April 17, 1956 H. W. McCLAIN 2,742,270

VACUUM CONTROLLED AIR BLEED VALVE

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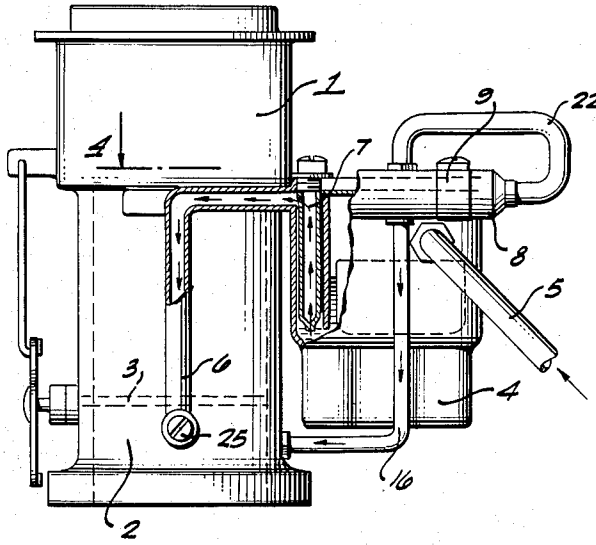
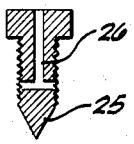


FIG. 1.

FIG. 5.



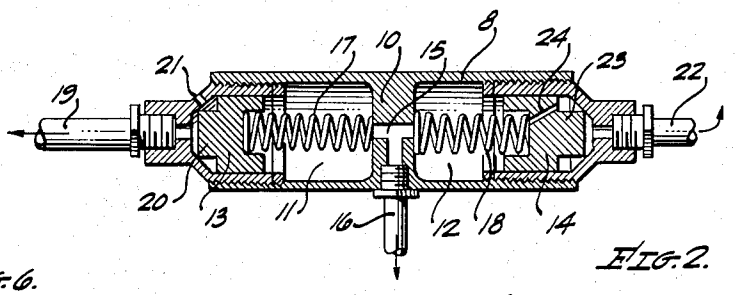


FIG. 2.

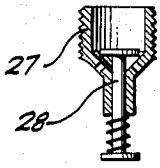


FIG. 6.

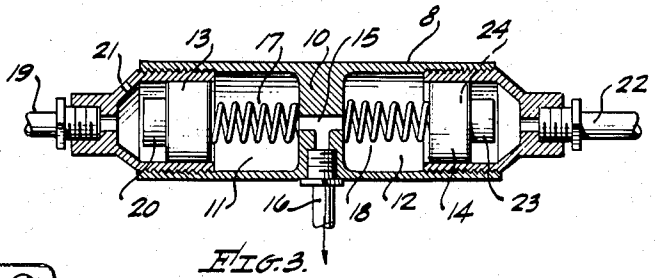
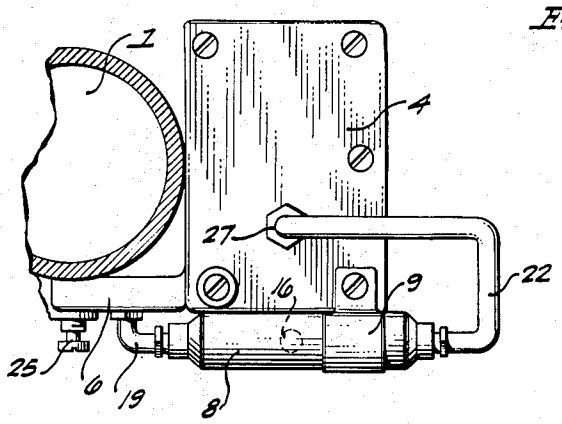


FIG. 3.

FIG. 4.



INVENTOR.
HARRY W. McCLAIN,
BY
N. M. Pruckman
ATTORNEY.

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VACUUM CONTROLLED AIR BLEED VALVE

Harry W. McClain, Long Beach, Calif.

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3 Claims. (Cl. 261—41)

This invention relates to a vacuum controlled air bleed valve for carburetors, the purpose of which is to prevent fuel flow in the idling or low speed system of a carburetor when the vacuum rises above the normal idling vacuum in the intake manifold. This increased vacuum in the intake manifold is caused by deceleration or coasting of the vehicle.

An object of my invention is to provide a novel vacuum controlled air bleed valve which is adjustable so that it will function at the required vacuum in the intake manifold.

Another object of my invention is to provide a novel valve of the character stated, which can be quickly and easily attached to carburetors presently in use, and without requiring extensive reworking or redesigning of the carburetor.

