Sept. 7, 1965 R. W. McSEVENY 3,204,935

COMBINED ACCELERATOR PUMP AND DASHPOT ASSEMBLY FOR CARBURETORS

Filed June 30, 1961 2 Sheets-Sheet 1

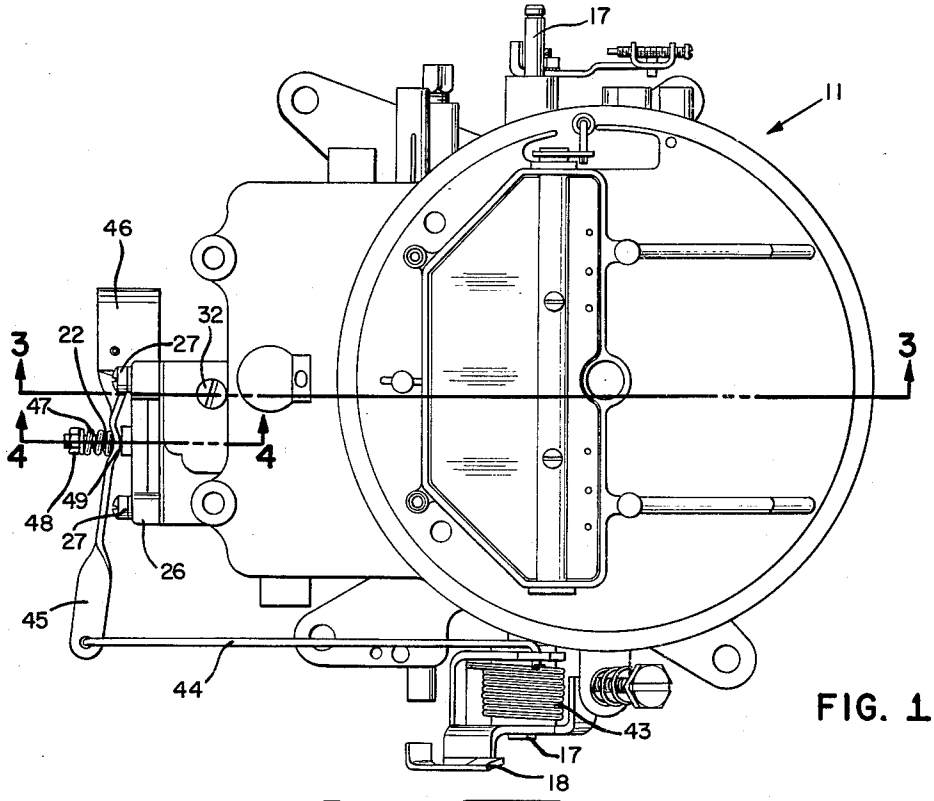



FIG. 1

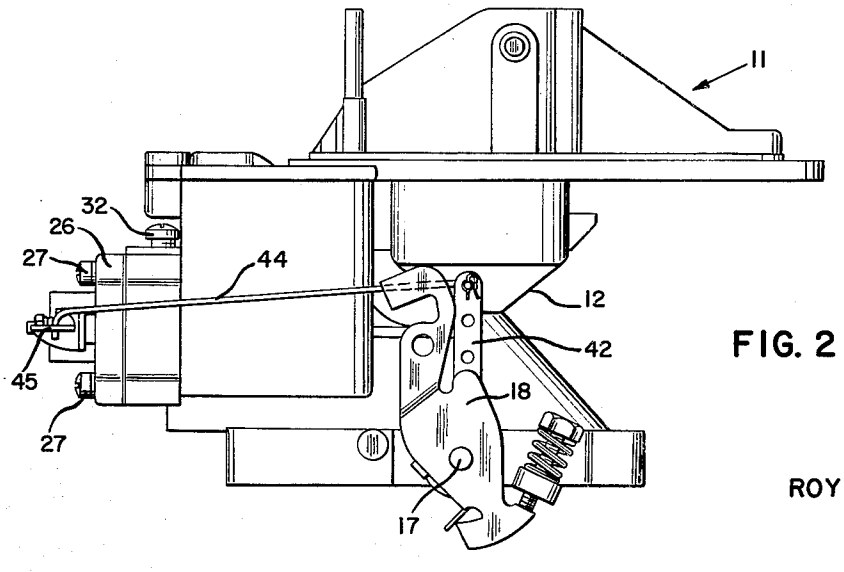



FIG. 2

ROY W. McSEVENY
*INVENTOR.*

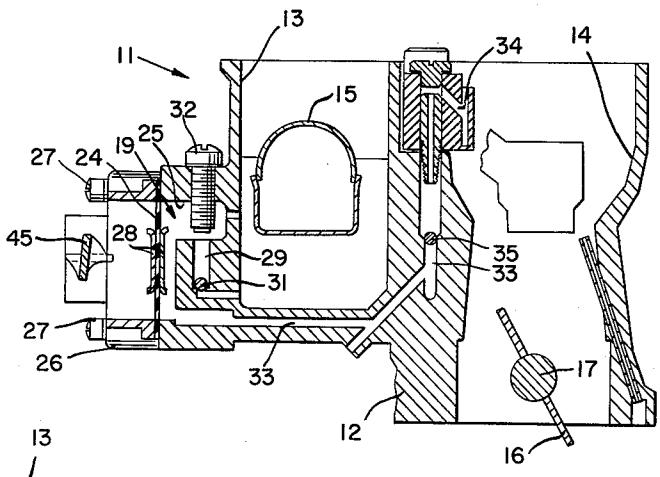
BY John R. Faulkner
Thomas H. Oster
ATTORNEYS

Sept. 7, 1965 R. W. McSEVENY 3,204,935

COMBINED ACCELERATOR PUMP AND DASHPOT ASSEMBLY FOR CARBURETORS

Filed June 30, 1961 2 Sheets-Sheet 2

FIG. 3



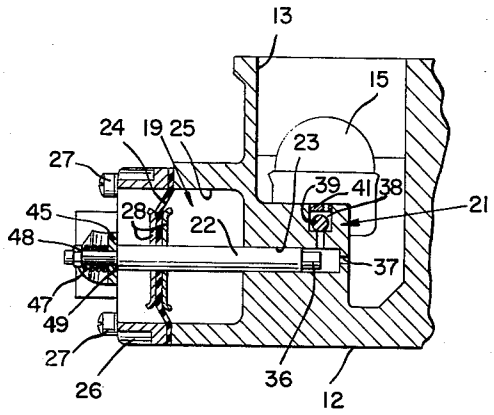




FIG. 4

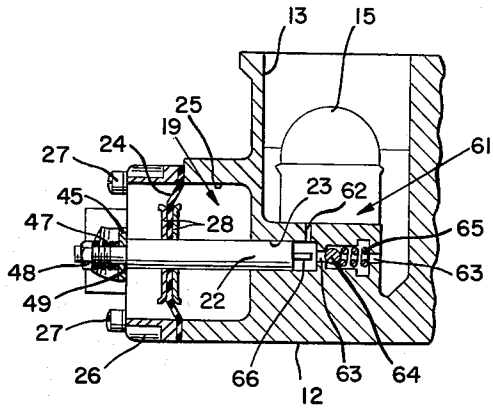



FIG. 5

ROY W. McSEVENY
*INVENTOR.*

*BY* John R. Faulkner
Thomas H. Oster
ATTORNEYS

United States Patent Office

3,204,935

Patented Sept. 7, 1965



3,204,935

# COMBINED ACCELERATOR PUMP AND DASHPOT ASSEMBLY FOR CARBURETORS

Roy W. McSeveny, Garden City, Mich., assignor to Ford Motor Company, Dearborn, Mich., a corporation of Delaware

Filed June 30, 1961, Ser. No. 121,046
2 Claims. (Cl. 261—34)

This invention relates to a combined accelerating pump and dashpot assembly for use in vehicular carburetors.

Rapid opening or closing of the throttle valve of a vehicular carburetor produces undesirable engine performance characteristics. Upon sudden opening of the throttle valve, the engine will hesitate or stall unless an increased amount of fuel is supplied immediately. Accelerating pumps which spray additional fuel into the carburetor's throttle passage are utilized to provide the initial increase of fuel requirements. If the throttle valve is closed too rapidly, the engine will also stall. For this reason, vehicular carburetors often incorporate some form of dashpot mechanism to retard the rate of throttle closing. Frequently, a single carburetor will incorporate both an accelerating pump and a dashpot. Although the accelerating pump and dashpot may be controlled by a common member, they are separate and otherwise independent units.

It is an object of the present invention to provide a unitary carburetor accelerating pump and dashpot to permit a compact carburetor construction.

A carburetor incorporating the instant invention includes a reciprocating member operated in response to the throttle control linkage. Two coaxially disposed pumps are operated in response to movement of the reciprocating member. Suitable conduits and check valves allow each pump to be charged with fluid from the carburetor fuel bowl. One pump acts as an accelerating pump by discharging fuel through the carburetor jets during rapid opening of the throttle valve. The other pump draws fuel from the fuel bowl through a restricted orifice to function as a dashpot when the throttle is rapidly closed.

In an embodiment of the invention, a check valve in the inlet conduit of the dashpot is prevented from seating during a portion of the pumping stroke. This shunts flow from the orifice during a portion of the stroke to shorten the effective stroke of the dashpot. This allows the accelerating pump and dashpot to operate over different length strokes.

