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ADJUSTABLE EXTERNAL VENT VALVE

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FIG. 2.

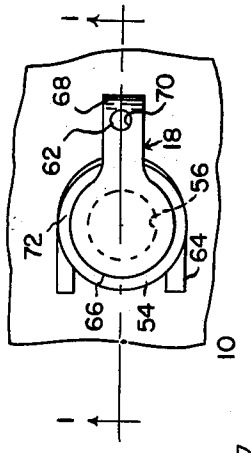


FIG. 3.

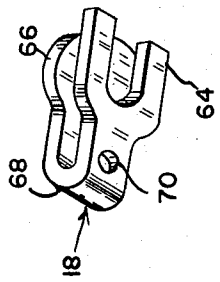
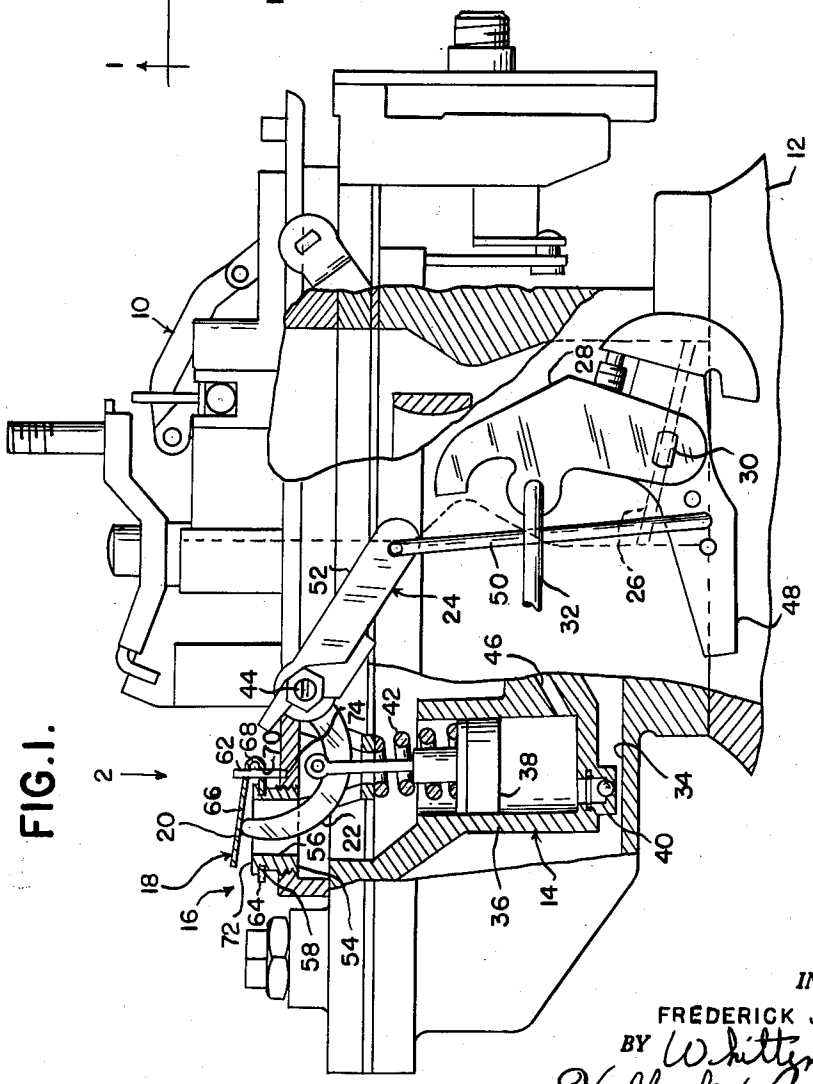


FIG. 1.



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ADJUSTABLE EXTERNAL VENT VALVE

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The invention relates to valves and refers more particularly to an improved adjustable external valve assembly for venting carburetor fuel bowls to atmosphere during idle operation of an associated internal combustion engine or similar device.

In the operation of carburetors it is necessary to provide vents for the fuel bowl thereof due to fuel vapors produced therein. This is particularly true during idle operation of the engine associated with the carburetor after running of the engine and consequent heating of the carburetor fuel bowl.