Still another object of my invention is to provide a novel valve of the character stated, which is simple in construction, inexpensive to manufacture, and which is effective in operation.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detailed description and the appended claims.

In the drawing:

Figure 1 is a side elevation of a carburetor with my bleed valve mounted theron and with parts broken away to show interior construction.

Figure 2 is a longitudinal sectional view of my bleed valve with the slide valves in closed position.

Figure 3 is a longitudinal sectional view of the bleed valve with the slide valves in open position.

Figure 4 is a fragmentary plan view of the carburetor taken on line 4—4 of Fig. 1 with my bleed valve mounted thereon.

Figure 5 is a longitudinal sectional view of the idling screw.

Figure 6 is a longitudinal sectional view of the float bowl valve.

Referring more particularly to the drawing, I will first describe the carburetor and the idling fuel system, or low speed fuel system of the carburetor, all of which is usual and well known. The carburetor **1** includes the usual throat or intake pipe **2** in which the throttle valve **3** is mounted. The fuel bowl or float bowl **4** is mounted on one side of the pipe **2**, and the fuel feeds into this bowl through the pipe **5**. The idling or low speed fuel system includes a pipe **6** which opens into the pipe **2** below the throttle **3**. This pipe extends into a tube **7** which is mounted in the float bowl **4** and extends vertically into this bowl, and the lower end of the tube is immersed in the fuel. Thus under usual operation, the vacuum exerted below the throttle valve **3** will draw fuel through the tube **7**, thence into the pipe **6**, and will feed the fuel into the pipe **2** where it passes into the intake manifold of the engine. It will be evident that if the vacuum increases excessively below the throttle valve **3**, that large quantities of fuel will be drawn through the pipe **6**, all of which

is detrimental to the engine. The excessive vacuum is caused by deceleration or coasting, as when a vehicle is going down a long hill when the throttle is closed.

To prevent excessive amounts of fuel from being drawn into the pipe **6**, I provide the following structure: A tubular valve housing **8** is mounted on the float bowl **4** by means of a clamp **9** which encircles the housing. A central wall **10** within the housing divides the same into two cylinders or chambers **11—12**. A piston **13** is slidably mounted in the cylinder **11** and a piston **14** is slidably mounted in the cylinder **12**. A port **15** extends through the wall **10** and opens into both of the cylinders **11** and **12**. A pipe **16** extends from the port **15** to the pipe **2** below the throttle valve **3**. Thus the vacuum below the throttle valve **3** will be exerted through the port **15** to both cylinders **11** and **12**. A spring **17** bears against the piston **13** and presses this piston against the outer end of the cylinder **11** and normally seats the piston, as will be further described. A similar spring **18** bears against the piston **14** and presses the piston against the outer end of the cylinder **12**. A pipe **19** extends from the outer end of the cylinder **11** to the pipe **6** and opens into the pipe **6** for the purpose of admitting atmospheric pressure to the pipe **6**, in a manner to be subsequently described. The outer end of the piston **13** is provided with a seat **20** which seals against the outer end of the cylinder **11**, normally closing the opening to the pipe **19** when the piston **13** is held pressed against the outer end of the cylinder **11**. A bleed port **21**, open to the atmosphere, extends into the outer end of the cylinder **11** but back of the seat **20**, so that atmospheric pressure is only admitted to the pipe **19** when the piston **13** is unseated.

When atmospheric pressure is admitted to the pipe **6**, fuel flow in the pipe will be broken since the vacuum in the pipe **6** will be materially reduced and thus will not draw fuel from the tube **7**. A conduit **22** extends from the outer end of the cylinder **12** and thence into the top of the float bowl **4**. The piston **14** is provided with a valve seat **23**, which normally rests against the outer end of the cylinder **12** to close the opening to the conduit **22**. A bleed port **24** extends through the piston **14** back of the valve seat **23**, and this bleed port extends into the inner end of the cylinder **12** so that vacuum can be exerted through this bleed port, thence through the conduit **22** and thence to the float bowl **4**, so that a vacuum will be drawn on top of the float bowl **4** when the piston **14** is unseated, as shown in Figure 3. Exerting a vacuum on top of the float bowl **4** will prevent fuel from flowing out of this float bowl, particularly when the vacuum is high below the throttle **3**, as will be subsequently described.

