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CARBURETOR

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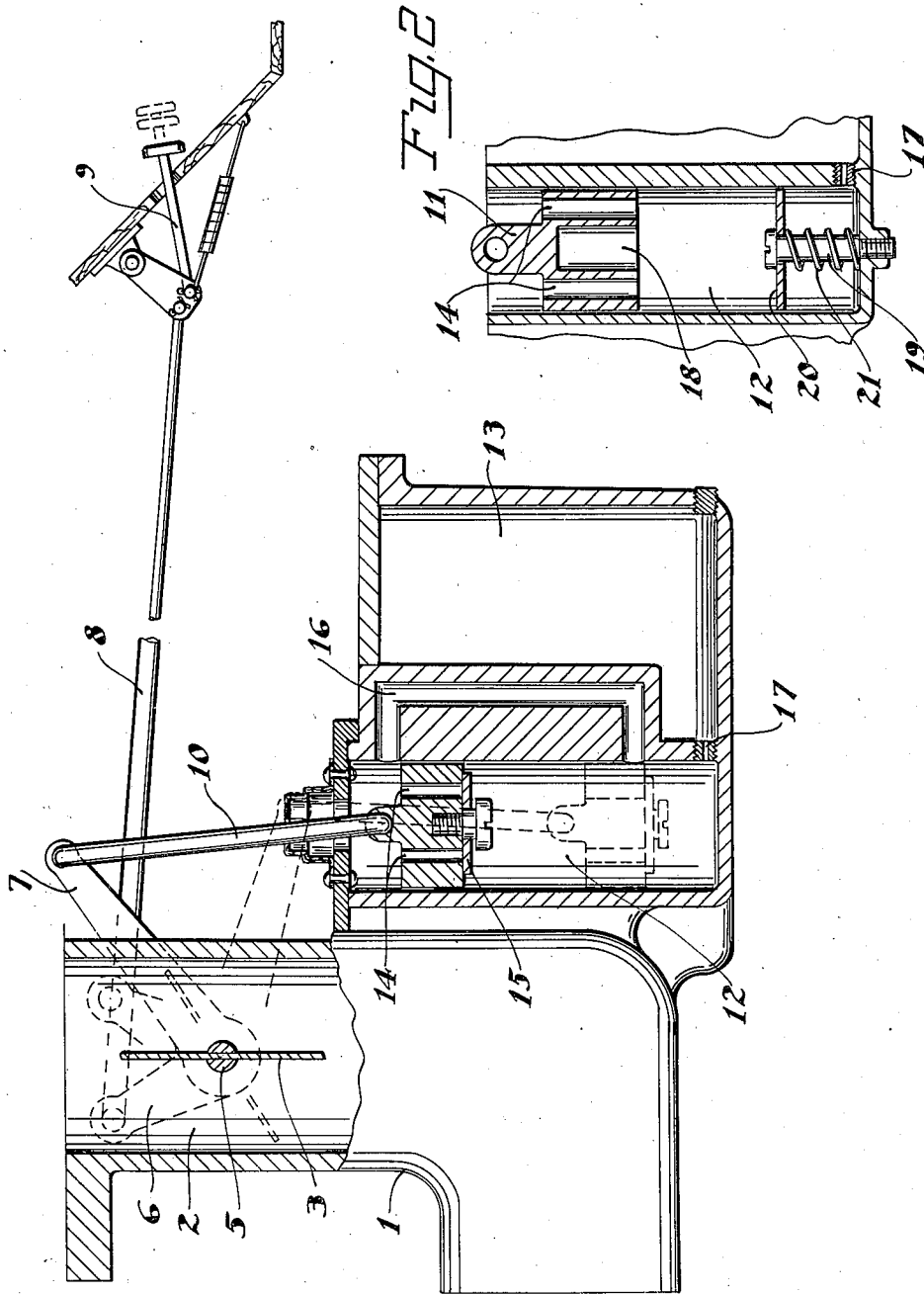


Fig. 1

Fig. 2

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CARBURETOR

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3 Claims. (Cl. 123—119)

This invention relates to carburetors for automobile engines and more particularly has reference to throttle controlling devices therefor.

When an automobile engine is operated at wide open throttle, or very nearly so, and the clutch is thrown out and the carburetor returned to idle, the engine sometimes stalls because of the mixture being too rich. The reason for this trouble seems to be that during wide open throttle operation, there is nearly full atmospheric pressure in the intake manifold and usually a film of liquid fuel, amounting to several cylinder charges, adheres to the manifold walls. When the throttle is then suddenly closed, the air pressure in the manifold is suddenly reduced considerably and the liquid fuel film immediately flashes into a vapor; this at a time when very little air is being admitted through the idling throttle opening, so that the mixture is momentarily overenriched.

The object of this invention is to obviate the above difficulty by allowing the throttle to close at its normal speed to a point where the speed of the engine is properly decreased, and then retarding the further movement of the throttle to the idling position. Thus, I have found that if the throttle is returned at its normal rate to, say a twelve miles an hour position, and then returned at a slow rate to extreme idle, stalling of the engine can be prevented.

With this and further objects in view which may be incident to my improvements, my invention consists in the combination and arrangement of elements hereinafter described and illustrated in the accompanying drawing, in which:

Figure 1 is a small scale side elevation of the accelerator pedal of an automobile and a larger scale section of a carburetor barrel and float chamber;

Figure 2 is a fragmentary section on an enlarged scale of a modified form of dash pot.

