May 17, 1938. W. C. HOLDEN 2,117,421

THROTTLE VALVE CONTROL MEANS

Filed July 24, 1934

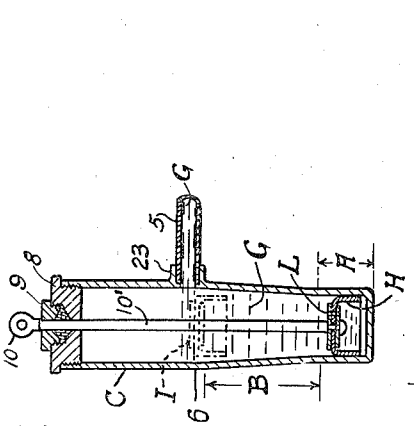


Fig. 4.

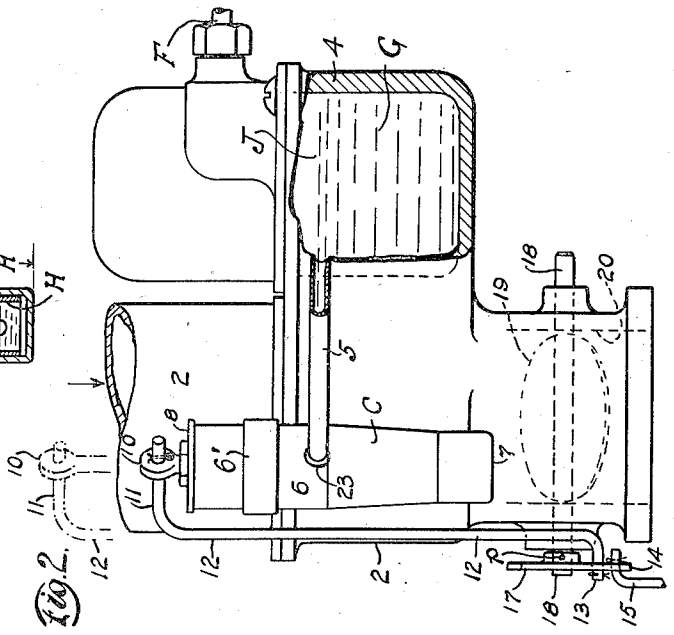


Fig. 2.

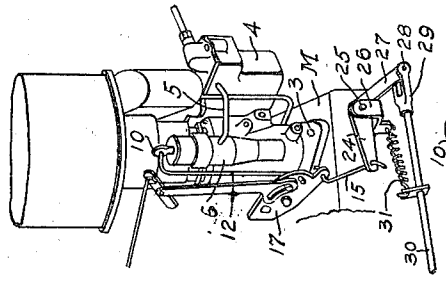


Fig. 1.

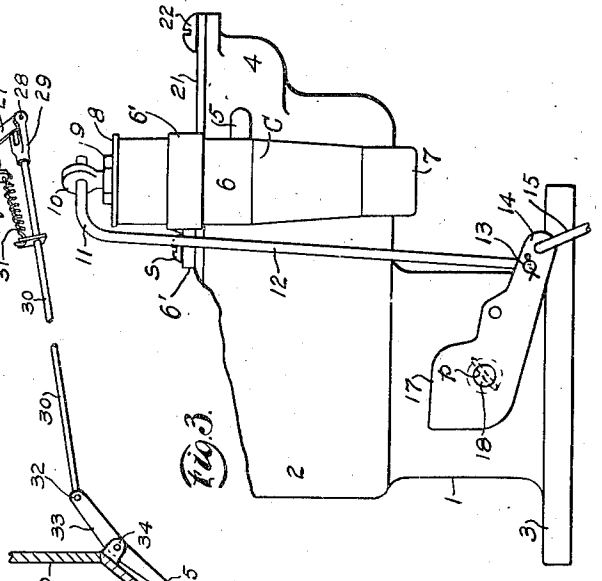


Fig. 3.

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THROTTLE VALVE CONTROL MEANS

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1 Claim. (Cl. 137—139)

The present invention relates to an improvement in automobile engine accelerator pedal control means, and it has for its principal object the provision of means in conjunction with the pedal accelerator of an automobile gas engine, whereby to permit of instant acceleration of the engine and to control the deceleration thereof to the desired degree, particularly but not exclusively while the engine is clutched to the gear drive means.

In modern automotive practice, the tendency is to build light weight automobiles with heavy powered, high speed engines, and this tendency, while increasing the pick-up, speed and acceleration of automobiles, when the throttle valve of the engine carbureter is opened, also has the unpleasant tendency to decelerate the speed of the automobile so rapidly, when the foot is removed from the accelerator pedal, as to tend to throw the passengers forwardly out of their seats.

It is, therefore, amongst the objects of the present improvement to permit of instant acceleration of the automobile and to so control the deceleration thereof, automatically, as to obviate the unpleasant rapid deceleration of the vehicle.

Such variable engine speed control is mainly accomplished through a throttle valve located in the carbureter passage and is well known practice.

Therefore, in order to control the deceleration action of the throttle valve, automatically, without interfering with the possibility of instant acceleration action of the throttle valve there has been provided, as will later be described in detail, a one way acting dash-pot throttle valve control, utilizing the liquid gasoline, from the usual carbureter float control chamber, as a liquid medium, to measurably control the dash pot plunger in its downward stroke, thus to prevent too rapid deceleration when the driver's foot is removed from the accelerator pedal.

The foregoing, and other features of advantage will be apprehended as the description herein proceeds, and it is obvious that modifications may be made in the structure herein, without departing from the spirit hereof or the scope of appended claim.

