel and air serve to provide the necessary feed to the engine for its rapid acceleration. The supply of air is further supplemented by the opening of the auxiliary valve port 38. This is accomplished upon the opening of the throttle valve 16 by accompanying depression of the plunger rod 47 and plunger 43 acting to compress the springs 48 and 40. This arrangement makes it possible to use a heavier spring 40 which is desirable for steady low speed operation, while a properly graduated additional air supply at higher speeds and loads is also assured by the throttle connections 43, 45, 49, and the spring 48. For example, with the throttle in open position, upon an increase in load and a consequent decrease in suction the required additional air will be assured by the position of the throttle connections even though a heavier spring 40 is used.

It will be understood that the additional measured quantities of fuel and air are furnished only at the moment of the opening of the throttle valve, thus meeting the engine's requirements for an instantaneous supply of enriched fuel. As soon as the throttle valve 16 is again closed, the tension of the spring 30 causes the plunger shaft 29 to move downwardly carrying with it the plunger 28. Said plunger 28 contacts the bell crank lever 26 and rocks the same to lift the plunger 8 back to normal position.

In Figures 3 and 4 are shown a modified type of my invention wherein the reference numeral 60 indicates a carburetor shell and 62 a float for controlling the inlet of fuel thereto through the inlet feed pipe 63. The normal level of the fuel is indicated by the dotted line 64. As before, there are provided two cylinders 65 and 66 in which are reciprocally mounted the plungers 67 and 68 respectively. The plunger 67 is link connected as at 69 to a lever 70, which in turn is rigidly connected to the axis 71 of a throttle valve 72. The plunger 68 is adapted to rest upon a coiled spring 74 within the cylinder 66, said plunger 68 carrying a conically pointed needle valve 75 adapted to close a port 76. A communicating passage 77 joins the lower portion of the cylinder 65 with the cylinder 66 above the plunger 68. The port 76 opens into a nozzle 78 leading to the constricted portion of a Venturi nozzle 79 in the feed line 80 leading to the engine.

The upper portion of the cylinder 65 is in open communication through the opening 81 with the interior of the carburetor below the level of the fuel. The cylinder 66 is similarly in communication with the interior of the carburetor through an opening 82. The main air supply is obtained through the pipe 83 which is in open communication with the Venturi nozzle 79. An auxiliary fuel supply is provided by a tube 84 having its lower end 85 opening beneath the fuel level 64 and its upper end 86 opening into the feed line 80 above the throttle valve 72. When the throttle valve 72 is in closed position, as shown in Figure 3, the plunger 67 is at the uppermost limit of its stroke, as is also the plunger 68. The valve port 76 is accordingly substantially closed by the needle valve 75. As soon as the throttle valve 72 is opened, the plunger 67 is depressed, thus displacing a measured amount of fuel through the communicating passage 77 into the cylinder 66. The plunger 68 is temporarily depressed by the increased pressure of the fuel and the valve port 76 opened to permit the fuel to be forced into the nozzle 78. This additional measured quantity of fuel is calculated to be sufficient

to meet the needs of the engine during its period of rapid acceleration. As soon as the throttle valve 72 stops in its movement to open position, the spring 74 returns the plunger 68 to its normal position, thereby closing the port 76. When the throttle is closed the plunger 67 is again elevated and fuel drawn into the lower portion of the cylinder 65 through the opening 81 and around the plunger 67.

The cylinder 66 is supplied with fuel for discharge through the port 76 at all times through an opening 66*a* so that whenever the throttle is moved towards open position the required additional supply of fuel is assured regardless of the position from which the throttle is so moved.

I am aware that many changes may be made, and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted hereon, otherwise than necessitated by the prior art.

I claim as my invention:

1. In a carburetor, a source of fuel supply, a nozzle communicating therewith including a discharge orifice and a metering pin, a throttle valve and cooperating plungers normally disposed in a plane below that of the fuel level of the source of fuel supply and actuated by opening movement of said throttle valve to move said metering pin in a direction increasing the effective area of said orifice.

2. In a carburetor, a source of fuel supply, a nozzle communicating therewith and including a discharge orifice and metering pin, a throttle valve, a plunger operating beneath the fuel level of the source of fuel supply and actuated by said throttle valve and a second plunger actuated by said first plunger upon opening movement of said throttle valve to move said metering pin to increase the effective area of said orifice.

3. In a carburetor, a source of fuel supply, a variable area nozzle including an orifice and a metering pin, communicating with said source of fuel supply, a throttle valve to move the metering pin to increase the area of said orifice, other independent means operable in the further opening of the throttle valve to further move the metering pin in accordance with the air flow through the carburetor and means providing a dash pot for said metering pin in any position thereof relative to the throttle opening.

4. In a carburetor, a source of fuel supply, a variable area nozzle including an orifice and a metering pin, communicating with said source of fuel supply, a throttle valve, means operative in the initial opening of the throttle valve to move the metering pin to increase the area of said orifice, other means operable in the further opening of the throttle valve to further move the metering pin in accordance with the air flow through the carburetor and means providing a dash pot for said metering pin in any position thereof relative to the throttle opening, said last mentioned means being substantially inoperative as a dash pot during throttle valve movements.

5. A carburetor embodying therein a source of fuel supply, a throttle valve, a pair of cylinders in communication with each other and with said fuel supply, means in one of said cylinders providing a nozzle orifice, a plunger in each cylinder, one of said plungers including a metering pin cooperating with said means providing said orifice to control the effective area thereof, linkage connecting the other plunger with said throttle and means operated by said linkage in the initial movement of the throttle to impart an initial lift to the metering pin to enlarge the area of said orifice.

6. A carburetor embodying therein a source of fuel supply, a throttle valve, a pair of cylinders in communication with each other and with said fuel supply, means in one of said cylinders providing a nozzle orifice, a plunger in each cylinder, one of said plungers including a metering pin cooperating with said means providing said orifice to control the effective area thereof, linkage connecting the other plunger with said throttle, means operated by the linkage in the initial movement of the throttle to impart an initial lift to the metering pin to provide an initial enlargement of said orifice and means actuated by the air flow through the carburetor in the further opening of the throttle to impart a further lift to said metering pin and provide a corresponding increase in area of said orifice.

7. In a carburetor, a source of fuel supply, a mixing chamber having a fuel discharge nozzle and means providing a supply of air, a throttle valve for the discharge of said mixing chamber, an air cylinder having its discharge communicating with said mixing chamber, a liquid fuel cylinder having its discharge communicating with said mixing chamber, plungers in said cylinders and connections between said plungers and said throttle valve for moving said plungers to positively expel fuel and air from their respective cylinders upon opening of said throttle valve.

In testimony whereof I have hereunto subscribed my name at Chicago, Cook County, Illinois.

PANTALEON E. MIQUELON.