Jan. 5, 1937. W. M. EWART 2,066,523

VALVE STRUCTURE

Filed May 20, 1936

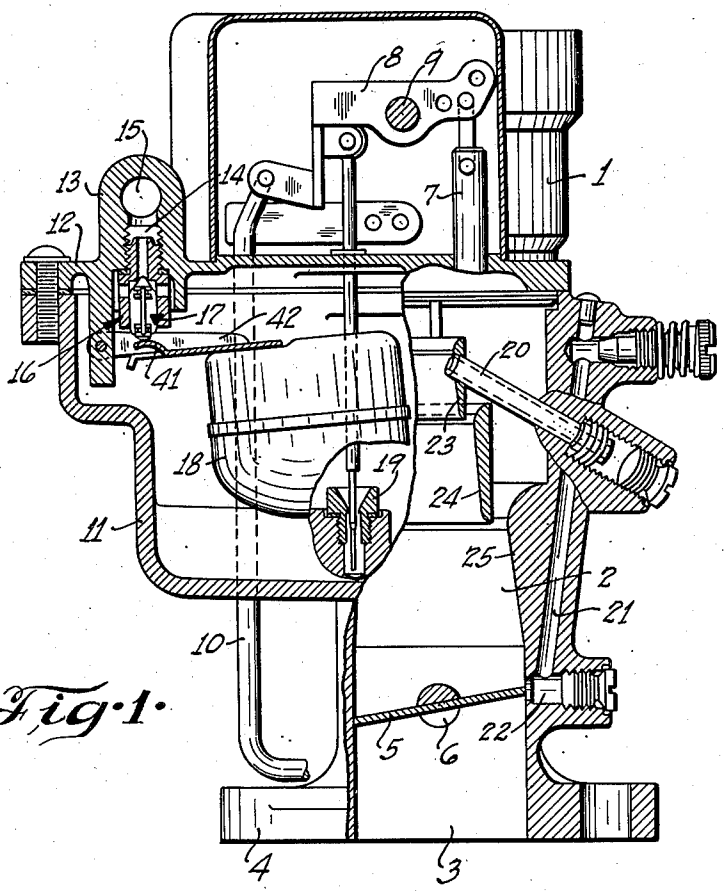
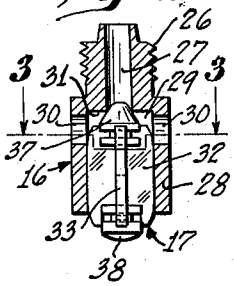


Fig. 1.

Fig. 2.



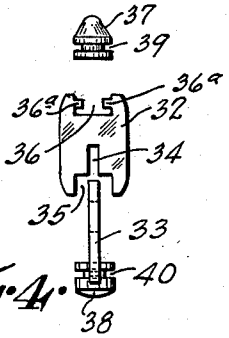
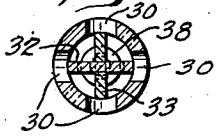


Fig. 4.

Fig. 3.



Inventor
William M. Ewart.
By Donald U. Rich
Attorney

Patented Jan. 5, 1937 2,066,523

UNITED STATES PATENT OFFICE

2,066,523

VALVE STRUCTURE

William M. Ewart, St. Louis, Mo., assignor to Carter Carburetor Corporation, St. Louis, Mo., a corporation of Delaware

Application May 20, 1936, Serial No. 80,737

1 Claim. (Cl. 251—27)

This invention relates to valves and consists in novel valve and 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 assembly 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 preferably 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 of the above type which may be formed in its entirety by ordinary machine operations and does not require specially shaped stock. Still another object is to provide a needle valve of alated construction so that the valve may fit relatively snugly within the bore of the seat member while permitting fluids to flow readily past the valve when off its seat.

According to the present invention, the needle valve is constructed substantially of a pair of intersecting, relatively thin plate elements and separately formed tip elements secured to the plate elements at each end.

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, sectionalized in part through the float bowl and in part through the mixture passage of the carburetor.

Figure 2 is an enlarged section showing a part of the structure in Figure 1.