Means venting carburetor fuel bowls during idle operation of the engine associated therewith have been provided in the past. Many of the venting means of the past have comprised valves actuated by internal carburetor components. Some vent valves of the past have been operated by the carburetor accelerating pump cocking mechanism which is a desirable feature since the accelerating pump cocking mechanism is normally in a limiting position during idle operation of the engine. Prior vent valves operated by the accelerating pump cocking mechanism of carburetors have however had the disadvantage that the accelerating pump displacement could not be adjusted without effecting the time of vent valve operation.

It is therefore one of the objects of the present invention to provide a vent valve assembly for use with a carburetor or similar device which is adjustable to vary the time of opening and closing thereof relative to carburetor operating conditions.

Another object is to provide a carburetor fuel bowl vent valve assembly actuated by the carburetor accelerator pump cocking mechanism which vent valve assembly is adjustable to provide the same relative time of operation thereof regardless of the adjustment of the carburetor accelerating pump displacement.

Another object is to provide a carburetor fuel bowl vent valve as set forth above which is external of the carburetor.

Another object is to provide a carburetor fuel bowl vent valve assembly comprising a nut threaded into an upper portion of the carburetor fuel bowl, said nut including a passage extending therethrough for venting the fuel bowl and also including an annular groove therearound, a valve member including a bifurcated end slidably engaged in the annular groove and a valve end, the valve member being U-shaped to position the valve end over the bifurcated end in closing relation to the passage through the nut with the bifurcated end engaged in the annular groove, and a stationary pin extending through the valve member operable to prevent rotation of the valve member with the threaded nut.

Another object is to provide a carburetor including an accelerating pump and accelerating pump cocking mechanism having an actuating arm in a limiting position during idle operation of the engine and a vent valve assembly adapted to be actuated by the actuating arm of the accelerating pump comprising a threaded nut in the top of the carburetor fuel bowl and having a passage extending therethrough for venting the fuel bowl, said threaded nut having an annular groove therearound exterior of the carburetor fuel bowl, a valve member being U-shaped and having spaced apart bifurcated and valve ends, said valve member being positioned on said threaded nut with the

bifurcated end slidably engaged in the annular groove and the valve end positioned to close said passage, and a pin extending through the arms of the U-shaped valve member and into the carburetor fuel bowl top to prevent rotation of the valve member with the threaded nut, the valve member thus being adjustable with respect to the carburetor fuel bowl from the exterior of the carburetor to position the valve end of the valve member in contact with the actuating arm of the accelerating pump cocking mechanism in a predetermined position thereof before the limiting position thereof is reached regardless of adjustment of the cocking mechanism whereby the valve is held opened by the accelerator pump cocking mechanism actuating arm during idle operation of the engine to which the carburetor is attached.

Another object is to provide an adjustable vent valve which is simple in construction, economical to manufacture and efficient in operation.

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

FIGURE 1 is an elevation view of a carburetor partly in section along the line 1—1 in FIGURE 2 illustrating an adjustable carburetor fuel bowl vent valve assembly in accordance with the invention.

FIGURE 2 is a top view of the carburetor vent valve assembly illustrated in FIGURE 1 taken in the direction of arrow 2 in FIGURE 1.

FIGURE 3 is a perspective view of the vent valve member of the carburetor vent valve assembly illustrated in FIGURES 1 and 2.

With particular reference to the figures of the drawing, one embodiment of the present invention will now be disclosed.

In accordance with the invention the carburetor 10 mounted on the engine 12 includes an accelerating pump 14 and the external carburetor fuel bowl vent valve assembly 16. In operation the valve member 18 of the vent valve assembly 16 is opened on engagement therewith of the end 20 of the actuating arm 22 of the accelerating pump cocking mechanism 24 and is adjustable relative thereto.

More specifically the carburetor 10 includes the usual throttle valve 26 and actuating lever 28 therefor mounted on the throttle valve shaft 30 for rotation therewith on axial movement of link 32. The carburetor 10 further includes the carburetor fuel bowl 34 for storing fuel pumped to the carburetor from fuel storage apparatus (not shown) for storage before being metered to the engine 12 by the carburetor 10.

The accelerating pump 14 includes the cylinder 36 positioned within the fuel bowl 34 and the piston 38 reciprocal within the cylinder 36. A check valve 40 is provided in the bottom of the cylinder 36 whereby fuel from the carburetor fuel bowl 34 is drawn into the cylinder 36 on an upward stroke of the piston 38.

