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W. M. EWART

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VALVE

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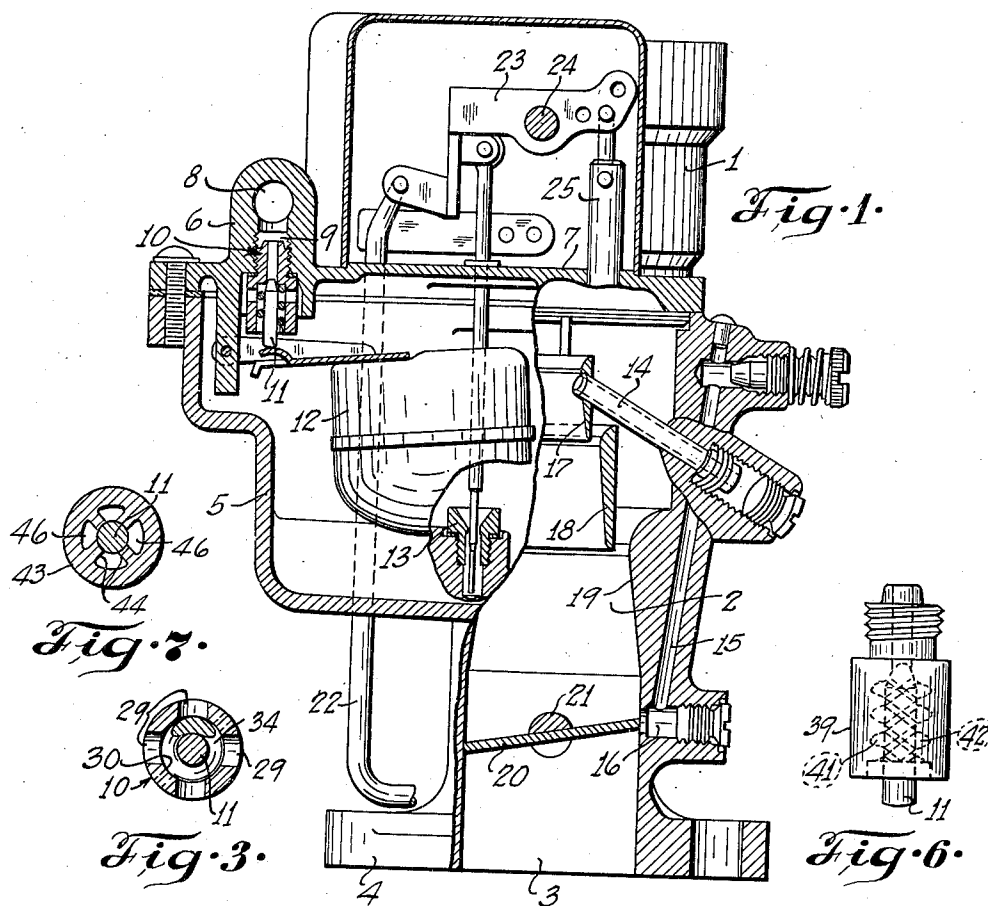


Fig. 2.

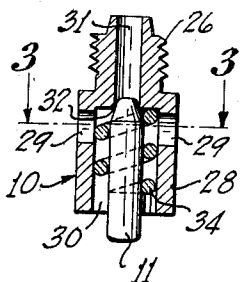


Fig. 4.

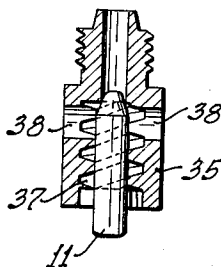
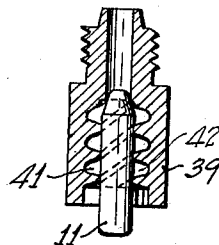


Fig. 5.



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VALVE

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1 Claim. (Cl. 251—133)

This invention relates to valves and consists in novel valve guide means applicable, particularly, to needle valve assemblies in internal combustion engine carburetors.

Carburetors for internal combustion engines, and particularly automotive engines, are ordinarily provided with float operated needle valves for controlling the admission of fuel to a constant level chamber. Fuel passes from this chamber through a calibrated orifice or jet to the mixing conduit and thence to the engine firing chambers. The needle valve structure frequently comprises a cylindrical seat or body member screwed into the cover or top portion of the fuel bowl, and a special, non-circular needle valve operating inside the seat member. The seat member is made inexpensively as a screw machine product of brass or similar metal, but the needle valve is made of special hard material, such as Monel metal, and, due to the special shape, is relatively expensive to manufacture.

An object of the present invention is to facilitate, simplify and cheapen the production of needle valve devices of the type described above.

A more detailed object is to provide a needle valve device in which both the seat member and the needle valve are generally cylindrical in form, the seat member being provided with means for guiding the needle valve while permitting fuel to flow freely past the valve when off its seat.

According to the present invention the passage of the valve seat member within which the needle valve is received is provided with structure extending along the walls thereof whereby the passage is adapted to closely fit the needle valve while providing space for the passage of fuel around the valve.

The above objects and other more detailed objects hereafter appearing are attained substantially by the structure illustrated in the accompanying drawing in which:

Figure 1 is a side view of a carburetor embodying the invention and shown sectionalized in part through the float bowl and in part through the mixture passage.

