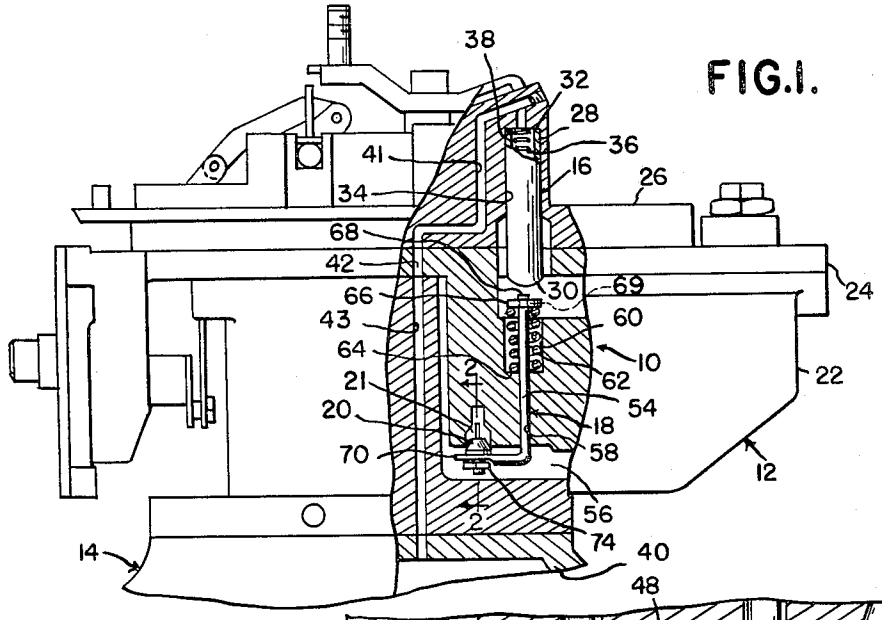
March 9, 1965 N. M. ROMEO ETAL 3,172,923

POWER VALVE

Filed Feb. 27, 1961

FIG.1.



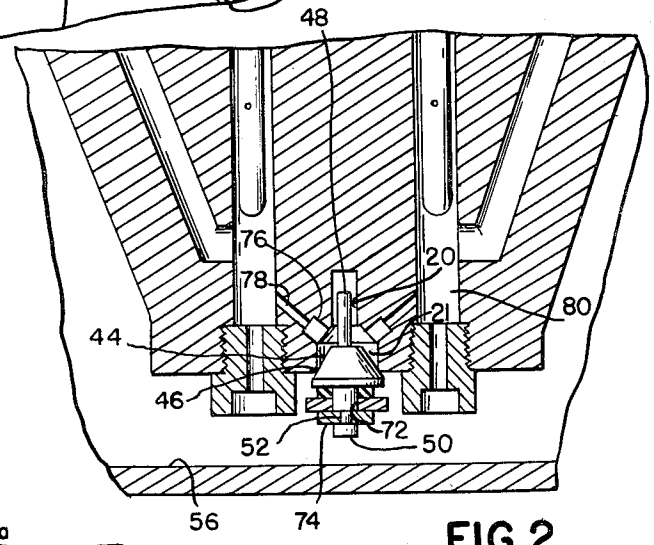
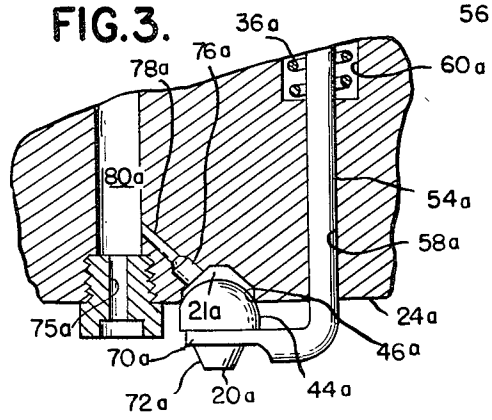


FIG.2.

FIG.3.



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POWER VALVE

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The invention relates to valves and refers more particularly to an improved power valve assembly for use in internal combustion engine carburetors and similar devices.

A power valve assembly is provided in a carburetor or similar device to meter additional fuel therethrough during periods when the power demand on the device is high. The power valve assembly is thus required to operate intermittently and therefore should be as simple as possible to avoid improper functioning thereof after periods of non-use.

Prior power valve assemblies have been deficient in that they have not been constructed so that they may be easily serviced as periodically required. Also the valve of the power valves of the past used in conjunction with carburetors have not always been positioned at the bottom of the carburetor fuel bowl which is desirable to promote ready flow of fuel therethrough. Further, power valve assemblies have sometimes been designed so that the valve actuating mechanism therefor does not permit free flow of fuel through the effective valve seat area.

It is therefore an object of the invention to provide a power valve assembly wherein on opening of the valve the full area of the valve seat is effective to meter fuel therethrough.