Piston 38 is drawn upward in opposition to the bias of the spring 42 by means of the actuating arm 22 of the accelerating pump cocking mechanism 24 on clockwise movement thereof. Piston 38 is forced downwardly in FIGURE 1 by the spring 42 on counterclockwise pivoting of the actuating arm 22 about pivot shaft 44 to force fuel within the cylinder 36 through the passage 46 and into the air intake of the carburetor to provide added fuel for acceleration.

The accelerating pump cocking mechanism 24 includes the lever 48 secured to the shaft 30 for rotation therewith, the connecting links 50 and 52 and the actuating arm 22. Connecting link 52 and actuating arm 22 are rigidly secured to the pivot shaft 44 for rotation therewith. Con-

necting link 50 is pivotally secured at opposite ends to the lever 48 and connecting link 52.

In operation, on pivoting of the throttle valve shaft 30 in a direction to cause opening of the throttle valve 26 the connecting link 50 is moved in a generally upward direction, as shown in FIGURE 1, to pivot the connecting link 52 and actuating arm 22 in a counterclockwise direction to provide a pumping stroke of the accelerating pump 14. On subsequent closing of the throttle the accelerator pump cocking mechanism 24 will return the piston 38 to the position illustrated in FIGURE 1 in preparation for a subsequent pumping stroke of the piston 38.

The vent valve assembly 16 comprises the threaded nut 54 having the passage 56 therethrough and mounted on the carburetor so that the passage 56 communicates with and vents the carburetor fuel bowl 34. The nut 54 includes an annular groove 58 therein around the end thereof exterior of the carburetor fuel bowl. The carburetor vent valve assembly 16 further includes the valve member 18 and the pin 62.

The valve member 18 is generally U-shaped and is best shown in FIGURE 3. Such valve member 18 includes a bifurcated end 64 and a valve end 66 held in spaced relation to each other by means of an open return bent portion 68. Aligned openings 70 are provided through the arms of the U-shaped valve member 18 adjacent the open return bent portion 68 for the reception of pin 62.

In assembly, as shown in FIGURE 1, the bifurcated end 64 of the valve member 18 is slidably received in the groove 58 of the nut 54 whereby the valve end 66 of the valve member 18 is resiliently engaged with the outer end 72 of the nut 54 to seal the vent passage 56 from the carburetor fuel bowl 34. The pin 62 is held in a secure position in the recess 74 in the carburetor 10 to prevent rotation of the valve member 18 with the nut 54.

Thus in operation the valve member 18 may be positioned vertically as shown in FIGURE 1 by rotation of the nut 54. In such vertical movement the valve member 18 slides vertically on the pin 62 while the nut 54 rotates with respect thereto and transfers the vertical movement of the end 72 thereof to the valve member 18 through the bifurcated end 64 thereof held within the groove 58 in the nut 54.

In over-all operation of the carburetor, when it is desired to change the pumping stroke of the acclerating pump 14, this is accomplished by means of adjustment of the accelerating pump cocking mechanism 24 to vary the limiting position of the actuating arm 22 when the throttle valve 26 is in an idle position. The valve member 18 may then be easily adjusted to contact the engaging end 20 of the actuating arm 22 with the actuating arm 22 in the same relation to the limiting position thereof as before the adjustment of the actuating arm so that the valve end 66 of the valve member 18 is opened by actuating arm 22 only at the required time to provide venting of the carburetor fuel bowl 34 through passage 56 during idle operation.

Thus it will be seen that in accordance with the invention a simple carburetor fuel bowl vent valve assembly is provided which is operated by the accelerating pump cocking mechanism 24 to open during idle operation of the carburetor 10 and which may be adjusted externally of the carburetor on adjustment of the accelerating pump stroke to insure venting of the carburetor fuel bowl only during idle operation.

The drawings and the foregoing specification constitute a description of the improved externally adjustable vent valve 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 I claim as my invention is:

1. A carburetor having a fuel bowl, a vent valve for said fuel bowl, adjustable means within said carburetor

for opening said vent valve in accordance with the position of the adjustable means, said vent valve including an annular externally threaded nut threaded in an opening in the carburetor fuel bowl for adjustment in directions into and out of the carburetor fuel bowl, said vent valve extending over the outer end of the nut and operable in one position to prevent venting of the fuel bowl through the nut, means for preventing rotation of the vent valve with the nut, and means for adjusting the nut and vent valve relative to the fuel bowl.

