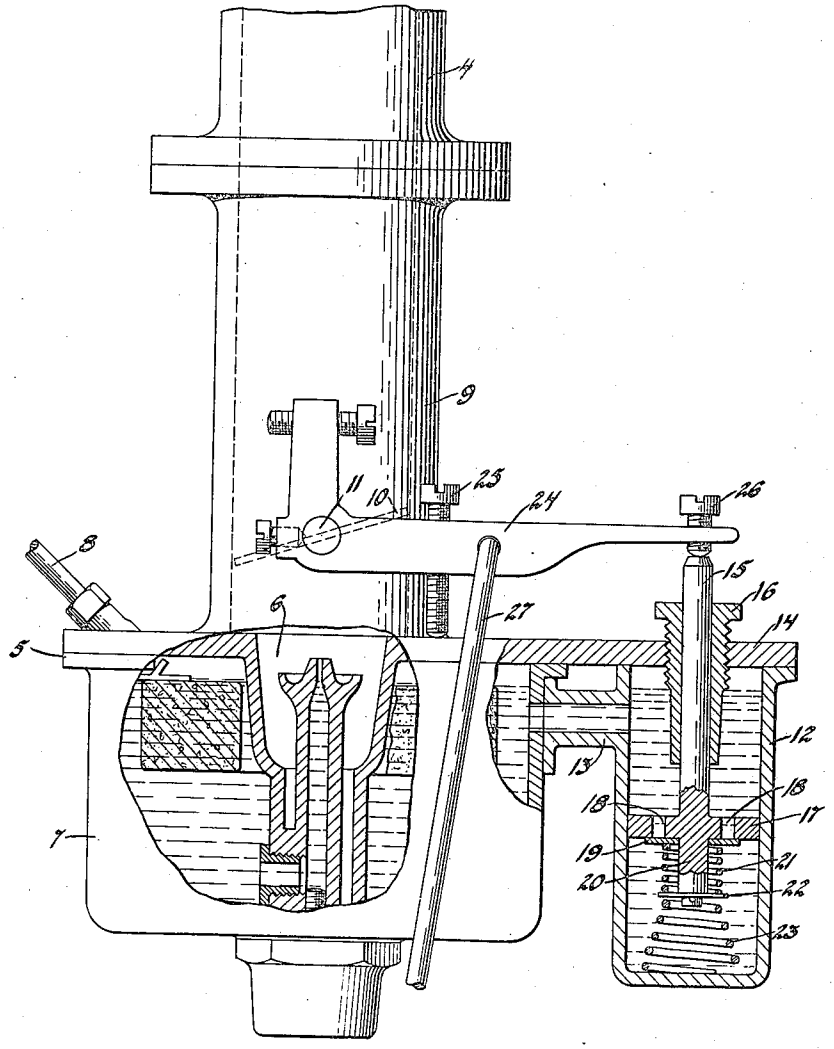
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ANTISTALLING DEVICE

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ANTISTALLING DEVICE

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In automotive vehicles in which there are provided internal combustion propelling engines, there is commonly provided a device which is known as an accelerator through which, by moving the throttle valve of the carburetor, the operator of the vehicle may control the speed of the engine. Movement of the accelerator in a direction to open the throttle valve and increase the speed of the engine is ordinarily effected by movement of the operator's foot, whereas movement of the accelerator in the reverse direction to close the throttle valve and decrease the speed of the engine is ordinarily effected automatically by means of a suitable spring device which causes the throttle valve to be moved from open to closed position quite suddenly.

When the engine is operating at high speeds or under heavy loads and under such conditions that no extraneous means will function to prevent a sudden decrease in the speed of the engine, a sudden movement of the throttle valve from open to closed position causes a sudden decrease in the speed of the engine. This sudden decrease in the speed of the engine disturbs mixture conditions in the induction system and, ordinarily, results in uneven running of and, frequently, in stalling the engine.

My invention relates to means for preventing a sudden decrease in the speed of the engine so as to prevent uneven running or stalling of the engine under the conditions outlined above, and resides, in the embodiment of my invention illustrated in the accompanying drawing, in the provision of a dashpot, and a piston which works in the dashpot and is adapted to be engaged, through the intermediary of a piston rod, by the throttle valve operating arm when the throttle valve reaches a predetermined position, and, thereafter, to decelerate the rate of closing of the throttle valve so that sufficient time will elapse before the throttle valve reaches fully closed position for mixture conditions in the induction system to become adjusted to the slower rate of engine speed and that uneven running and stalling of the engine is prevented.

For a better understanding of the nature and objects of the present invention, reference is made to the following specification in which is described the preferred embodiment of my invention which is illustrated in the accompanying drawing.

