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[54] **SKIRTED MAIN METERING JET FOR A CARBURETOR**

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[52] **U.S. Cl.** **261/51**
[51] **Int. Cl.** **F02m 7/22**
[58] **Field of Search** .... 261/51, 34 R, 34 A, 69 R

[56] **References Cited**

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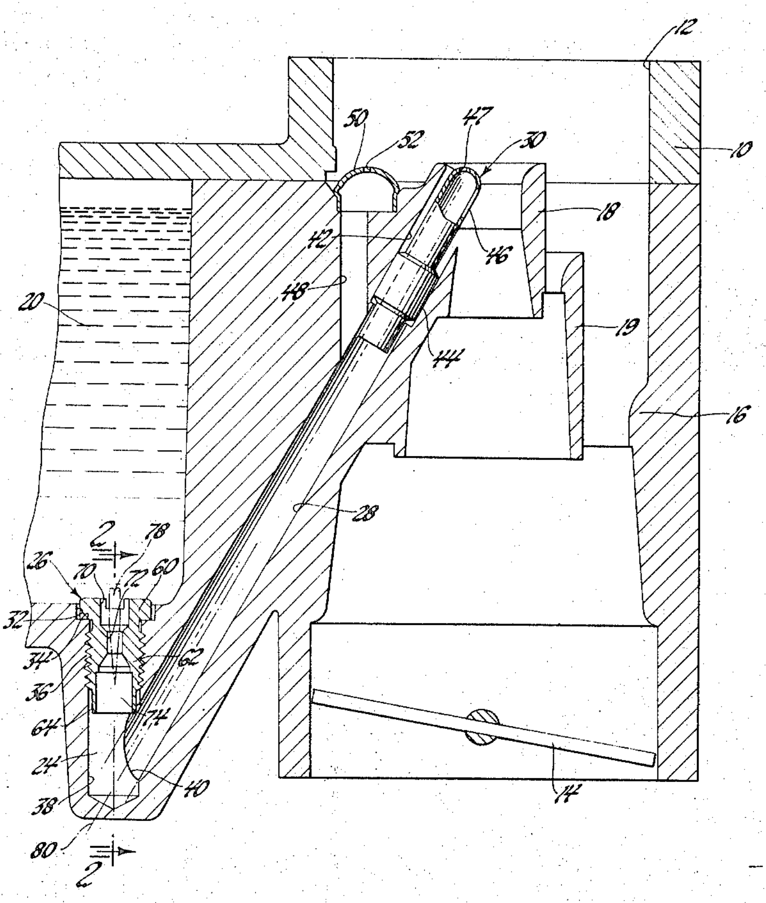
[57] **ABSTRACT**

The main metering jet in a carburetor for an internal combustion engine includes a cylindrical skirt depending below the intersection between the main fuel jet passage in which the main metering jet is disposed and the main fuel well passage leading to the carburetor mixture conduit. The skirt establishes a uniform turning point for the fuel from the jet irrespective of the angular manufacturing variations in the intersection of the two passages.