Further objects and advantages of this invention will become more apparent as this description proceeds, particularly when considered in conjunction with the accompanying drawings, wherein:

FIG. 1 is a top plan view of a vehicular carburetor incorporating an embodiment of the instant invention.

FIG. 2 is a side elevational view of the carburetor shown in FIG. 1 with the carburetor top plate removed.

FIG. 3 is a cross sectional view taken along line 3—3 of FIG. 1 with the carburetor top plate removed.

FIG. 4 is a cross sectional view taken along line 4—4 of FIG. 1 with the carburator top plate removed.

FIG. 5 is a cross sectional view in part similar to FIG. 4 showing another embodiment of the invention.

Referring now in detail to the drawings, there is shown generally at 11 a carburetor embodying the present invention. The body 12 of carburetor 11 is formed with a fuel bowl 13 and throttle passage 14. A float 15 controls the level of the fuel in fuel bowl 13. A throttle valve 16 is rigidly secured to a throttle valve shaft 17. Throttle valve shaft 17 is rotatably supported by carburetor body 12 to position throttle valve 16 in throttle



passage 14 and control the flow of fuel air mixture therethrough. The angular position of throttle valve 16 in throttle passage 14 is controlled by the throttle control link 18 which is rigidly secured for rotation with throttle valve shaft 17. Link 18 is actuated in response to the accelerator linkage (not shown). The construction thus far described is conventional and forms no part of the present invention.

An embodiment of the accelerating pump and dashpot of the instant invention is shown in detail in FIGS. 3 and 4. The accelerating pump is indicated generally at 19. The dashpot is shown generally at 21. Accelerating pump 19 and dashpot 21 include a common actuating member, rod 22. Rod 22 is supported for reciprocation in the bore 23 formed in carburetor body 12. Accelerating pump 19 is of the diaphragm type and includes a flexible diaphragm 24 overlying the mouth of a cylindrical cavity 25 formed in carburetor body 12. Diaphragm 24 is held in place by the annular member 26 secured to carburetor body 12 as by the bolts 27. Rod 22 passes through an aperture formed in the center of diaphragm 24. The rigid washers 28 support the center of diaphragm 24 and rigidly secure the center of diaphragm 24 to rod 22 in the known manner.

Fuel may flow from fuel bowl 13 to cavity 25 through the passage 29 formed in carburetor body 12. The ball check valve 31 prevents fuel flow in a reverse direction. A bolt 32 threaded in the carburetor body 12 permits replacement of a ball 31. Accelerating pump 19 discharges through the passage 33 and discharge nozzle 34 into carburetor throttle passage 14. A ball check valve 35 positioned in passage 33 prevents the entry of air into cavity 25.

Dashpot 21 includes rod 22 and reduced diameter piston portion 36 formed on the end of rod 22. The innermost portion of bore 23 functions as a cylinder for rod 22 and piston portion 36. Fuel may enter bore 23 from fuel bowl 13 through a metered orifice 37. Another fuel passage 38 connects bore 23 and fuel bowl 13. A ball check valve 39 is positioned in passage 38 to prevent flow of fuel through passage 38 when rod 22 moves to the left. Ball 39 is retained in passage 38 by the aperture plug 41.

Rod 22 is actuated in response to throttle control link 18. For this purpose, a lever 42 is rotatably supported on throttle valve shaft 17. A coil spring 43 encircles shaft 17 and has its opposite end secured to lever 42 and link 18. A rod 44 interconnects lever 42 and a lever 45 pivotally supported by the portion 46 of annular member 26. Apertures are formed in levers 42 and 45 through which rod 22 passes. A coil spring 47 contained between the nut 48 and lever 45 urges lever 45 into contact with the shoulder 49 formed on rod 22. In this way, pivotal movement of lever 45 is translated into reciprocatory movement of rod 22 and motion may be transmitted between throttle control link 18 and rod 22.

*Operation*

Clockwise movement of throttle control link 18 to open throttle valve 16 is transmitted through coil spring 43 to lever 42 and this motion is translated into movement of rod 22 to the right as seen in FIG. 4. This causes accelerating pump 19 to discharge fuel through passage 33 and nozzle 34 into throttle passage 14. During this movement, ball check valve 31 prevents flow of fuel from cavity 25 to fuel bowl 13. Dashpot 21 merely pumps fuel from bore 23 into fuel bowl 13 through orifice 37 and passage 38. Ball check valve 39 is open during this movement so there is no fluid resistance to opening of throttle valve 16. Once rod 22 completes its stroke, spring 43 yields to allow further opening of

throttle valve **16** without accompanying movement of rod **22**.

