Nov. 29, 1955 M. W. JENSEN 2,725,212

FUEL CARBURETOR ADJUSTMENT VALVE

Filed June 7, 1951

Fig. 1

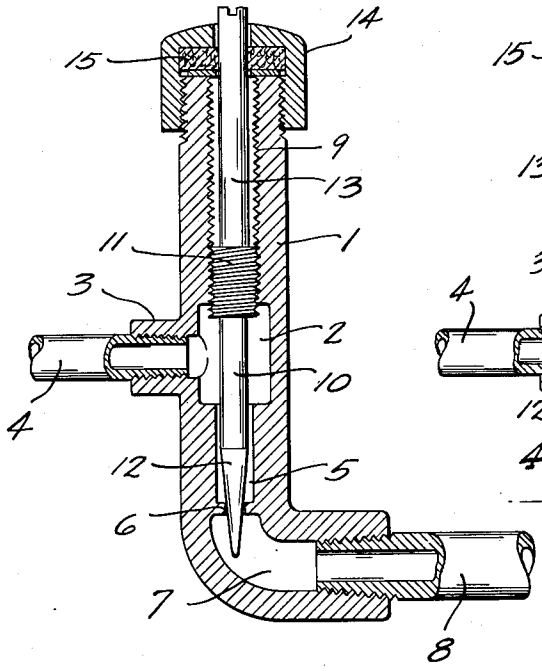


Fig. 2

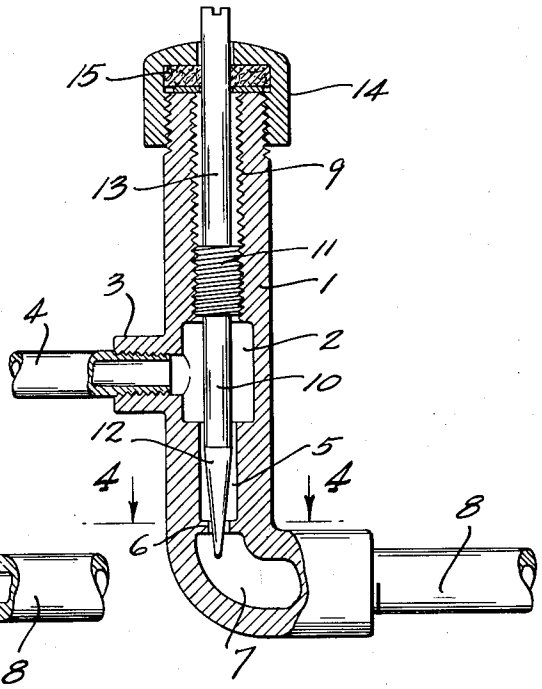


Fig. 3

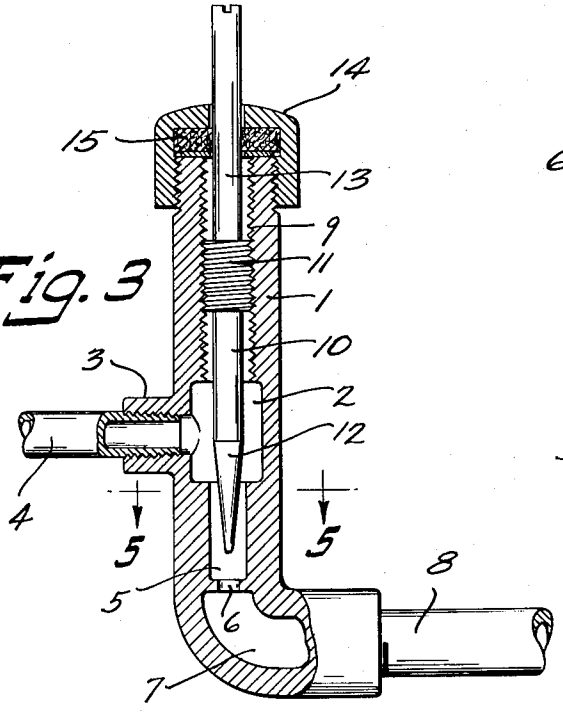


Fig. 4

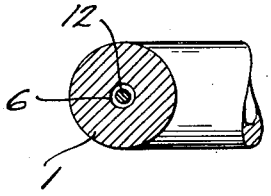
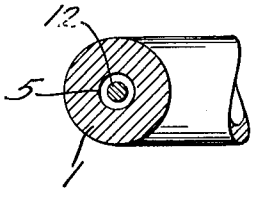


Fig. 5



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FUEL CARBURETOR ADJUSTMENT VALVE

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1 Claim. (Cl. 251—122)

This invention relates to valves, particularly as employed in carburetors for regulating the delivery of liquid fuels.

The invention provides a needle valve unit for use in engine carburetors using alternatively different fuels which have either different physical properties or different heating values or both so that such fuels must be delivered at widely different volumetric, controlled rates of flow for a given engine operation.

The principal object of the invention is to regulate similarly both fuels with a given adjustment of a single valve unit.

A more particular object is to provide a single valve unit having two restricted orifices of different sizes selectively capable of adjustment.

A further object is to provide an arcuate, sensitive control of the flow of either of both fuels using a single valve unit.

Another object is to provide full control of flow of liquid fuel between ranges corresponding to the range of engine requirements of the respective fuels.

These and other objects and advantages will be more fully set forth in the following description of a preferred embodiment of the invention for use in regulating the delivery of alcohol and gasoline fuels, as illustrated in the accompanying drawing.

