

March 8, 1955

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2,703,705

SLOW CLOSING THROTTLE DEVICE

Filed Feb. 28, 1951

2 Sheets-Sheet 1

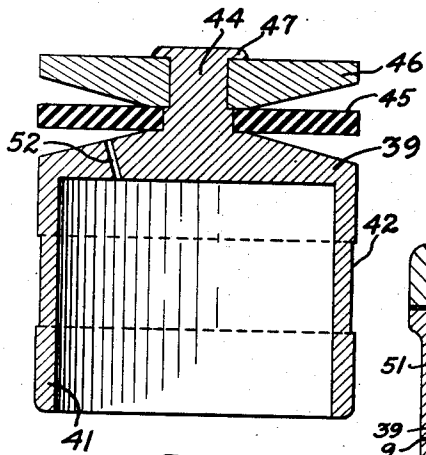


FIG. 2.

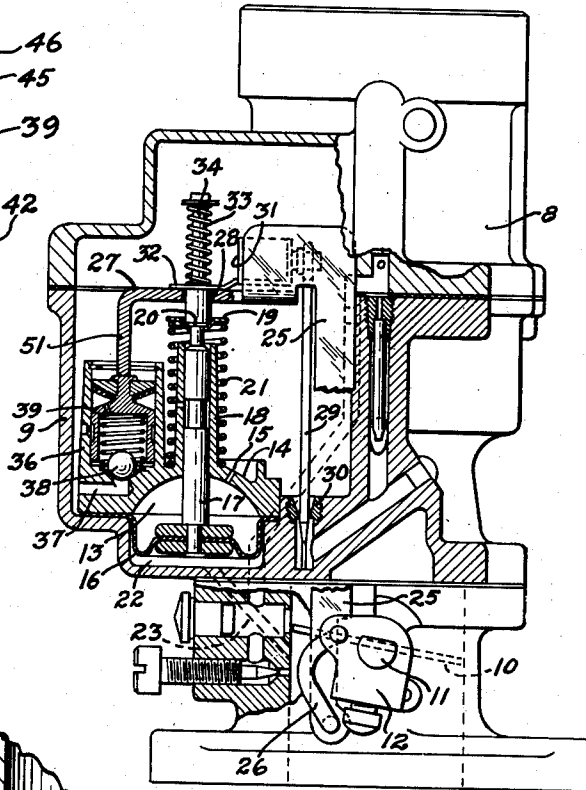


FIG. 1.

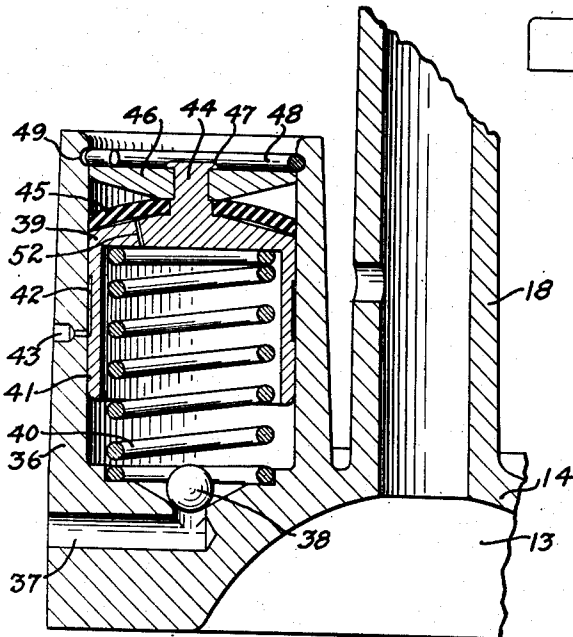


FIG. 3.

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2 Sheets-Sheet 2

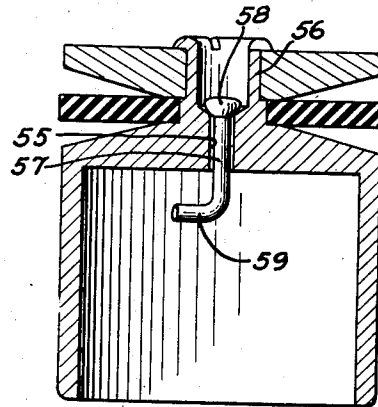
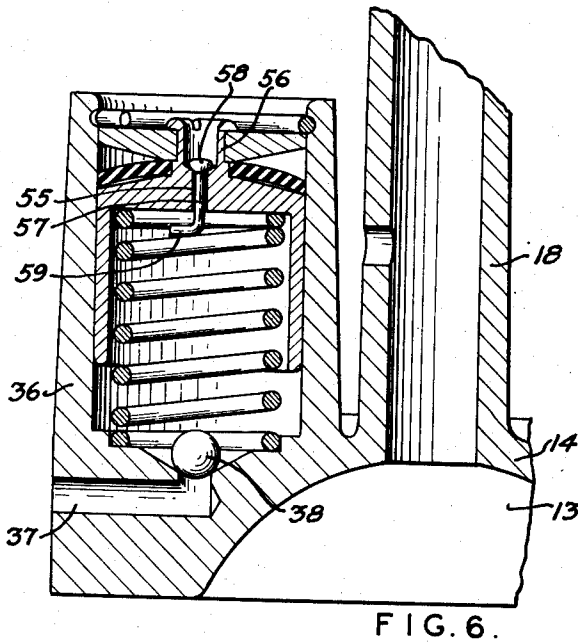


FIG. 7.