Another object is to provide a power valve assembly in conjunction with a carburetor or similar device having a fuel bowl including a valve positioned at the bottom of the fuel bowl which power valve assembly is constructed to permit its easy removal from and installation in the device to facilitate repair or replacement of the valve.

Another object is to provide a power valve assembly comprising a valve, means for resiliently biasing the valve against a valve seat and a vacuum actuated piston engageable with the means resiliently biasing the valve against the valve seat operable to open the valve in response to a change in vacuum applied thereto.

Another object is to provide a carburetor in conjunction with an engine which carburetor includes a metering unit positioned in the carburetor fuel bowl, a power valve in said carburetor including a valve resiliently held against a valve seat in the metering unit adjacent the bottom of the carburetor fuel bowl, and a vacuum actuated piston operable to open the valve in response to a lowering of manifold vacuum.

Another object is to provide a power valve assembly in a carburetor associated with an internal combustion engine comprising a valve held against a valve seat in a carburetor metering unit by means of an L-shaped push rod extending through the metering unit and spring biased to urge the valve against the valve seat, a hollow closed ended cylinder spring biased toward the L-shaped push rod and connected at its open end to engine manifold vacuum operable to engage the push rod and open the valve in response to a lowered manifold vacuum.

Another object is to provide a power valve which is simple in construction, economical to manufacture and efficient in use.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawings, illustrating preferred embodiments of the invention, wherein:

FIGURE 1 is an elevational view partly in cross-section of a carburetor including a power valve assembly according to the invention.

FIGURE 2 is an enlarged partial cross-sectional view of the power valve illustrated in FIGURE 1 taken on the line 2—2 in FIGURE 1.

FIGURE 3 is an enlarged section view of a portion of a modification of the power valve illustrated in FIGURES 1 and 2.

With particular reference to the drawings one embodiment of the invention will now be disclosed.

The power valve assembly **10** is shown in FIGURE 1 installed in a carburetor **12** which is mounted on the engine generally indicated **14**. The power valve assembly **10** comprises the vacuum actuated piston assembly **16** and the push rod assembly **18** on which the valve **20** is mounted. In operation the valve **20** is held in a seated position by the push rod assembly **18** to seal the metering orifice **21** until the piston engages the push rod, after which valve **20** is opened to meter additional fuel through orifice **21** to the carburetor so that the fuel mixture to the engine **14** will be richer and the power output of the engine will be increased.

More specifically the carburetor **12** comprises the throttle body and fuel bowl member **22**, the metering spacer **24** for supporting fuel metering means in the throttle body and fuel bowl member **22** and the air horn and fuel bowl cover **26**. The housing members **22**, **24** and **26** are secured together by bolts or other convenient means (not shown). Carburetor **12** may also be secured to the motor **14** by bolts or other convenient means (not shown).

The vacuum actuated piston assembly **16**, best shown in FIGURE 1, includes the piston **28** which is tubular as shown and includes a closed end **30** and an open end **32**. The closed end **30** of the piston **28** is adapted to engage the push rod assembly **18**, as will be considered later. Piston **28** is slidably mounted in the recess **34** in the air horn and fuel bowl cover **26** and is urged toward the push rod assembly **18** by means of the bias spring **36** acting between the closed end **30** of the piston and the end **38** of the recess **34**. End **38** of recess **34** is connected to the manifold **40** of motor **14** through the passages **41**, **42** and **43** extending through the air horn and fuel bowl cover **26**, the metering spacer **24** and the throttle body and fuel bowl member **22** respectively, as shown.

The valve **20**, as shown in FIGURES 1 and 2, includes a conical valve surface **44** urged into engagement with the valve seat **46** surrounding the metering orifice **21** in the metering spacer **24**. Guide member **48** is provided on valve **20** to insure proper seating of the surface **44** on the valve seat **46**. Valve **20** is further provided with the axially extending cylindrical portion **50** having the reduced diameter portion **52** for use in securing the valve **20** to the push rod **54**. Valve **20** may be constructed of molded rubber, brass or other metal as desired and is located adjacent the bottom of the carburetor fuel bowl **56**.

The valve **20** may be removed from the flattened end **70** of the push rod **54** after clip **74** is removed by merely withdrawing the reduced diameter end **50** thereof upwardly through the opening **72** in the end of the push rod illustrated in FIGURE 2.

The push rod assembly **18** includes the L-shaped push rod **54** extending through the passage **58** in the metering spacer **24**, as shown in FIGURE 1. The passage **58** includes the enlarged diameter portion **60** at the upper end thereof in which the bias spring **62** is positioned. Bias spring **62** acts between the end **64** of the enlarged diameter portion **60** of the passage **58** and the annular, radially split clip **66** which is removably secured to the end **68** of the push rod **54** by convenient means such as a reduced diameter portion **69** on end **68** of rod **54**. The other end **70**

of the push rod 54 is flattened, as illustrated in FIGURES 1 and 3, and is provided with an opening 72 extending therethrough which is sleeved over the cylindrical extension 50 of the valve 20. The valve is secured to the end 70 of the push rod 54 by means of the removable annular, radially split clip 74 engaging the reduced diameter portion 52 of the cylindrical extension 50 of the valve 20.