In the single figure of the accompanying drawing, there is shown, in side elevation with parts broken away and in section, a carburetor and certain associated parts of an automotive vehicle in which is embodied my invention.

In the drawing, the reference character 4 indicates the riser of the intake manifold of an internal combustion engine, and the reference character 5 a carburetor, which includes a mixing chamber 6, a float bowl 7 to which fuel is supplied from a suitable source through a pipe 8, and a mixture conduit 9 which opens into the mixing chamber 6 and into the intake riser 4. In the mixture conduit 9, there is located a throttle valve 10 of the butterfly type which is fixed on a shaft 11.

To the body of the carburetor, there is suitably secured a dashpot 12, which is connected to the float bowl by a conduit 13 which opens into the float bowl and the dash pot below the level of the fuel in the float bowl, so that when the float bowl is filled, fuel will flow therefrom, through the conduit 13, into the dashpot and fill the latter to the same level as the float bowl. The upper end of the dashpot is closed by a suitable cover 14, which may be, as shown in the drawing, integral with the body of the carburetor and the means through which the dashpot is secured to the body of the carburetor. A piston rod 15 is slidably mounted in a guide 16 which extends through the cover 14 of the dashpot. The upper end of the piston rod extends above the upper end of the guide 16 and the lower end thereof extends into the dashpot and carries a piston 17 through which extend a plurality of openings 18. A plate valve 19, which is slidably mounted on a projection 20 which is formed on the lower side of the piston, is urged, by a coil spring 21 which surrounds the projection and bears at its opposite ends against the lower side of the valve 19 and against an abutment 22 which is fixed on the projection 20, to a position in which it closes the openings 19. A coil spring 23, which bears at its opposite ends against the abutment 22 and against the bottom of the dashpot, urges the piston 17 to its uppermost position in the dashpot.

To the shaft 11 on which the throttle valve is mounted, there is secured an operating arm 24 through an intermediate portion of which extends a set screw 25, which is adapted to engage the body of the carburetor to limit the closing movement of the throttle valve, and on which is provided an extension through which extends a set screw 26 which is adapted to abut against the upper end of the piston rod 15. There is secured to the operating arm 24, intermediate its ends, a rod 27 through which the throttle valve

is adapted to be opened by an accelerator of the type which is ordinarily provided on automotive vehicles and through which the throttle valve is adapted to be closed by a suitable spring device (not shown) of the type which is ordinarily employed on automotive vehicles and which is strong enough to close the throttle valve against the resistance of the spring 23.

When the carburetor is installed on the internal combustion engine of an automotive vehicle and the engine is operating at a speed above a predetermined speed, the set screw 26 will not be in engagement with the piston rod 15. When, however, the operator of the vehicle moves the accelerator, or allows it to be moved, in a direction to decrease the speed of the engine, the rod 27 will move the throttle valve toward closed position. When the throttle valve has been closed to a predetermined extent, the set screw 26 will abut against the upper end of the piston rod 15. Thereafter, further movement of the rod 27 in a direction to close the throttle valve will cause the piston to be moved downwardly in the dashpot. Since downward movement of the piston will be resisted by the spring 23 and can take place only when accompanied by leakage of fuel from the lower to the upper side of the piston, the movement of the throttle valve from the position in which it is when the set screw 26 abuts against the upper end of the piston rod 15 to fully closed position, will be much slower than it would be if its movement were not resisted by the means above mentioned. By retarding the rate of closing of the throttle valve during the latter part of its closing movement, the means above mentioned insures that, before the throttle valve has reached fully closed position, sufficient time will have elapsed for the mixture conditions in the induction system to become adjusted to the slower rate of engine speed and, therefore, serves to prevent uneven running and stalling of the engine at such times.

When the rod 27 is operated to move the throttle from closed to open position, the piston 17 will be moved upwardly in the dashpot by the spring 23. During this upward movement, the valve 19 will be opened against the resistance of the spring 21 and sufficient of the fuel in the dashpot above the piston will drain through the openings 18 into the portion of the dashpot below the piston to maintain the lower part of the dashpot filled with fuel.

It is obvious that the objects of the invention may be attained by means other than described above. For this reason, it is to be understood that, although I have shown and described a preferred embodiment of my invention, this has been done by way of example and not by way of limitation, and that the scope of my invention is to be determined only by the appended claims.

I claim:

1. A throttle, and actuating means therefor including a liquid containing dashpot to retard the last part only of the closing movement of said throttle.

2. In a carburetor, a throttle and means including a liquid containing dashpot to retard the last part only of the closing movement of said throttle.

