Sept. 24, 1957 A. BRUEDER 2,807,457

HYDRAULIC DEVICE FOR RETARDING THE RETURN OF A CARBURETOR THROTTLE TO ITS IDLING POSITION

Filed Oct. 19, 1954 2 Sheets-Sheet 1

Fig. 1

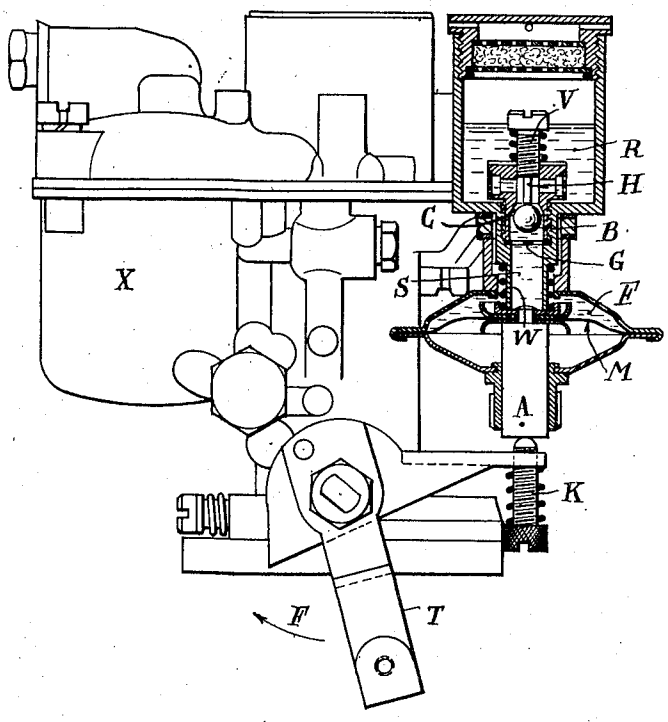

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Fig. 2

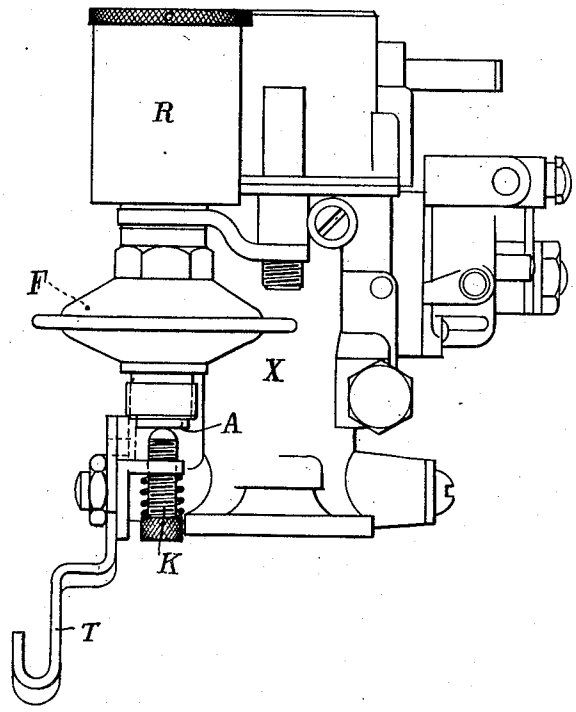
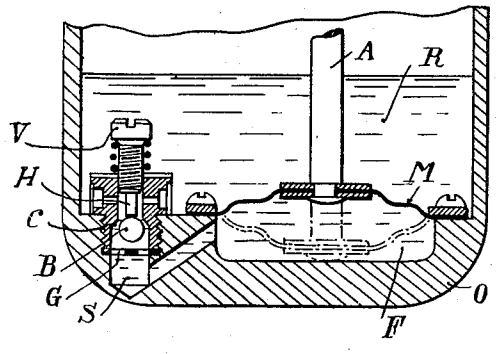


Fig. 3



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HYDRAULIC DEVICE FOR RETARDING THE RETURN OF A CARBURETOR THROTTLE TO ITS IDLING POSITION

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6 Claims. (Cl. 267—1)

This invention relates to automotive construction and more particularly to control means adapted automatically to retard the return movement of a carburetor throttle to its idling or slow-running position. This feature is particularly useful on vehicles equipped with automatic clutches. On a vehicle, for example an automobile, having a standard transmission with foot-controlled clutch, when the throttle pedal is released after the car has picked up speed, the engine is still driven from the driving wheels through the transmission, but if we consider the case of a vehicle equipped with an automatic clutch, whether self-controlled or controlled through the gear change lever, when the engine rotates at a velocity below the coupling value it is no more driven and must provide by itself, without stalling, the required continuity of operation until it is idling.