1 Claim, 3 Drawing Figures



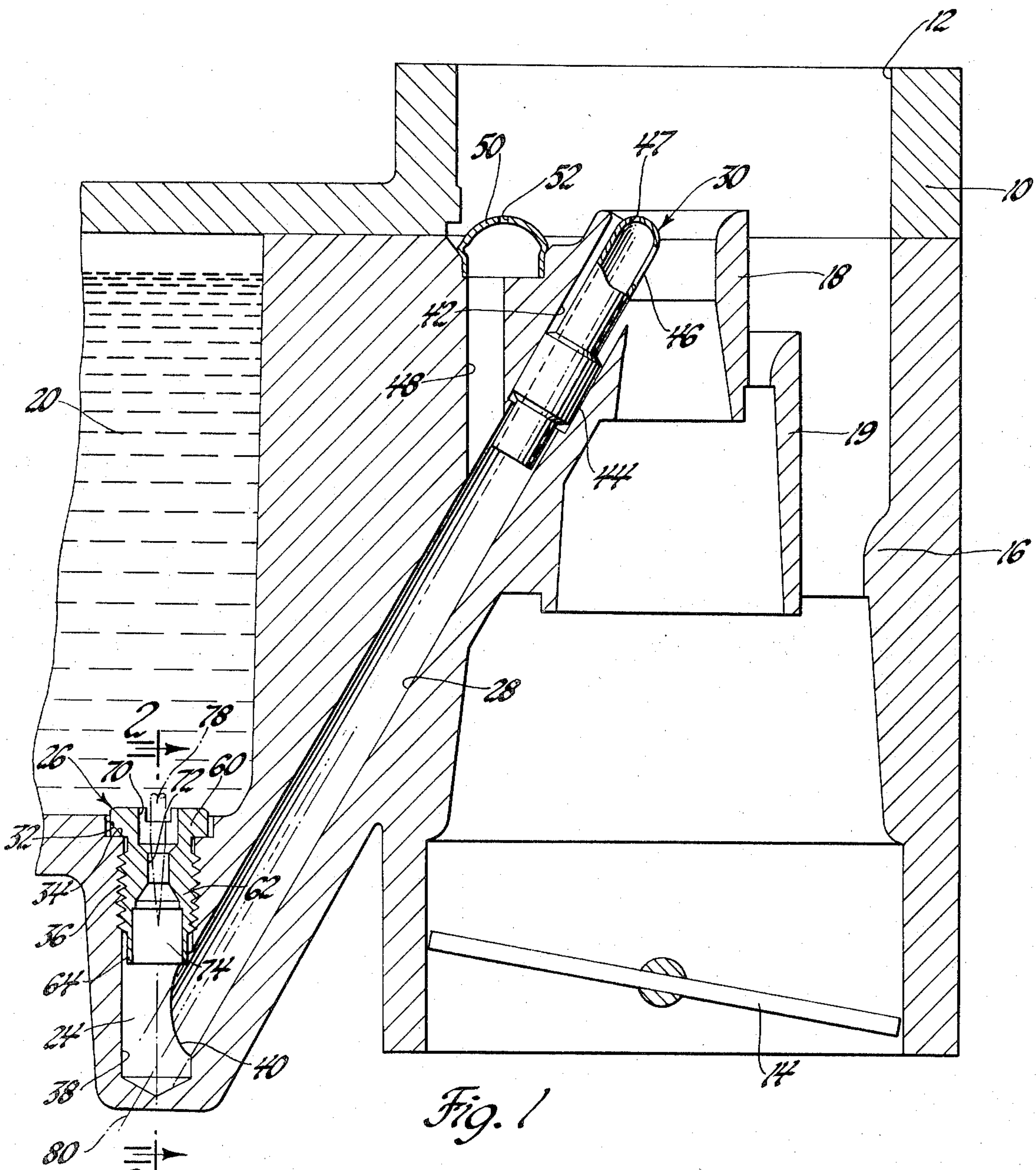


Fig. 1

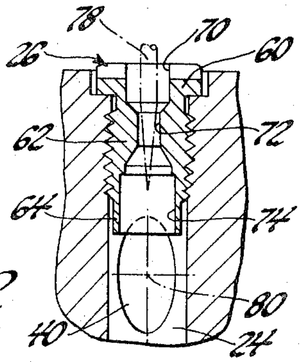


Fig. 2

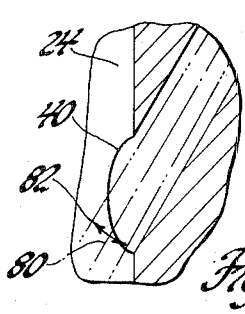


Fig. 3

SKIRTED MAIN METERING JET FOR A CARBURETOR

The present invention relates to carburetors for internal combustion engines and, in particular, to the main metering system for the delivering of fuel to the carburetor mixture conduit.

Current carburetors include a main fuel delivery system comprising a vertical passage leading from the fuel bowl which is intersected by an angularly disposed drilled passage discharging at the venturi section of the carburetor mixture conduit. A metering jet is disposed in the vertical passage. A throttle actuated metering rod controls the flow of fuel through the jet. Accurate metering of the fuel is necessary for proper operation of the system. It has been found that this metering capability is adversely affected by the tolerances incident to the intersection of the two passages.

In conventional systems, the main metering jet discharges above the intersection of the two passages. Due to the permissible angular variations in drilling the second passage, the axial location of the edge of the inlet to the second passage can vary considerably with respect to the jet. This has been found to cause large metering variations between carburetors in production. While it is not completely understood why this occurs, it is thought that the varying location of the intersection between the passages changes the turning point and thus the metering of the fuel between the jet passage and the angular fuel well passage.

The present invention provides a main metering jet construction which provides a uniform turning point for the fuel at the transition between the jet passage and the fuel well passage. This is achieved by including a depending cylindrical skirt at the discharge of the main metering jet. The lower edge of the skirt extends below the intersection of the two passages within the range of production tolerances for drilling the fuel well passage. Thus regardless of the actual position of the intersection, the skirt will extend into the projected envelope of the fuel well passage and will provide a fuel turning point interior thereof. Testing has shown that this construction provides accurate metering of the fuel irrespective of the aforementioned tolerances.

These and other features of the present invention will be apparent to one skilled in the art upon reading the following detailed description, reference being made to the accompanying drawings showing a preferred embodiment in which:

FIG. 1 is a partial cross sectional view of a carburetor having a fuel supply system including a skirted main metering jet with metering rod removed made in accordance with the present invention;

FIG. 2 is a view taken along line 2—2 of FIG. 1 showing the position of the main metering jet with respect to the intersection between the passages.

FIG. 3 is a schematic view illustrating the effect of drilling tolerances on the location of the intersection between the passages.

Referring to the drawings, there is shown a carburetor 10 having a vertical mixture conduit 12 for downwardly delivering a mixture of fuel and air to an internal combustion engine as controlled by the opening and closing of a throttle valve 14. The mixture conduit 12 includes a conventional main venturi 16. Conventional first and second boost venturiis 18, 19 are disposed in the mixture conduit 12.