3. Supplemental controlling means for the throttle controlling apparatus of a hydrocarbon internal combustion engine comprising a dashpot arranged to engage said throttle controlling apparatus during the closing movement of the latter, but only just prior to the completion of said movement, and to thereby slightly delay the completion of said throttle closing movement.

4. Controlling means for the throttle valve of a hydrocarbon internal combustion engine comprising the combination with an oscillating element controlling the operation of said valve, of a dashpot apparatus having a reciprocally oscillating element the movement of which is retarded in one direction, but may be relatively rapid in the other direction, said elements being so located with reference one to another that the throttle element, during the last stage only of its throttle closing movement, engages said dashpot element and tends to move the latter in the direction in which it is capable of slow motion only.

5. An apparatus such as defined in claim 4 combined with a spring tending to move said dashpot element in the opposite direction and a stop for limiting said latter motion.

6. An apparatus such as defined in claim 4 combined with a spring tending to move said dashpot element in the opposite direction and a stop for limiting said latter motion, together with a second spring tending to move said throttle element in a throttle-closing direction and which is strong enough to overpower the first spring, when said elements are in operative engagement.

7. A combination such as defined in claim 4 in which said dashpot apparatus comprises a closed casing containing a body of liquid and a piston fitting said casing and movable in said liquid.

8. In internal combustion engine carbureting apparatus, means for conducting combustible mixture to the engine, a valve which decreases the volume of combustible mixture which is supplied to the engine per unit of time when it is moved in one direction, means for moving the valve in the mentioned direction so as to decrease the volume of combustible mixture which is supplied to the engine per unit of time, and retarding mechanism which is so constructed and arranged that it is ineffective during the earlier stages of movement of the valve in the mentioned direction but retards the rate of decrease of the volume of combustible mixture which is supplied to the engine per unit of time after the valve has been moved to a predetermined position in the mentioned direction.

9. The invention claimed in claim 8 in which the retarding mechanism includes a dashpot mechanism.

10. In internal combustion engine carbureting apparatus, means for conducting combustible mixture to the engine, a valve which decreases the volume of combustible mixture which is supplied to the engine per unit of time when it is moved in one direction, means for moving the valve in the mentioned direction so as to decrease the volume of combustible mixture which is supplied to the engine per unit of time, and retarding mechanism which is so constructed and arranged that it is ineffective during the earlier stages of the movement of the valve in the mentioned direction but resists further movement of the valve in the mentioned direction so as to retard the rate of decrease of the volume of combustible mixture which is supplied to the engine per unit of time after the valve has been moved to a predetermined position in the mentioned direction.

11. In internal combustion engine carbureting apparatus, means for conducting combustible mixture to the engine, a valve which decreases the volume of combustible mixture which is sup-

plied to the engine per unit of time when it is moved in one direction, means for moving the valve in the mentioned direction so as to decrease the volume of combustible mixture which is supplied to the engine per unit of time, and retarding mechanism which is so constructed and arranged that it is out of engagement with the valve during the earlier stages of the movement of the valve in the mentioned direction but is engaged by the valve or a part operatively associated therewith after the valve has been moved to a predetermined position in the mentioned direction so that it resists further movement of the valve in the mentioned direction and retards the rate of decrease of the volume of combustible mixture which is supplied to the engine per unit of time after the valve has been moved to a predetermined position in the mentioned direction.

12. In a carburetor, a mixture passage, a valve in the mixture passage to control the discharge of combustible mixture therefrom, means for moving the valve, and means adapted to resist movement of the valve only when it is moving toward closed position and has reached a predetermined position between fully opened position and fully closed position, the last mentioned means including a dashpot mechanism which is operatively connected to the valve only when the valve is in a predetermined position.

13. In a carburetor, a mixture passage, a valve in the mixture passage to control the discharge of combustible mixture therefrom, means for moving the valve, and means adapted to resist movement of the valve only when it is moving toward closed position and has reached a predetermined position between fully opened position and fully closed position, the last mentioned means including a cylinder, and a piston in the cylinder adapted to be operatively connected to the valve only when the valve is in a predetermined position and then to resist movement of the valve only when it is moving toward closed position.

14. In a carburetor, a mixture passage, a valve in the mixture passage to control the discharge of combustible mixture therefrom, means for moving the valve toward closed position, and means including a dashpot mechanism for retarding the rate of closing of the valve during the latter part only of its closing movement.

15. In a carburetor, a mixture passage, a valve in the mixture passage to control the discharge of combustible mixture therefrom, means for moving the valve toward closed position, and means for retarding the rate of closing of the valve during the latter part only of its closing movement, the last mentioned means including a dashpot mechanism to which the valve is operatively connected during the latter part only of its closing movement.

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