Figure 3 is a horizontal section taken substantially on the line 3—3 of Figure 2, and

Figure 4 is a partially disassembled view of the valve member only.

The carburetor shown in Figure 1 includes a generally cylindrical body hollowed to form a downdraft mixture passage including an air inlet portion 1, mixing chamber 2 and outlet 3, flanged as at 4 for attachment to the intake conduit of an engine (not shown). A throttle valve 5 is pivotally mounted on shaft 6 near the lower portion of the carburetor and has a crank (not shown) for manual operation. The accelerating pump piston rod 7 is connected to the throttle by means of lever 8 permanently pivoted at 9, link 10, and a suitable crank or arm (not shown) rigid with the shaft 6. At the side of the mixture passage is a float bowl 11 with a cover 12 having a projecting boss 13 for attachment to a conduit connected with a fuel tank (not shown). Boss 13 has a central vertical bore 14 communicating with horizontal opening 15 and threaded for receiving the needle valve seat 16. The needle valve, generally indicated at 17, is controlled by float 18 to maintain fuel within the bowl 11 at a substantially constant level.

Fuel passes through the calibrated jet 19 to the main nozzle 20 and idling passages 21 and 22 in a manner well known in the art. Nozzle 20 terminates inside the primary venturi 23 which is concentric with additional venturis 24 and 25 in the interior of the mixture passage.

The needle valve seat member includes a threaded nipple 26 for attachment to boss 13 and having a longitudinal bore 27, and a lower portion 28 having a bore 29, substantially larger than bore 27, and lateral apertures 30. A shoulder 31 between bores 27 and 29 forms a valve seat.

The needle valve has a body portion formed of a pair of identical, relatively thin plate elements 32 and 33, having frictionally interfitting, longitudinal slots, as at 34. The outer portion of each slot 34, which opens through the edge of the plate element, is enlarged as at 35. At the opposite edge of each plate element is a recess 36 having a pair of restricted, inward offsets 36a projecting from the side walls thereof.

At the ends of the winged body portion formed by plates 32 and 33 are the separately formed tip elements 37 and 38 having annular grooves 39 and 40, and the former having a tapering portion for cooperating with the valve seat 31. The tip element 38 is adapted to be engaged by tongue 41 on the float arm 42 (Figure 1).

To assemble the needle valve, one of the tip elements 37 and 38 is inserted from the side into the recess 36 in each plate element, the off-sets 36a being received in the annular grooves 39 and 40, and the sides of the recesses extending along the sides of the tip elements. The plate elements 32 and 33 having tips 37 and 38 thus attached

thereto are then disposed in the manner indicated in Figure 4 and forced together with the longitudinal slots **34** interfitting. Each slot **34** preferably tightly receives the other plate element so as to form a tight frictional fit. When the plate elements are properly assembled, each tip element is held securely in position by the sides of tongued recess **36** in one plate and the sides of recess **35** in the other plate.

The plate elements **32** and **33** may be conveniently and inexpensively formed by a stamping operation and the tip elements are adapted for screw machine production. The four parts, that is, the two plate elements and the two tip elements may be assembled by hand or with the aid of a suitable jig or fixture.

When assembled, the valve member is formed of substantially longitudinal, alated construction with deep spaces between the wings which facilitate passage of fuel through the valve seat member when the needle valve is off its seat. The valve is rugged, functions well in the intended manner, and is relatively simple and inexpensive to manufacture.

The invention is not limited to the structure shown, but may be modified in various respects as will occur to those skilled in the art and the exclusive use of all such modifications as come within the scope of the appended claim is contemplated.

I claim:

In a needle valve, a body portion comprising a pair of plates secured together by means of tightly interfitting slots extending from opposite edges thereof, said plates having recesses in their edges opposite the edges through which said slots open and the open ends of said slots being enlarged and there being offset structure in each of said recesses, the open end of each of said slots being adjacent one of said recesses in the assembly, and a separately formed tip element in each of said recesses and the adjacent enlarged slot portion, said tip elements being undercut to receive said offset structure to secure together said body portion and said tip elements.

WILLIAM M. EWART.