In some instances, and for ease of installation, I may construct the idling valve **25** with a port **26**. In this instance the pipe **19** (which may be rubber) is slipped over the valve **25** for the same purpose of balancing the vacuum in the idling system and preventing excessive fuel from being drawn into the carburetor. The connection of the pipe **22** into the float bowl **4** may be facilitated by means of the valve attachment **27**, which screws into the top of the float bowl and is provided with a spring pressed valve **28** which opens under the pull of a vacuum. In order that the springs **17—18** may be adjusted in tension, I may thread the ends of the chambers **11** and **12** into the housing **8**, thus enabling the springs to be correctly tensioned.

In operation when the vacuum below the throttle **3** is normal, for example, during idling speeds of the engine, the springs **17** and **18** will hold the pistons **13** and **14** seated against the outer ends of the cylinders **11** and **12**, respectively. The normal idling fuel will now be drawn through the pipe **6** and through the tube **7** in a normal manner, whenever the vacuum increases below the throt-

tle 3, so that the springs 17—18 will be compressed and the pistons 13 and 14 will be drawn inwardly, as shown in Figure 3. In this position of the pistons atmospheric air is drawn through the bleed port 21 and feeds air under atmospheric pressure through the pipe 19 and into the pipe 6. This breaks the vacuum in the pipe 6 and fuel will cease to flow through this pipe and thence into the throat 2 of the carburetor. At the same time a reduced air pressure is maintained on one side of the piston 14. This reduced pressure is exerted through the port 24 and thence through the pipe 22, so that the float bowl 4 will be partially evacuated and further reducing the possibility of fuel flowing through the pipe 6 and thence into the engine. As soon as the excessive vacuum is reduced, i. e., when the throttle 3 is open, the springs 17—18 will again return the pistons 13—14 to the position shown in Figure 2 and the normal operation of the carburetor will continue.

Having described my invention, I claim:

1. In a carburetor including an intake pipe, a throttle in the intake pipe, a float bowl, an idling fuel pipe extending from the float bowl into the intake pipe below the throttle, a vacuum controlled air bleed valve comprising a housing, said housing having a cylinder therein, a first piston in the cylinder, said piston seating against one end of the cylinder, air bleed means adjacent the piston seat and said air bleed means being opened when the piston is unseated, a second piston in the cylinder, the second piston seating against the other end of the cylinder, a pair of springs, each spring bearing against one of said pistons and urging the pistons against their seats, a vacuum pipe extending from the intake pipe of the carburetor to said cylinder, another pipe extending from the cylinder at the end against which the first piston seats and thence into the idling fuel pipe to admit atmospheric air to the idling fuel pipe, a conduit extending from the other end of the cylinder and thence into the float bowl of the carburetor, said second piston having a vacuum port therein, said vacuum port being open to said conduit when the second piston is unseated.

2. In a carburetor including an intake pipe, a throttle in the intake pipe, a float bowl, an idling fuel pipe extending from the float bowl to the intake pipe below the throttle, a vacuum controlled air bleed valve comprising a housing, said housing having a cylinder therein, a first piston in the cylinder, said first piston seating against one end of the cylinder, said housing having an air bleed port therein between the first piston and the seat in the cylinder, a

second piston in the cylinder, the second piston seating against the other end of the cylinder, a pair of springs each bearing against one of the pistons and urging the pistons against their seats, a vacuum pipe extending from said intake pipe of the carburetor to said cylinder, another pipe extending from the cylinder at the end against which the first piston seats and thence into the idling fuel pipe, a conduit extending from the other end of the cylinder and thence into the float bowl of the carburetor, said second piston having a bleed port extending therethrough, the bleed port being open when the second piston is unseated, said bleed port opening into the cylinder whereby a vacuum is drawn in the conduit and float bowl when the piston is unseated.

3. In a carburetor including an intake pipe, a throttle in the intake pipe, a float bowl, an idling fuel pipe extending from the float bowl to the intake pipe below the throttle, a vacuum controlled air bleed valve comprising a housing, a central wall in the housing, said housing having a cylinder therein on each side of the central wall, a piston in each cylinder, said pistons each seating against the outer ends of the cylinders, said housing having an air bleed port therein between the first piston and the seat in the cylinder, a pair of springs, each spring bearing against one of the pistons and urging the pistons against their seats, a vacuum pipe extending from the intake pipe of the carburetor and thence into the central wall, said central wall having a port extending therethrough into each of the cylinders, and said port communicating with the vacuum pipe, another pipe extending from the outer end of the cylinder against which the first piston seats and thence into the idling fuel pipe, a conduit extending from the outer end of the other cylinder and against which the second piston seats, said conduit extending into the float bowl, the last named piston having a bleed port extending therethrough to evacuate the conduit and the float bowl when the last named piston is unseated.

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