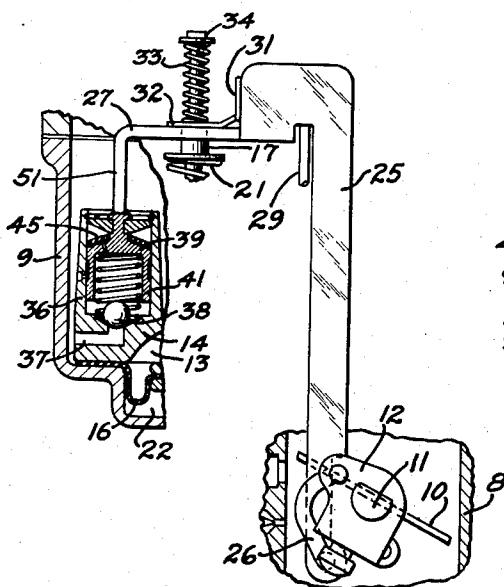


FIG. 4.

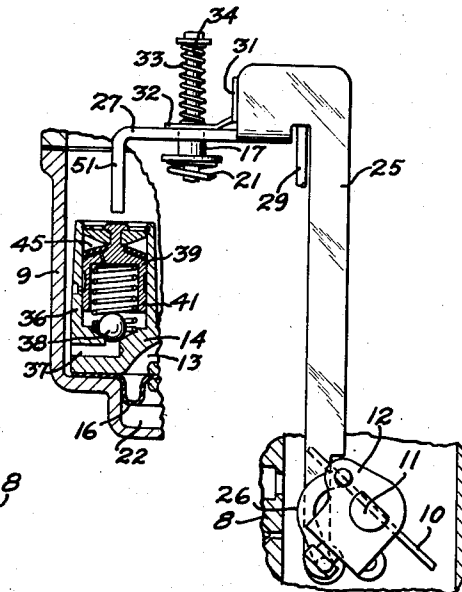


FIG. 5.

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2,703,705

SLOW CLOSING THROTTLE DEVICE

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Application February 28, 1951, Serial No. 213,073

1 Claim. (Cl. 261-34)

This invention relates to carburetors for internal combustion engines and consists particularly in novel means for retarding the final portion of the throttle closing movement in order to prevent stalling in case the throttle pedal is suddenly released while the engine is operating slowly, particularly, if the engine is equipped with a fluid coupling.

Dash pot arrangements have been provided, previously, for accomplishing the above function, but these have been of relatively complicated and expensive construction.

Consequently, it is the main object of the present invention to provide a novel, simplified, and less expensive slow closing throttle dash pot for a carburetor.

This object and other more detailed objects hereafter appearing are attained by the devices illustrated in the accompanying drawings in which:

Fig. 1 is a side view of a carburetor embodying the invention, portions being broken away and sectioned to illustrate the functional parts.

Fig. 2 is an enlarged view of the dash pot piston disassembled.

Fig. 3 is an enlarged section showing a portion of the structure in Fig. 1 including the dash pot.

Fig. 4 is a fragmentary sectional view showing the dash pot and its actuating connections just prior to retardation of the throttle closing movement thereby.

Fig. 5 shows the structure of Fig. 4, but with the throttle open beyond the range of the dash pot action.

Fig. 6 is a view similar to Fig. 3, but showing a modification.

Fig. 7 is an enlarged section of the dash pot piston in Fig. 6.

Figure 1 shows a downdraft carburetor, in general, of known construction, having a mixture barrel portion 8 and a fuel bowl 9 within which fuel is maintained at a substantially constant level by means of the usual needle valve and float mechanism (not shown). In the lower part of the mixture barrel is a butterfly throttle valve 10 mounted on a shaft 11 on one end of which is rigidly attached an arm 12. In the lower part of the float bowl there is formed an accelerating pump pressure chamber 13 having a top wall 14 with an inlet aperture 15. A flexible diaphragm 16 extends across the pressure chamber and has an actuating stem 17 secured to the central portion thereof and projecting upwardly through wall 14 and a guide tube 18. A collar 19 seats against an annular shoulder 20 on the actuating stem and itself seats a coiled, compression spring 21 which constantly urges stem 17 and the pump diaphragm upwardly in the discharge direction. A chamber 22 below pump diaphragm 16 is connected by a suction passage 23 to the mixture conduit posterior to throttle valve 10.

