

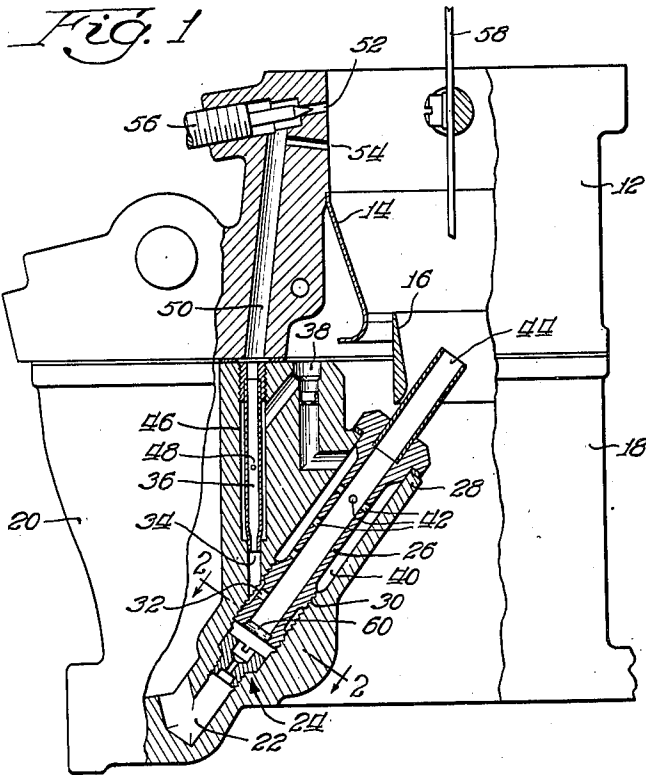
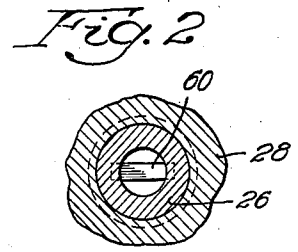
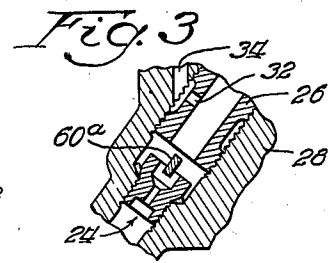
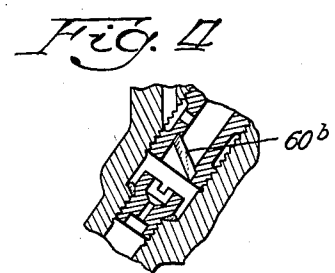
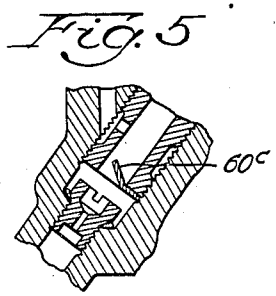
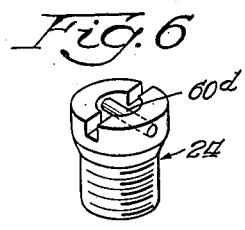
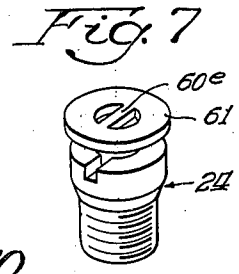
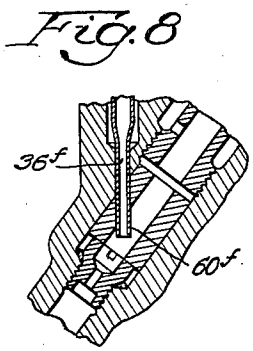
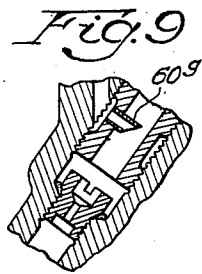
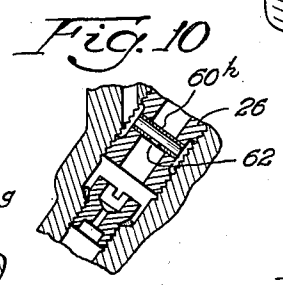
July 28, 1942.

