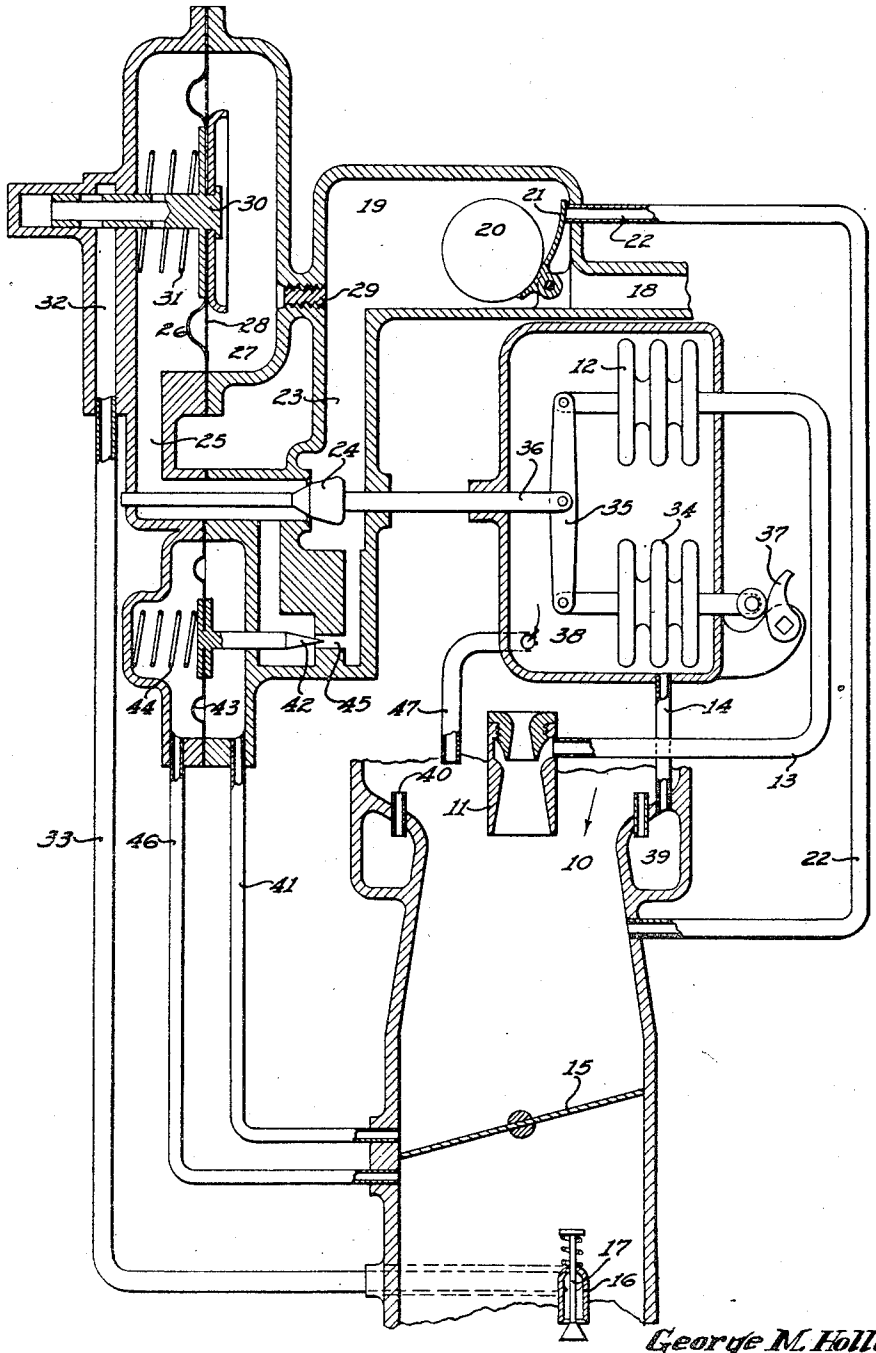
May 6, 1947. G. M. HOLLEY, JR 2,420,079

PRESSURE CARBURETOR

Filed Nov. 10, 1943



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Patented May 6, 1947 2,420,079

UNITED STATES PATENT OFFICE

2,420,079

PRESSURE CARBURETOR

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Application November 10, 1943, Serial No. 509,944

1 Claim. (Cl. 261—41)

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The object of this invention is to provide a pressure-type carburetor of the simplest possible construction consistent with proper compensation for altitude, load, and temperature. A minor object is to locate the vapor separator immediately before the fuel flows through the metering orifice. I have discovered that if there is any pressure regulating valve located between the metering orifice and the vapor separator, the pressure regulating valve causes a slight separation of the vapor from the fuel, and even a slight separation of vapor from fuel will seriously interfere with accurate metering of the flow of fuel through the fuel orifice.