Figure 2 is an enlarged sectional view showing a portion of the structure in Figure 1.

Figure 3 is a section taken substantially on the line 3—3 of Figure 2.

Figures 4 and 5 are views similar to Figure 2 but showing other forms of the invention.

Figure 6 is an elevation of the structure in Figure 5 and

Figure 7 is a section similar to Figure 3 but showing still another modification.

The carburetor illustrated comprises broadly, a generally cylindrical body forming a downdraft mixture passage including an air inlet portion 1, a fuel and air mixing portion 2, and mixture outlet 3 flanged as at 4 for attachment to the intake manifold of an engine (not shown). At one side of the body is the float bowl 5. A fuel tank (not shown) is connected with the float bowl by means of a boss 6 formed integral with the cover 7 of the float bowl and having a horizontal bore 8 and vertical bore 9 threaded for receiving the needle valve assembly, generally indicated at 10. Needle valve 11 is controlled by float 12 to maintain fuel at a substantially constant level in bowl 5.

Fuel is fed from the float bowl through calibrated jet 13 to the main nozzle 14 and idling passages 15 and 16 in a manner well known in the art. Nozzle 14 terminates inside the smallest or primary venturi 17. Other venturis 18 20 and 19 are located beneath the primary venturi. A throttle valve 20 is pivotally mounted on shaft 21 in the lower portion of the mixture passage and is provided with a suitable crank (not shown) for manual operation. The throttle valve operates an accelerating pump through link 22 secured to the shaft 21 by means of a suitable crank or arm (not shown), and a lever 23 permanently pivoted at 24. Pump piston rod 25 is secured to lever 23 opposite link 22.

The needle valve assembly, shown substantially enlarged in Figure 2, includes a valve seat member having a threaded nipple 26 for attachment to boss 6 on the float bowl cover, and a lower portion 28 having lateral apertures 29 and longitudinal bore 30. Nipple 26 has a bore 31 substantially smaller than bore 30 and constituting an extension of bore 30. A shoulder 32 between bores 30 and 31 forms a valve seat for cooperating with the tapered extremity of needle valve 11 to control the passage of fuel through the seat member according to the position of the float. A coiled wire 34 is firmly lodged within bore 30 and snugly receives the cylindrical body portion of valve 11 so as to guide the valve in its movements towards and away from the valve seat.

When needle valve 11 is off its seat, fuel may pass around the tapered extremity of the valve and through lateral apertures 29 and the interstices between the helical coils of the wire 34 into the float bowl. If desired the apertures 29 may be omitted without seriously affecting the operation of the valve assembly.

In Figure 4, the lower portion 35 of the seat member has a central bore, in general, of a size

to snugly receive the cylindrical body portion of the needle valve 11. The wall of this bore is provided with a helical groove 37 extending substantially from end to end of the portion 35.

5 When the valve is off its seat, fuel may pass through the lateral apertures 38 and helical groove 37 into the float bowl.

10 In Figures 5 and 6, the portion 39 of the valve seat member has a longitudinal bore, as in the previous form, shaped to snugly receive needle valve 11. The bore is provided with a pair of grooves 41 and 42 extending helically around the wall thereof in opposite directions so as to intersect, as best shown in Figure 6. The device in this form functions substantially the same as that in Figure 4. No lateral apertures are shown adjacent to the valve seat.

15 Figure 7 is a sectional view showing the lower portion of a valve seat member 43 corresponding with the seat members shown in the previous forms. The inner wall of member 43 is provided with a plurality of ribs or offsets 44 which snugly receive the needle valve 11 while providing spaces 46 between the valve and wall of said member for facilitating passage of fuel when the valve is off its seat.

20 In each of the forms the valve seat member is of generally cylindrical construction so as to be readily formed in its entirety by screw machine operations. The needle valve is likewise generally cylindrical so as to be conveniently and inexpensively formed from standard, round metal stock. The modified cylindrical construction of the portion of the seat member which receives the needle valve provides for snugly guiding the valve while facilitating the passage of fuel therearound. The cut away, grooved, ridged, or offset interior wall of the seat member in each case

also substantially reduces the portion of this wall which would otherwise engage the valve stem and thus minimizes the chances of the valve sticking.

5 The seat member may be provided with grooves or ridges of other configuration shaped otherwise than in the forms shown and it may be advantageous in some instances to form the needle valve or the seat member or both non-round in section. These modifications and others as will occur to those skilled in the art may be made without departing from the spirit of the invention and the exclusive use of all such modifications as come within the scope of the appended claim is contemplated.

I claim:

15 A needle valve assembly for carburetors including a unitary body member of cylindrical shape with a central bore having a restricted upper portion comprising an annular valve seat and an annular open end, a cylindrical valve member 20 arranged in the bore of the body member and projecting below the same, said valve member being movable to and from said valve seat to control the passage therethrough, an actuator for engaging the valve member below the body member to move the same to closed position, and a relatively short spiral body inserted upwardly into the normally open end of said bore between the wall of the bore and said cylindrical valve member, and engaging these parts in a manner 30 to be retained in position by frictional engagement with the wall of the passageway and simultaneously snugly engaging said valve member in a manner permitting its guided opening by gravity, the passageway defined by said spiral body permitting discharge from said valve into the bore below said spiral body.

35 WILLIAM M. EWART.