When the vehicle engine is subjected to a snap opening of the carburetor throttle under full-torque conditions at low engine speed, upon release of the throttle pedal the engine must be driven during a few seconds, otherwise it will stall for over-richness of the mixture resulting from the gasoline excess required for the immediately preceding acceleration.

Therefore, it is necessary to avoid that the throttle be closed too suddenly so that the engine may get over this period of strong mixture and poor ignition without stalling.

It is the essential object of this invention to provide a device permitting on the one hand a positive and rapid control of the throttle in the acceleration direction and adapted on the other hand to retard the return movement of the throttle to its slow-running or idling position.

For this purpose the accelerator or throttle control is operatively connected with a diaphragm or piston located in a hydraulic or damper chamber communicating with a hydraulic reservoir through a device adapted to throttle the liquid flowing therethrough as the accelerator rod is actuated.

In order to afford a clearer understanding of the invention and of the manner in which the same may be carried out in the practice, reference will now be made to the accompanying drawings forming part of this specification and showing by way of example only a few forms of embodiment of the invention. In the drawings:

Figure 1 is an elevational and part-sectional view of the device equipping a carburetor of standard design.

Figure 2 is a side elevational view of the assembly as viewed from the right-hand side of Fig. 1; and

Figure 3 is a fragmentary sectional view of a modified embodiment.

As the carburetor is of any current or suitable design and therefore not concerned with the purpose of this invention, it is not necessary to describe it and although a conventional carburetor has been illustrated in the drawings as indicated by the reference letter X, it will readily occur to anybody conversant with the art that other types of carburetors may be used for carrying out the invention.

The hydraulic or damper device according to this invention for retarding the return movement of the carburetor throttle to its idling position is associated with the carburetor X and the throttle is controlled by the throttle lever T, as shown.

This device comprises a hydraulic reservoir R, a chamber F having a yielding bottom wall M and communicating with the reservoir R through a passage S and a metering or gaged orifice C acting as a seat for a ball valve B; this ball valve B is adjustable relative to the seat C by means of a screw V, and the diaphragm M is constantly urged to its lowermost position by a spring W, thereby causing the central rod A secured to the central portion of this diaphragm to engage the adjustable screw K carried by the throttle lever T.

This device operates as follows:

The fluid is throttled by the displacement of the ball valve B in the tapered orifice C connecting the reservoir R with the chamber F of which the bottom wall, as already explained, consists of the diaphragm M secured to the rod A.

In the acceleration position (indicated by the arrow F) the ball is at the larger end of the orifice C and in the deceleration or return position at the narrower end of the orifice C, so that the fluid will undergo the maximum throttling action in the first case and the minimum throttling action in the other case.

The downward stroke of the ball B is limited by a perforated disk G and its upward stroke by an adjustable stop H the vertical position of which may be adjusted by means of the screw V; the diameter of the passage overlying the tapered seat C may be equal to, small or greater than the ball diameter, and if it is greater the annular space between the ball and the passage wall may be utilized for regulating the retarding action exerted during the return movement of the throttle.

The fluid may be supplied if desired from the brake fluid reservoir, or from the oil tank, the fuel tank or even the carburetor float chamber of the vehicle. In this last instance the damper of this invention may form an integral part of the carburetor and be mounted in the float chamber thereof, or laterally at the same level as, or above the level of, the liquid fuel, as shown in Fig. 2.

In the alternate form of embodiment shown in Fig. 3 of the drawings, the device is mounted within the float chamber O of the carburetor and the chamber F is positioned beneath the diaphragm M secured to the throttle-controlled rod A; this chamber F communicates with the reservoir R overlying the diaphragm M through a passage S provided with a seat-forming throttling orifice C in which a ball valve B is displaceable under the same conditions as those described with reference to the embodiment of of Fig. 1, a stop member H adjustable by means of a spring-braked screw V limiting the upward stroke of the ball whilst a perforated disk G restricts the downward movement of the ball.