In the drawing, 10 is the air entrance. 11 is the venturi located therein which creates a pressure difference responsive to the airflow, which pressure difference is applied to the bellows 12 through the pipes 13 and 14. Throttle 15 controls the airflow. Below the throttle 15, the fuel discharge outlet 16 is located in which there is a valve 17 which is seated by a spring and opened by fuel pressure. The fuel enters the carburetor at 18 and enters the chamber 19 in which is located a float 20 which controls the vapor separator valve 21 which allows the air or vapor to escape through the pipe 22 which discharges on the atmospheric side of the throttle 15. The fuel passes from the chamber 19 down the pipe 23 past the control valve 24 through the passage 25 into the chamber 26. Chamber 27 is separated from the chamber 26 by a diaphragm 28. Chamber 27 communicates with chamber 19 by the passage 29, which passage 29 is a helical passage to prevent surging. The diaphragm 28 supports the balanced valve 30. The diaphragm 28 is supported by the compression spring 31. The effect of pressure in the passage 25 is to close the valve 30. The tendency of the spring 31 is to open the valve 30 admitting fuel down the passage 32. The passage 32 communicates with the pipe 33 which is connected to the fuel outlet nozzle 16. The pressure responsive element 12 is coupled to the barometric responsive element 34 and the two are connected together by the arm 35 which is connected to the rod 36 which is connected to the valve 24. A cam 37 controls the position of the barometric element 34. Both pressure responsive elements are located in the chamber 38 which communicates through the passage 14 with the chamber 39 which is subjected to the impact of the air entering the carburetor through the pipe 40.

The idle fuel is controlled through the pipe 41 past the valve 42, which valve is controlled by

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the diaphragm 43, supported by the compression spring 44, fuel being supplied from the passage 23 through the bypass passage 45 controlled by the valve 42. A pipe 46 subjects the diaphragm 43 to a suction below the throttle when the throttle 15 is in the idle position. When the throttle 15 opens, substantially atmospheric pressure is restored to pipe 46 and the diaphragm 43 immediately thereafter closes the valve 42 and idle fuel is no longer supplied.

Operation

Assume that the engine is running with the throttle 15 slightly open. There is then a great suction adjacent to the downstream side of the downstream lip of the throttle 15. This causes a high suction in the pipe 46 which causes the diaphragm 43 to move to the left, compressing the spring 44 and admitting a little fuel from the inlet 18, bypassing the valve 24 and flowing into the chamber 26, moving the diaphragm 28 to the right and letting fuel flow out past the valve 30 down the passage 32, past the valve 17 and thus discharging through the nozzle 16.

When the throttle 15 is moved far enough so as to place the passage 46 on the atmospheric side of the downstream lip of the throttle 15, atmospheric pressure is transmitted through the passage 46 to the left-hand side of the diaphragm 43 causing the diaphragm 43 to move to the right under the influence of the spring 44 causing the needle 42 to close the bypass 45 and from there on, the fuel is controlled solely by the double tapered valve 24. The control of this valve is in response to the depression in the throat of the venturi 11. This depression is transmitted to the chamber 12 which moves the rod 36 to the right.

When the pressure becomes great enough as when at sea level, the element 34 is compressed and the valve 24 is moved to the right so that when the plane is flying in the extremely dense air which is found close to the earth's surface, it compensates for this abnormal condition. The dense air compresses the element 34 and thus opens the valve 24. The valve 24 is shown with double taper to make the mixture sufficiently rich to prevent the engine from over-heating. When running the engine there is a steady flow of air into the end of the chamber 38 up the pipe 14 and down the pipe 47 so that the air at atmospheric temperature is below that of the element 34 which contains a small quantity of air; hence 34 responds to both temperature and pressure. When the temperature gets high or the barometer gets low, the rod 36 moves to the left so as to restrict

the flow of fuel through passage 25. The function of the vapor separator 21—22 is no part of this invention and is merely added to show that there is a complete disclosure. The plug 29 is made to include a long, small helical passage so that the pressure acting in the chamber 27 is the average of that in 18 so that the pressure in chamber 19 can pulsate with the pulsations of the pump while the pressure in chamber 27 will be steady, being the average pressure of the pressure in chamber 19.

The pressure difference between the chamber 19 and the chamber 26 is maintained by the spring 31 and the valve 30 carried by the diaphragm 28. Variation in pressure in chamber 19 will not appreciably influence the mixture ratio.

What I claim is:

In a carburetor of the pressure type, a source of fuel under pressure, a pressure regulating control valve adapted to control the admission of the fuel to the engine, a moving wall controlling said valve, a passage connecting the two sides of said wall, a fuel flow controlling restriction in said passage, a portion of said passage connecting the chamber on one side of the moving wall with the entering fuel under pressure, the other side of the wall being subjected to the pressure on the downstream side of said restriction, a metering valve in said restriction, a venturi in the air entrance to the engine, means responsive to the depression in the throat of said venturi adapted to open said metering valve, a butterfly throttle, a low-

speed fuel control device associated therewith comprising a bypass around said fuel metering restriction, a valve adapted to control the flow through said bypass, yielding means adapted to close said valve, an air chamber having a moving wall, a passage connecting said air chamber to the air inlet on the downstream side of and adjacent to the downstream lip of said butterfly throttle, said second moving wall being connected to said bypass valve so that the engine suction is adapted to open the valve of the low speed fuel control device when the throttle is almost closed and when the throttle is opened past the idling position, the valve for the low speed fuel control device is closed.

GEORGE M. HOLLEY, JR.

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