The carburetor 10 further includes a covered fuel bowl 20. The supply of fuel entering the fuel bowl 20 is controlled by a float mechanism not shown.

The main fuel supply system for delivering fuel from the bowl 20 to the mixture conduit 12 includes a vertical main fuel jet passage 24, a main metering jet 26 disposed in the jet passage 24, and an angularly disposed fuel well passage 28 extending from the jet passage 24 to the boost venturi 18, and a main discharge fuel nozzle 30 disposed in the upper end of the well passage 28.

The jet passage 24 is drilled vertically from the lower surface of the fuel bowl 20. The jet passage 24 includes an upper counterbore 32 having an accurately machined annular seating surface 34, an intermediate threaded section 36, and a lower cylindrical bore 38.

The well fuel passage 28 is drilled from the boost venturi 18 and angularly intersects the passage 24 at an elliptical inlet 40. An enlarged counterbore 42 is formed at the upper end of the well passage 28 adjacent the upper boost venturi 18.

The fuel discharge nozzle 30 is a conventional tubular construction. The nozzle includes an enlarged cylindrical section 44 which is pressed into the counterbore 42 to locate the nozzle 30 in the mixture conduit 12. The discharge nozzle 30 includes a downwardly directed discharge opening 46 and an upper air bleed passage 47. A vertical air bleed passage 48 intersects the well passage 28 below the nozzle 30. An air bleed cap 50 including an orifice 52 regulates the air bleed through the passage 48.

The main metering jet 26 includes an upper circular head section 60, an intermediate threaded shank 62, and a depending cylindrical skirt 64. The head section 60 includes a lower annular seating surface which engages the seating surface 34 of the counterbore 32. When the threaded shank 62 is threadably disposed in the threaded section 36 of the jet passage 24 the skirt 64 depends downwardly into the bore 38.

The main metering jet 26 includes an axially disposed fuel metering passage comprising an upper bore 70, an intermediate restricted metering orifice 72, and a lower discharge bore 74. As shown in FIG. 2, a tapered metering rod 78 actuated by the carburetor throttle linkage (not shown) controls the flow of fuel through the jet 26.

In operation, as the throttle valve 14 is opened the resulting pressure drop at the venturi 18 draws fuel from the bowl 20 through the jet 26 into the passage 24. The fuel then is drawn upwardly in the well passage 28, mixed with air from the air bleed passages 47, 48 and discharged from the opening 46 into the mixture conduit 12 for delivery to the engine.

However, it has been found that the fuel metering to the conduit 12 can be affected by the geometry of the fuel supply system and, in particular, the location of the inlet 40 with respect to the jet 26. As shown in FIG. 3, the well passage has a nominal axis 80. Due to normal production tolerances incident to the drilling of the passage 28, the actual axis will be located with a tolerance cone 82, typically having an included angle of around 2°. This causes the opening 40 and the jet passage 24 to vary axially with respect to the axis of the jet passage 24. For a 2.5 inch passage 28, the axial variation is around 0.090 inch. Absent the skirt 64, it is thought this results in a varying turning point for the fuel flowing between the passages 24, 28 and affects the metering fuel in the system.

The cylindrical skirt 64 of the present invention extends below the upper edge of the opening 40 for all tolerances incident to the drilling. In other words, the lower rim of the skirt 64 projects interior of the projected cylindrical envelope of the well passage 28. For a 0.170 inch diameter well passage 28 and the above angular tolerances, a penetration of the envelope of at least 0.020 is thought to be desirable. Inasmuch as the rim and the opening 40 can be accurately located with respect to the surface 34, the easily obtained accurate referencing the skirt 64 to the seating surface of the head section 60 will ensure a uniform turning point for the fuel irrespective of the angular tolerances. This in turn has been found to provide accurate fuel metering despite manufacturing variations in the geometry of the fuel passage.

Although only one form of this invention has been shown and described, other forms will be readily apparent to those skilled in the art. Therefore, it is not intended to limit the scope of this invention by the embodiment selected for the purpose of this disclosure but only by the claims which follow.

What is claimed is:

1. A carburetor for an internal combustion engine comprising: a mixture conduit; a fuel supply; a fuel metering system interconnecting said fuel supply and said mixture conduit including a first downwardly extending vertical passage communicating with said fuel supply; an annular seating surface surrounding said vertical passage; a second passage in said fuel metering system angularly disposed with respect to said first passage, said second passage having an outlet at said mixture conduit and an inlet at said first passage, said inlet being variably axially disposed within a predetermined tolerance of said seating surface; a metering jet having a shank section disposed on said first bore and a head section having a flat annular surface adjacent the shank section seated against said seating surface; a cylindrical skirt on said shank section, said skirt having a diameter smaller than said shank section, extending substantially below said shank section, and terminating with a lower rim spaced a predetermined distance from said flat annular surface of said head section, said predetermined distance being sufficient to ensure that said rim extends axially below the edge of said inlet of said second passage for all locations of said inlet within said predetermined tolerance to ensure that fuel is discharged at said skirt interior of the projected envelope of said second passage thereby defining a uniform turning point for fuel passing from said jet to said second passage irrespective of the relative locations of said passages.

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