In operation before an enriched fuel supply is required the push rod assembly 18 holds the valve 20 in engagement with the valve seat 46 due to the bias applied to the push rod 54 by the spring 62, as shown in FIGURE 1. At this time the vacuum in the manifold 40 of the engine is relatively high whereby the piston 28 is held in an up position, as shown in FIGURE 1, in opposition to the bias of the spring 36. The fuel flow into the main fuel wells 80 at this time is through the metering orifices 75 from the carburetor fuel bowl 56.

When it is desired to meter more fuel through the carburetor due to opening of the throttle valve (not shown) of the carburetor, the vacuum in the manifold 40 will decrease in the usual manner on opening of the throttle valve so that the piston 28 is urged downward by spring 36 into contact with the end 68 of the push rod 54. The push rod 54 is thus urged in a downward direction against the upward biasing of the spring 62 which is weaker than the spring 36. Downward movement of push rod 54 causes the valve 20 to unseat allowing the added fuel required to meter past the valve 20 through valve orifice 21 and the ports 76 and 78 into the main fuel wells 80, as shown in FIGURE 2.

A modified valve 20*a* is illustrated in FIGURE 3. The valve 20*a* is similar to the valve 20 with the exception that the surface 44*a* thereof is spherical rather than conical, the guide 48 has been eliminated therefrom, and the valve 20*a* is secured to the push rod 54*a* by removable head 72*a* which may be threadedly engaged with valve 20*a* through push rod 54*a*.

When it is desired to remove the valve 20 for refinishing of the surface 44 or the valve seat 46, the removable clip 66 is first removed from the push rod 54, after which the push rod 54 and valve 20 may be removed from the passage 58 in the metering spacer 24. The valve 20 is then removed from the push rod 54 on removing the clip 74.

Thus it will be seen that in accordance with the invention there is provided a power valve assembly for use with internal combustion engine carburetors and similar devices which is simple and efficient, and which includes a valve located at the bottom of the carburetor fuel bowl, which valve is easily removable and replaceable.

The drawings and the foregoing specification constitute a description of the improved power valve assembly in such full, clear, concise and exact terms as to enable any person skilled in the art to practice the invention, the scope of which is indicated by the appended claims.

What we claim as our invention is:

1. On an engine having means for producing manifold vacuum, a carburetor including separate throttle body and fuel bowl, and fuel bowl cover and air horn members, and a fuel metering spacer sandwiched between the throttle body and fuel bowl member and the air horn and fuel bowl cover member having a carburetor main fuel well portion suspended therefrom with a bottom adjacent the bottom of the fuel bowl portion of the throttle body and fuel bowl member, a fuel metering orifice in said bottom of the main fuel well portion, a power valve assembly in said carburetor comprising an annular valve seat around said metering orifice, a valve including an annular valve surface positioned between the bottom of said carburetor main fuel well portion and the bottom of the fuel bowl portion of the throttle body and fuel bowl member for reciprocal movement therebetween into and out of closing relation to said metering orifice, an L-shaped push rod extending through the metering spacer and between the bottoms of the main fuel well portion and fuel bowl portion of the carburetor, means removably securing said L-shaped push rod at one end to said valve at a location remote from the metering orifice whereby on movement of the portion of the push rod extending between the bottoms of the main fuel well portion and fuel bowl portion of the carburetor away from the metering orifice unrestricted fuel flow around the complete circumference of the metering orifice is permitted, resilient means for biasing the push rod in a direction to seat the valve on the valve seat, a cylinder recess in the air horn and fuel bowl cover member, means connecting the recess to engine manifold vacuum through the air horn and fuel bowl cover member, the metering spacer and the fuel bowl and throttle body member, a hollow cylindrical piston spaced from one end of said L-shaped push rod and mounted in said cylinder recess, said piston being closed at one end and open at the other end to the manifold vacuum in the cylinder recess and resilient means stronger than the first mentioned resilient means in the cylinder recess for urging the other end of the piston member into engagement with the push rod.

2. Structure as set forth in claim 1 wherein the valve member is conical.

3. Structure as set forth in claim 1 wherein the valve member is hemispherical.

References Cited in the file of this patent

UNITED STATES PATENTS

1,909,389	Ball et al.	May 16, 1933
2,757,913	Sutton et al.	Aug. 7, 1956
2,792,203	Olson et al.	May 14, 1957
2,969,965	Braun	Jan. 31, 1961
3,076,639	Szwargulski et al.	Feb. 5, 1963