A goose neck link 25 extends upwardly from the vicinity of the throttle valve through the floor of bowl 9 and, at its lower extremity, is connected by a small link 26 to throttle shaft arm 12. A sideward extension 27 from the goose neck link has an opening 28 which slidably receives pump stem 17. A metering rod 29 has its lower extremity projecting into main metering orifice element 30 and at its upper end is carried by a bracket element 31 which has an extension 32 normally secured between goose neck link extension 27 and a coiled spring 33 on the reduced upper extension 34 of the pump stem.

Under normal operating conditions, pump diaphragm 16 follows the throttle valve, drawing fuel through port 15 into chamber 13 as the throttle is closed and expelling

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this fuel through an outlet passage (not shown) into the mixture barrel as the throttle valve is opened. The pump diaphragm, also, may move upwardly a slight distance independently of the throttle connection when suction drops in the mixture barrel posterior to the throttle. This pump is more fully described and claimed in a co-pending application, Serial No. 117,772, filed September 26, 1949, now Patent No. 2,619,333 dated November 2, 1952 in the name of John S. Carrey.

A dash pot cylinder 36 is formed integral with top wall 14 of the pump pressure chamber and immediately adjacent tubular guide 18 for stem 17. A small passage 37 connects the interior of the cylinder with the fuel bowl and is provided with a ball check 38 at its seat forming inner end. A dash pot piston 39 works in this cylinder and is constantly urged upwardly by a coiled compression spring 40. The piston includes a lower cup-shaped portion with a wall 41, the major portion of which rather closely fits the inner wall of cylinder 36 and which has a wide annular groove 42 registering with a port 43 through the cylinder wall. A stem 44 projects upwardly from the cup and receives a packing washer 45, conveniently of synthetic rubber or similar flexible material. The washer is of somewhat greater diameter than the cylinder and flexes over center during operation as in Figs. 4 and 6 so that close tolerances of the washer and cylinder are not important. A frusto-conical disk 46 fits over stem 44 and secures the packing washer in position. Stem 44 on the piston cup is riveted over at 47 to secure the disk in position. The upward stroke of the dash pot piston is limited by a split ring 48 of spring wire which seats in an annular groove 49 near the upper extremity of the cylinder wall.

Sideward extension 27 on goose neck link 25 has a depending element 51 at its outer extremity which is in position to engage dash pot projection 44 during the throttle closing movement when the throttle valve reaches approximately the position shown in Fig. 4. Thereafter, further closing movement of the throttle valve is retarded by the dash pot as the plunger is forced downwardly from the position in Fig. 4 to that in Fig. 1.

During downward, retarding action of the dash pot piston, liquid is expelled from beneath the piston through a small port 52 in the top thereof. Packing 45 flexes, as in Fig. 1, and prevents escape of the liquid upwardly. The liquid, however, may escape, slowly, downwardly along the side wall of the cup-shaped dash pot piston and thence back into the fuel bowl through annular groove 42 on the piston wall and relief port 43. The retarding action of the dash pot is dependent upon the closeness of fit of the dash pot piston within cylinder 36, the length of the land between groove 42 and the upper wall of the piston cup as well as the size of passage 52, and the sizes of ports 52 and 43. When the throttle valve is again moved toward open position, the dash pot piston is forced upwardly by its spring 40 and fuel may enter rapidly through passage 37 and past check 38. Figs. 3 and 5 show the dash pot in its fully extended position.

Figs. 6 and 7 show a modification in which liquid is released from the interior of the dashpot chamber during the retarding, downward action thereof through a passage 55 formed centrally in the top wall of the dash pot piston and opening into the fuel bowl through the hollow actuating projection 56. This projection receives the packing washer and its securing disk, as in the previous form. Relief passage 55 is restricted by a wire 57 enlarged at its upper end, as at 58, and bent sidewardly at its lower end, as at 59, to secure the same in position. This means of providing a restricted outlet for the dash pot liquid is considerably cheaper to manufacture than that shown in the first form.

The invention may be modified in various respects as will occur to those skilled in the art and the exclusive use of all modifications as come within the scope of the appended claim is contemplated.

I claim:

In a carburetor, a mixture conduit, a throttle valve therein, a fuel bowl, an accelerating pump and a dashpot located side by side in said bowl and both communicating with said bowl, said dashpot comprising a cylinder open at its upper end, a piston slidably fitting said cylinder, a

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packing groove in said piston substantially equal in width to the length of stroke of said piston and tapered from the piston periphery inwardly, an apertured packing washer of substantially uniform thickness secured at its inner periphery by the inward taper in said groove and projecting outwardly therefrom, whereby said washer flexes in said packing groove so that the upper and lower edges of said washer engage said cylinder wall, a link operatively connected to said throttle and said pump, and an element on said link disposed to engage and actuate said piston during a portion of the throttle closing movement.

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