J. E. STORER, JR

2,291,418

CARBURETOR

Filed Aug. 21, 1940



Inventor:
John E. Storer, Jr.
By Edward C. Gintzbaugh
Att'y

UNITED STATES PATENT OFFICE

2,291,418

CARBURETOR

John E. Storer, Jr., Flint, Mich., assignor to Borg-Warner Corporation, Chicago, Ill., a corporation of Illinois

Application August 21, 1940, Serial No. 353,449

1 Claim. (Cl. 261-41)

This invention relates to carburetors of the type wherein the idle jet takes its fuel supply from the lower portion of the main nozzle into which lower portion the fuel is delivered from the fuel reservoir by a power jet.

In the operation of such a carburetor, there sometimes occurs a hiatus in the delivery of the proper mixture from the carburetor and a consequent momentary misfiring of the engine, when the throttle is moved from a full open position to a position corresponding to a lower speed than cruising speed, i. e., about half open or slightly less. Where the carburetor is applied to aircraft, such mis-firing of the engine, even though restricted to only one or two cylinders, is particularly objectionable.

The general object of the invention is to improve upon the construction of the type of carburetor mentioned so as to prevent the occurrence of the above described condition. To this end the invention provides means for preventing the fuel stream issuing from the power jet from being projected past the inlet of the idle jet.

Other objects, the advantages and uses of my invention will become more apparent after reading the following specification and claim, and after consideration of the drawing forming a part of the specification, wherein:

Fig. 1 is an elevation of a carburetor, partly in section, embodying the invention.

Fig. 2 is a transverse sectional view of the main nozzle taken as indicated by the line 22 of Fig. 1.

Fig. 3 is a detailed sectional view illustrating a modified form of the invention.

Fig. 4 is a detailed sectional view illustrating another modification of the invention.

Fig. 5 is a detailed sectional view illustrating a still further modification of the invention.

Fig. 6 is a perspective view of another modification of the invention.

Fig. 7 is a perspective view of a further modification of the invention.

Fig. 8 is a sectional view of another modified form of the invention.

Fig. 9 is a sectional view of a still further modified form of the invention.

Fig. 10 is a sectional view of a still further modified form of the invention.

As an illustration of one form in which the invention may be embodied, there is shown in Fig. 1 a carburetor comprising a throttle barrel 12 in which is mounted a pair of Venturi tubes 14 and 16 which cooperate with the barrel 12 to form a fuel mixing passage. Secured to the barrel 12 is a skirt 18 through which air flows to the mixture

passage. Formed integral with the skirt 18 is a fuel bowl 20 from which fuel is adapted to flow through a fuel channel 22 to a power jet indicated generally at 24, which is threaded into the wall of the skirt 18 in axial alignment with the main nozzle 26, which is mounted in a tubular boss 28 formed inside of the skirt 18.

The lower end of the nozzle 26 is threaded as at 30 into the boss 28 and is provided with a delivery opening 32 through which fuel passes to the idle fuel orifice 34, formed in the lower end of the idle tube 36.

Air is adapted to pass through a nozzle air vent 38 into an annular passage 40 defined between the main nozzle 26 and the boss 28, and from the passage 40 the air may enter the main nozzle 26 through nozzle bleed holes 42 to form, together with the fuel that is being injected into the main nozzle by the power nozzle 24, an emulsion which is delivered from the main nozzle outlet 44 into the throat of the venturi 16.

From the vent 38, air may also flow to an annular passage 46 surrounding the idle nozzle 36, and then through idle vent 48 into the idle tube 36, there to form an emulsion which is delivered through an emulsion channel 50 formed in the wall of the barrel 12 to an idle delivery opening 52, controlled by a needle valve 54.

The flow of air through the mixing passage is controlled by a throttle valve 58 which when closed is adapted to establish high suction on its posterior side and to substantially cut off the flow of air through the mixing passage, thereby causing a rich mixture to be drawn from the idle opening 52 into mixing passage posterior of the valve 58. As the valve 58 opens, the outlet 54 will become operative to assist the outlet 52 in delivering the rich mixture, and with further opening of the throttle, the flow of air through the Venturi tubes will increase to a point where fuel will be delivered from the nozzle outlet 44 for high speed operation.