Counterclockwise movement of throttle control link **18** to close throttle valve **16** causes rod **22** to move to the left once the lost motion permitted by spring **43** is taken up. During this movement, ball check valve **35** closes and ball check valve **31** opens allowing accelerating pump **19** to be charged with fuel from fuel bowl **13**. Ball check valve **39** also closes so fuel can be drawn into bore **23** by rod **22** only through orifice **37**. The fluid resistance created retards the movement of rod **22** and, in turn, the rate of closing of throttle valve **16**.

Frequently, it is desirable to have the dashpot operate over a shorter stroke than the accelerating pump does. This is permitted by the construction showing in FIG. 5. The accelerating pump shown in FIG. 5 is identical to that shown in FIGS. 3 and 4 and further description is deemed unnecessary.

The dashpot assembly of the embodiment of FIG. 5 is indicated generally at **61**. The metered orifice **62** permits restricted fuel flow between fuel bowl **13** and bore **23**. A passage **63** also permits flow between bore **23** and fuel bowl **13**. Passage **63** is axially aligned with rod **22** and includes a ball check valve **64**. The coil spring **65** normally urges ball check valve into a seated position in which fuel flow through passage **63** is obstructed.

As the throttle valve **16** is opened, rod **22** moves to the right in a manner previously described. This increases the fuel pressure in bore **23** and spring **65** will yield to permit check valve **64** to open as soon as rod **22** commences movement. Continued movement of rod **22** to the right brings the projection **66** formed on the end of rod **22** into contact with ball **64**. The diameter of rod **66** is sufficiently small to pass through the passage **63**. As the throttle valve **16** is closed, rod **22** commences to move to the left. Initial movement of rod **22** to the left produces no fluid resistance since projection **66** prevents check valve **64** from seating. There is sufficient clearance between projection **66** and passage **63** to permit free fuel flow. Under this condition, fluid may flow freely from fuel bowl **13** to bore **23** through passage **63**. After rod **22** has moved to the left sufficiently to free check valve **64** from the action of projection **66**, the check valve will seat. Fluid must then flow to bore **23** through restricted orifice **62**. The resulting fluid resistance retards the rate of further closing of the throttle valve **16**. The effective length of the stroke of the dashpot **61** may be regulated by the length of the projection **66**.

It is to be understood that the invention is not to be limited to the construction shown and described, but that various changes and modifications may be made within the spirit and scope of the invention as defined by the appended claims.

I claim:

**1.** In a carburetor having a fuel bowl, a throttle passage, a throttle valve and throttle control linkage, a reciprocating member, driving means operatively connecting said throttle control linkage and said reciprocating member for interrelated movement, first and second pump means including first and second fuel impelling means affixed to said reciprocating member, first means communicating fuel flow from said fuel bowl to said first pump means, second means communicating fuel flow from said first pump means to said throttle passage upon movement of said reciprocating member for its full travel in a direction corresponding to opening of said throttle valve, third means communicating fuel flow between said second pump means and said fuel bowl, and means restricting fuel flow between said second pump means and said fuel bowl movement of said reciprocating member for only a portion of its movement in a direction corresponding to closing of said throttle valve.

**2.** In a carburetor having a fuel bowl, a throttle passage, a throttle valve and throttle control linkage, a reciprocating member, driving means operatively connecting said throttle control linkage and said reciprocating member for interrelated movement, first and second pump means operated by said reciprocating member, first means communicating fuel flow from said fuel bowl to said first pump means upon movement of said reciprocating member in a first direction corresponding to closing of said throttle valve, second means communicating fuel flow from said fuel bowl to said second pump means upon movement of said reciprocating member in said first direction, said second means being constructed to retard movement of said reciprocating member in said first direction by restricting fuel flow therethrough, third means communicating fuel flow from said first pump means to said throttle passage upon movement of said reciprocating member in a second direction corresponding to opening of said throttle valve, fourth means communicating fuel flow between said second pump means and said fuel bowl, valve means in said fourth means preventing fuel flow from said fuel bowl to said second pump means upon movement of said reciprocating member in said first direction, and means preventing closing of said valve means upon movement of said reciprocating member in said first direction for a portion of its stroke.


**References Cited by the Examiner**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 1,844,738 | 2/32 | Aseltine. | |
| 1,954,536 | 4/34 | Prentiss. | |
| 1,999,334 | 4/35 | Mallory. | |
| 2,047,899 | 7/36 | Aseltine. | |
| 2,236,560 | 4/41 | Bancroft. | |
| 2,619,333 | 11/52 | Carrey. | |
| 2,703,705 | 3/55 | Boller. | |
| 2,968,476 | 1/61 | Stoltman | 267—1 |



HARRY B. THORNTON, *Primary Examiner.*

EUGENE BLANCHARD, RONALD WEAVER, *Examiners.*