Referring particularly to Figure 1, the reference numeral 1 designates a carburetor having the usual barrel 2, in which is mounted a butterfly throttle valve 3 to control the flow through the carburetor. A shaft 5, carrying throttle valve 3, is journaled in the walls of barrel 2 and carries at one end outside said barrel fixed arms 6 and 7, the former connected by a rod 8 to a spring-retracted accelerator pedal 9, and the latter by a link 10 to a piston 11 operating in a dash pot 12 interposed between the carburetor barrel 2 and a liquid fuel supply chamber 13. Piston 11 has a slidable fit in dash-pot 12 and is provided with a plurality of channels 14 which

are closed by a check valve 15 during the down stroke of the piston but are open for the circulation of liquid therethrough during the up stroke of the piston, as clearly shown in Figure 1. In the wall between dash-pot 12 and float chamber 13, there is provided a by-pass channel 16, the upper outlet of which is above the normal travel of piston 11 and the lower outlet of which opens into dash-pot 12 at a point where it is desired to retard the piston on its downward stroke. Dash-pot 12 communicates at its bottom with float chamber 13 through an interchangeable, calibrated metering restriction 17. This not only permits the supply of retarding fluid (gasoline) to enter the dash-pot at all times, but fixes the rate of retardation of piston 11 and by substituting restrictions with different bores, this rate may be properly regulated.

In Figure 2, I have shown a modification in which the piston 11 carries no check valve, but in lieu thereof is provided with a central bore 18 which fits over and receives a stud 19 screw-threaded into the bottom of dash-pot 12 where the piston reaches the lower end of its stroke. Stud 19 serves as a guide post for an annular plate 20 which reciprocates thereon and is normally held against the head of the stud 19 by an encircling spring 21 in a position in dash-pot 12 corresponding to the lower outlet of by-pass 16 in Figure 1. When piston 11 contacts with plate 20 on its downward stroke, the circulation of liquid through channels 14 is cut off and the piston then descends against the pressure of spring 21 and the inertia of liquid below plate 20 escaping through restriction 17.

The operation of my device is apparent from the foregoing description. When the throttle is fully open, the accelerator pedal 9 is fully depressed and the piston 11 is at the top of its stroke, all as shown in full lines in Figure 1. If now the pedal 9 is released, its spring quickly changes the throttle to the partially closed, slow speed position shown in dotted lines in Figure 1. At the same time piston 11 descends to its dotted position, where it just cuts off the lower outlet of by-pass 16. This position of the throttle corresponds to an engine speed somewhat above idling, or approximately twelve miles an hour. In descending to the position shown in dotted lines in Figure 1, the piston does not appreciably retard the closing of the throttle because of the free circulation of liquid through by-pass 16. Any slight retarding caused by the piston to this point can be overcome by increasing the tension

on the accelerator pedal spring so that the rate of closing of the throttle is unaffected.

After reaching the position shown in dotted lines in Figure 1, the descent of piston 11 is retarded by the restricted rate at which the liquid trapped below the piston escapes through calibrated orifice 17, and the further closing of the throttle 3 is correspondingly retarded until it reaches its most restricted or idling position.

By this arrangement the throttle can return rapidly up to a position of about 12° from the extreme restricted position (corresponding to a speed of about twelve miles per hour), and from this point on, will return slowly, depending on the adjustment of the dash pot. By thus retarding the last part of the throttle closing, I avoid the over-enrichment of the mixture and stalling of the engine.

While I have shown and described the preferred embodiments of my invention, I do not wish to be limited to the constructional forms shown by way of illustration, as changes in combination and arrangement of elements may be made by those skilled in the art without departing from the spirit of my invention or exceeding the scope of the appended claims.

I claim:

1. In a carburetor, a throttle, a liquid fuel supply chamber, a dash-pot communicating with and supplied with liquid from said chamber through a calibrated metering restriction, a piston adapted to reciprocate in said dash-pot, a by-pass in said dash-pot around said piston operative during the major part of its stroke, and a connection

between said piston and throttle so that when said throttle is closed, said piston travels freely during the operation of said by-pass and then at a retarded rate dependent upon said metering restriction whereby said throttle closes at a rapid rate during the major part of its closing movement and thereafter at a retarded rate.

2. In a carburetor, a throttle, a liquid fuel supply chamber, a dashpot communicating with and supplied with liquid from said chamber through a removable metering restriction at the bottom of the dashpot, a piston reciprocably mounted in the dashpot and connected to the throttle, a conduit in the dashpot by-passing the piston and terminating adjacent the lowermost position of the throttle above the metering restriction in such relation that when the throttle is moved to its closed position the piston travels freely through the greater part of its stroke and obstructs the by-pass to force liquid fuel through the metering restriction.

3. In a carburetor, a throttle, a liquid fuel reservoir, a dashpot supplied with liquid from the fuel reservoir, a piston reciprocably mounted in the dashpot and connected to the throttle, and liquid conduits associated with the dashpot and arranged to cause the piston to force fuel against a relatively low resistance during a part of the closing movement of the throttle and to cause it to force fuel through a relatively high resistance during the remainder of the closing movement of the throttle.

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