During such high speed or full throttle operation, the demand upon the high speed nozzle will be such as to cause a continuous stream of fuel to be projected from the power jet 24 and the idle system will be reversed so that air is drawn from idle fuel orifice 34 into main nozzle 26 through delivery opening 32. It has been found that in the high speed operation of this type of carburetor the stream of fuel from the jet 24 was projected beyond the inlet opening 32 of the idle jet, so that upon a sudden closing of the throttle from a wide open position, the momentum of the stream would momentarily pre-

vent it readily re-entering the idle jet to refill the idle system. This condition has been completely remedied by the present invention by the expedient of placing a baffle element in the path of the stream projected from the nozzle 24 so as to break up this stream and prevent it from being projected past the opening 32.

Such a baffle element, in one of its preferred forms, comprises simply a pin 60 mounted in the lower end of nozzle 26 and extending diametrically across the mouth, so that the stream of fuel issuing from the nozzle 24 may impinge thereon and be broken up, this form being illustrated in Fig. 1.

Instead of being mounted on the lower end of nozzle 26, the pin may be mounted in notches in the upper end of the nozzle 24, as indicated in Fig. 3, at 60a.

The baffle element may instead of being mounted at right angles to the axis of the nozzle, be mounted at an angle as shown at 60b in Fig. 4.

Instead of taking the form of a pin extending entirely across the nozzle mouth, the baffle element may be secured at one end and extend only part way across the nozzle bore as indicated at 60c in Fig. 5.

The pin 60d shown in Fig. 6, instead of being mounted in the notches in the end of the nozzle 24, is mounted in a position at right angles to said notches.

Instead of being in the form of a pin, the baffle element may, as shown in Fig. 7, be in the form of a washer 61 having an integral web portion 60e extending across the fuel passage.

In the modification of the invention shown in Fig. 8, the baffle is formed by an extension 60f on the end of the idle tube 36F.

In the modification of the invention shown in Fig. 9, the baffle element is in the form of a separate short tube 60g which comprises the inlet to the idle passage.

In Fig. 10, the baffle is likewise in the form of a tube forming the inlet to the idle passage, the tube 60h in this case extending entirely across the nozzle 26 and having an opening 62 through which fuel passes to the idle passage.

Tests have shown that the invention very effectively corrects the difficulty that has been experienced in connection with the sudden closing of the throttle after a period of wide open throt-

tle operation. For a long time, the problem remained unsolved until I realized that the condition was caused by the fuel being thrown past the idle inlet opening, and I devised the above disclosed solution to this problem.

While I have described my invention in connection with certain specific embodiments thereof, it is to be understood that this is not by way of limitation and that the scope of my invention is defined solely by the appended claim which should be construed as broadly as the prior art will permit.

I claim:

In a carburetor assembly including means defining a main air passage having a venturi therein, a butterfly throttle valve for controlling the flow therethrough and an upwardly extending nozzle having one end in communication with fuel from a fuel bowl, the other end being positioned within said venturi for delivering fuel thereto, said nozzle having a straight cylindrical bore leading from the inlet to the outlet thereof, means defining an idle fuel supply passage having the discharge end thereof under the control of said butterfly valve when moved to the idle position, said idle passage having an inlet terminal portion communicating directly with said nozzle bore at a point spaced along the axis of said bore from the inlet end thereof, means defining a metering power jet located below the inlet end of said nozzle bore for delivering fuel from said fuel bowl generally coaxially into said fuel nozzle bore, said arrangement being particularly characterized by the provision of a pin-like element projecting across the path of flow from said power jet at a point between said power jet defining means and said idle passage inlet, said pin-like element having a cross-sectional area less than the cross-sectional area of the bore of said nozzle, and being the sole obstruction to the free flow of fuel from said jet to the outlet of said nozzle, said power jet being directed against said pin-like element which functions to prevent the fuel from being projected beyond said idle inlet, thus providing a supply of fuel at said idle inlet to be drawn therein when said butterfly valve is moved to idle position to effect a change over from main nozzle feed to idle feed.

JOHN E. STORER, Jr.