2. A carburetor having a fuel bowl, a vent valve assembly for said fuel bowl including a nut threaded in an opening in the fuel bowl and having a passage therethrough, said nut being rotatable for adjustment into and out of the fuel bowl, and a valve member having an arm portion within a peripheral groove in said nut whereby the valve member is movable axially with said nut, said valve member having another arm portion extending over the passage in said nut and operable as a valve in one position to close said passage and prevent venting of the fuel bowl through said nut, adjustable means within said fuel bowl for opening the valve in accordance with the position of the nut and valve member, and means for preventing rotation of the valve member with the nut.

3. An adjustable valve assembly for venting a carburetor fuel bowl, comprising a rotatable annular member of axial extent adjustable vertically in an opening in said fuel bowl and provided exteriorly of said fuel bowl with a peripheral groove, a valve member having an arm in said peripheral groove and having an arm extending over the outer end of said annular member and operable as a valve in one position to close said passage and prevent venting of the fuel bowl through said annular member, and a vertical pin extending through both of said arms and secured to said fuel bowl to prevent rotation of the valve member with the annular member, the valve member being slidable vertically on said pin upon rotation of said annular member relative to said fuel bowl.

4. An adjustable valve assembly for use in venting carburetor fuel bowls and like structures comprising a hollow cylindrical valve adjusting member secured in an opening in the structure to be vented for axial movement into and out of the structure to be vented, a valve extending over one end of the valve adjusting member, means operably associated with the valve and the structure to be vented for engaging the valve in one position thereof to open the valve and provide a vent passage through the valve adjusting member, and means for preventing rotation of the valve with the valve adjusting member while allowing movement of the valve axially of the valve adjusting member with the valve adjusting member on movement of the valve adjusting member into and out of the structure to be vented.

5. Structure as set forth in claim 4 wherein the valve adjusting member comprises an externally threaded nut rotatably secured in a threaded opening in the structure to be vented.

6. Structure as set forth in claim 4 wherein the valve includes a substantially flat flexible portion extending over said one end of the valve adjusting member and cantilevered at one side thereof for pivotal movement toward and away from the one end of the valve adjusting member to open and close the passage therethrough.

7. Structure as set forth in claim 4 wherein the valve adjusting member includes an annular groove therearound adjacent said one end thereof and the valve comprises an open return bent U-shaped member having a substantially flat end extending over one end of the valve adjusting member and a bifurcated end positioned within the annular groove in the valve adjusting member.

8. Structure as set forth in claim 4 wherein the valve is an open return bent U-shaped member and the means for preventing rotation of the valve with the valve adjusting member comprises aligned openings extending

through the valve and a pin extending through said openings and secured to the structure to be vented.

9. An adjustable valve assembly for use in venting carburetor fuel bowls and like structures comprising an externally threaded nut having an axially extending vent passage therethrough and an external annular groove therearound threadedly received in an opening in the structure to be vented for axial movement into and out of the opening, an open return bent flexible valve having one substantially flat end positioned over the outer end of the nut and one bifurcated end positioned within the annular groove around the nut and including a central portion having a pair of aligned openings therethrough, and a pin extending through the aligned openings secured to the structure to be vented for preventing rotation of the valve with the nut while permitting movement of the valve axially with the nut on axial movement of the nut.

10. A carburetor having a fuel bowl and an accelerating pump including an actuating arm therefor and a vent valve for said fuel bowl comprising an externally threaded nut positioned within a threaded opening in the carburetor fuel bowl adjacent the accelerating pump actuating arm for axial movement into and out of the carburetor fuel bowl and having an annular groove around the outer end thereof, an open return bent flexible valve having a substantially flat end extending over the outer end of the nut, a bifurcated end positioned within the annular groove in the nut and a folded central portion having aligned openings therethrough and a pin extending through the aligned openings and secured to the carburetor adjacent the nut for preventing rotation of the valve with the nut while allowing axial movement of the valve with the nut, said accelerating pump actuating arm engaging the end of the valve extending over the outer end of the nut in one position thereof to provide an external vent for the carburetor fuel bowl.

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