In the drawing:

Figure 1 is a transverse vertical section of the valve unit showing the valve closed;

Fig. 2 is a view similar to Fig. 1 showing the valve in an open intermediate position of adjustment as for a gasoline base fuel;

Fig. 3 is a view similar to Fig. 1 showing the valve in an intermediate position of adjustment as for an alcohol base fuel;

Fig. 4 is a section taken on line 4—4 of Fig. 2 showing the smaller orifice regulated as for a gasoline base fuel; and

Fig. 5 is a section taken on line 5—5 of Fig. 3 showing the larger orifice regulated as for an alcohol base fuel.

The body 1 of the valve unit shown in the drawing is provided with the inner chamber 2. The threaded connector 3 adjacent chamber 2 secures the threaded end of conduit 4 which is adapted to deliver the selected fuel to chamber 2 from suitable supply means, not shown.

The bore 5 in the valve body 1 extends downwardly from chamber 2 to the lower end of the unit. Bore 5 opens through the smaller, restricted passage 6 in body 1 and into the lower cavity 7 of the body. The threaded end of the conduit 8 is connected to the lower end of body 1 to receive the fuel from cavity 7 and is adapted to deliver the fuel to the carburetor mixing chamber, not shown.

The threaded bore 9 in valve body 1 opens upwardly thereof from chamber 2 and is accurately aligned with bore 5 and restricted passage 6. The round valve stem 10 includes an enlarged threaded section 11 which fits the

threads of bore 9 to movably support the stem in the valve body.

Stem 10 extends into bore 5 with the tapered end 12 thereof extending through passage 6 to close the latter in the valve position shown in Figure 1.

The upper end 13 of stem 10 projects from the valve body and is adapted to be turned manually or with a suitable tool, not shown, to move the stem to several ranges of fuel adjustment provided and to various positions of adjustment within the ranges provided.

The cap 14 threaded on the upper end of the valve body 1 retains the packing 15 which seals the valve against leakage.

Stem 10 is movable lengthwise within valve body 1 by turning in bore 9. With each revolution of the stem, the tapered end 12 of the stem is moved a certain distance equal to the pitch of the threads of bore 9.

From the closed position shown in Figure 1 the stem 10 is moved upwardly by turning the stem in bore 9 thereby withdrawing the tapered end 12 of the stem from the restricted passage 6 of valve body 1. As the tapered end 12 is withdrawn the orifice between body 1 forming passage 6 and the end 12 of stem 10 is gradually enlarged and the restriction effected by the stem to the flow of the fuel through passage 6 is gradually reduced until the maximum desired opening of passage 6 to the flow of the fuel is reached. The range of control between the maximum referred to and the minimum approaching full closure of passage 6 is intended to accommodate the lighter fuel, particularly gasoline.

It should be noted that the clearance between stem 10 and bore 5 should provide a total area sufficient to accommodate the maximum desired flow of fuel in the range provided.

From the maximum required opening of passage 6 the stem 10 may be moved further upwardly by continued turning of the stem thereby withdrawing the tapered end 12 of stem 10 from bore 5. As the tapered end 12 is withdrawn the orifice in bore 5 between the valve body and the tapered end 12 of stem 10 is enlarged and the restriction effected by the stem to the flow of fuel through bore 5 is gradually reduced until the desired maximum opening of bore 5 to the flow of the fuel is reached. Passage 6 must necessarily be of sufficient size to accommodate the maximum desired flow of the heavier fuels. The range of control between the minimum and maximum referred to immediately above will accommodate the heavier fuels such as kerosene base fuels.

Generally the variable restriction of passage 6 for controlling the flow of lighter fuels is effected by the smaller portion of the end 12 of stem 10 while the variable restriction of bore 5 for controlling the flow of heavier fuels is effected by the larger part of the end 12 of the stem.

The relative diameters of the different parts of the stem respectively opening or closing bore 5 and passage 6, provides a comparable degree of adjustment of the flow of the particular heavier or lighter fuel with a given turn of the stem within the respective range of adjustment. That is, a given turn of stem 10 in one range which alters only noticeably the engine speed or output when operating on one fuel will also only noticeably alter the engine performance on the other fuel when the stem is equally turned in the corresponding other range.

The invention is particularly unique in providing the full equivalent of two valves in the structure of a single valve employing no additional parts and existing valves are easily converted to the dual range for such different fuels.

Various embodiments of the invention may be employed within the scope of the following claim.

I claim:

In a valve for controlling within separate ranges the

flow of different liquid fuels for separate alternative use in an engine carburetor and the like, a valve body having a valve chamber including communicating axially aligned larger and smaller cylindrical bores and a threaded valve member carried by said valve body and including a cylindrical stem extending through said larger bore and having a tapered end portion extending into said smaller bore to close the bore, said member being movable axially by turning to open said smaller bore and to withdraw the same progressively from said larger bore into an enlarged portion of said valve chamber, the tapered end portion of said member and said smaller bore being dimensioned to provide a maximum flow of a fuel within a given range upon withdrawal of the tapered end portion of said member whereupon the relative dimensions of the stem of the valve member and larger bore are effective to provide a

minimum flow of a second fuel within a separate higher range, the smaller bore when entirely opened being of a size to allow the increased flow of the second fuel to the maximum of said second range upon the withdrawal of the tapered end portion of the valve member from said larger bore.

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