In the drawing,

Fig. 1 is a reduced, perspective view of a gasoline carbureter having the throttle valve control means attached thereto in one form of embodiment;

Fig. 2 is an enlarged side elevation of a fragmented carbureter with portions broken away for better showing;

Fig. 3 is an enlarged side view of the lower intake end and float chamber portion of the carbureter, with parts broken away or removed, showing the dash-pot throttle valve connection; and

Fig. 4 is a transverse section, enlarged, of the dash-pot, showing the dash piston in its lowermost, throttle closing position.

As the carbureter is of well known "down-draft" construction only such main details thereof as cooperate with the present improvement will be described to aid in a proper understanding of the function of the instant improvement.

The carbureter, Fig. 3 as partially shown comprises a body formed with a fastening flange 3 attached to the throttle valve port portion 1, which latter is surmounted by the Venturi passage portion 2. To one side of the Venturi portion 2 is located the fuel float chamber 4, as in Figs. 1, 2 and 3.

The throttle valve port portion 1 has a passage way, shown dotted at 20, Fig. 2, and this passage is traversed by a rotatable throttle valve shaft 18, which carries and operates the usual butterfly, or throttle valve disc 19, for variably controlling the port 20, and thus control the speed of the engine.

One end of the shaft 18 has affixed thereto, by a pin *p*, a lever arm 17 and this in turn mounts a foot pedal operated lever operating rod 15, Figs. 1, 2 and 3, which latter, as in Fig. 1 has its other end operatively connected to one arm 24 of a crank arm which is pivoted at 25 to a bracket 26, the latter being rigidly connected and fulcrumed to the manifold M. The other end 27 of the crank arm is operatively connected to a yoke end 29 at 28, said yoke end being fixedly mounted to a reciprocable push rod 30. Rod 30 is operatively connected at its opposite end, at 32 Fig. 1, to one end of a rock arm 33, said arm being pivotally mounted and fulcrumed at 34 to a bracket fixed to the underside of dash D.

The other end of arm 33, as at 35, is operatively connected to a push rod 37, with the opposite end of push rod 37 being operatively connected at 36 to an accelerator pedal 37 which is pivotally connected in the usual manner through and to the upper face of foot board of dash D at 38.

The foregoing described foot operated means to cause operation of the throttle valve 19, is a characteristic construction, well known in this art.

The throttle valve control comprises the dash

pot C shown in section in Fig. 4, and is shown as having a closed bottom, a threaded open upper end closed by a threaded cap plug 8, said plug mounting a bored packing nut 9, which surrounds the piston rod 10', for reciprocal movement thereof, with its leather cup piston, generally denoted by H, said cup piston being constructed in the known manner.

The upper end of the piston rod 10' may carry an integral eye 10, for operatively receiving the upper integral arm 11 of a reciprocating rod 12, the lower end of which rod 12 is operatively connected to the rock lever 17 at 13, Fig. 2. Rocking of the lever 17 upwardly by accelerator pedal 36, causes the piston H to rise to the dotted position I, Fig. 4.

At its mid-portion the dash-pot has a tubular connection 5, connected to its boss 23, the other end of 5 being connected into the float chamber 4, at 5, Fig. 3, at about the normal gasoline level, as controlled by the usual float cut-off not shown, and liquid gasoline G flows into the dash pot C through tube 5 and thus keeps tube 5 filled to float level J with gasoline, which acts as the fluid decelerant when piston H starts downwardly, under influence of spring 31.

It will further be noted that the dash-pot cylinder C, at or about its lower end A, is a normal, straight cylindrical fit with the periphery of the piston H, and flares outwardly and upwardly along a distance B, and from thereon is of larger, constant bore, to its upper threaded end, thus providing for a sequentially increasing piston clearance, on the upstroke of the piston, for rapid acceleration or deceleration control of valve throttle 19; and also providing for a sequential retardation action on the piston, for decreasing the speed of the piston upon the down stroke under the action of spring 31, such decreasing speed being of increased ratio as the piston H descends into the gradually decreasing piston cylinder area.

The piston cup may be provided with an extremely small vent hole L, as in Fig. 4, to gradually permit the escape of fuel from the chamber under the cup washer as the piston H approaches its final closed position.

Various structural details of means of embodying the dash-pot control may be substituted for the structure herein disclosed and still permit of fast, accelerating piston movement and automatic, gradually retarded deceleration movement of the piston and its appurtenant throttle valve, during the last stage of the throttle closing movement.

From the foregoing it will be noted that as in Fig. 4, the cylinder C is decreased progressively in nominal inside diameter from the top to the bottom, as viewed in Fig. 4, being larger at the top and, at the bottom being an operative fit with the piston H, so that while the piston may be rapidly moved upwardly, its downward movement is gradually retarded progressively until the piston reaches the upper limits of position A, whereupon the tighter fitting of the piston H, causes the vent L to operate to pass liquid to the upper chamber above the piston, thus further progressively decreasing the piston movement and accordingly the throttle valve closing speed. In this manner the engine speed is gradually reduced, progressively, to its slowest speed of rotation.

Having thus described the invention, what is claimed is:

In combination with an internal combustion engine carburetor having a throttle valve and a constant level chamber, manual means for opening the throttle valve, a spring for closing the throttle valve, and means for resisting movement of said throttle valve comprising a dash pot communicating with said constant level chamber, and a cup-shaped piston in said dash pot permanently connected to said throttle valve, said piston including a relief vent, said dash pot having a reduced cylindrical end portion shaped to snugly receive said piston during its movement therein, the open end of said cup-shaped piston facing the reduced end portion of said cylinder, said relief vent permitting the travel of said piston at a substantially predetermined constant rate in said reduced cylindrical end portion under tension of said spring, and walls tapered away from said reduced cylindrical end portion to permit a varying rate of movement of the piston toward said end portion.

WILLIAM C. HOLDEN.