The use of the carburetor float chamber O for supplying the necessary fluid to the hydraulic chamber F is advantageous in that no maintenance is required, but it offers the drawback that the gasoline level is increased when the liquid is forced back to the float chamber from the chamber F of the device; to avoid this, an immersed arrangement is provided in the float chamber; when the rod A and diaphragm M are moved upwards the liquid enters the chamber F through the aforesaid adjustable valve device, but the volume of liquid is compensated by the rising upper portion or wall of chamber F; when the liquid is forced back from the lower chamber F the reverse occurs, so that a capacity compensation is effected by the device.

A device of this character will afford the maximum safety under slow-running conditions, irrespective of the manner in which the vehicle is driven.

What I claim is:

1. A dashpot for progressively retarding the movement in one direction of a movable member which comprises a chamber of which one wall consists of a flexible diaphragm, a push member rigid with said diaphragm and disposed in alignment with said movable member, a spring for constantly urging said diaphragm and push member towards said movable member, a reservoir for a liquid which is located at a higher level than said chamber, a passage connecting said reservoir to said chamber, a nozzle in said passage which is limited on the chamber side by a perforated disc and communicates with said reservoir through a frusto-conical portion having its smaller end on the reservoir side, a valve-forming ball in said nozzle, an adjustable stop located in the passage portion through which said nozzle communicates with said reservoir to prevent said ball from contacting said frusto-conical portion of said nozzle, said liquid filling partly said reservoir and completely said chamber, and means for urging said ball towards said perforated disc and holding it thereagainst until a pressure exerted by said movable member on said push member forces through said nozzle a certain quantity of liquid to cause said ball to engage said stop.

2. A dashpot for progressively retarding the movement in one direction of a movable member which comprises a chamber of which one wall consists of a flexible diaphragm, a push member rigid with said diaphragm and registering with said movable member, a spring for constantly urging said diaphragm and push member towards said movable member, a reservoir for a liquid which is located at a higher level than said chamber, a passage connecting said reservoir to said chamber, a vertically-disposed nozzle in said passage which is limited downwards on the chamber side by a perforated disc and communicates upwards with said reservoir through a frusto-conical portion tapering upwards, a ball of relatively heavy material disposed in said nozzle, an adjustable stop disposed in axial alignment in said passage above said nozzle and adapted to prevent said ball from contacting the frusto-conical portion of said nozzle, said liquid filling partly said reservoir and completely said chamber, the weight of said ball in said vertical nozzle constantly urging said ball for engagement with said perforated disc and holding said ball against said disc until a pressure exerted by said movable member on said push member forces through said nozzle a certain quantity of liquid to cause said ball to engage said stop.

3. A dashpot for progressively retarding the movement of a push member in one direction, which comprises a chamber of which one wall consists of a flexible diaphragm having rigidly secured said push member thereon, a reservoir for a liquid which is located at a higher level than said chamber, a passage connecting said reservoir to said chamber, a nozzle in said passage which is limited on the chamber side by a perforated disc and communicates with said reservoir through a frusto-conical portion having its small end on the reservoir side, a ball located in said nozzle, an adjustable stop disposed in the passage portion through which said nozzle communicates with said reservoir to prevent said ball from engaging said frusto-conical portion of said nozzle, said liquid filling partly said reservoir and completely said chamber, and means for urging said ball towards said perforated disc and holding same thereagainst until a movement of said push member in the direction in which the retarding action is required forces through said nozzle a certain quantity of said liquid to push said ball towards said stop.

4. A dashpot for progressively retarding the movement of a push member in one direction, which comprises a chamber of which one wall consists of a flexible diaphragm rigidly secured to said push member; a reservoir for a liquid which is located at a higher level than said chamber, a passage connecting said reservoir to said chamber, a nozzle disposed vertically in said passage and bound at its lower end on the chamber side by a perforated disc, said nozzle communicating at its upper end through a frusto-conical portion having its small end on the reservoir side, a relatively heavy ball disposed in said nozzle, an adjustable stop disposed in axial alignment in said passage above said nozzle to prevent said ball from engaging said frusto-conical nozzle portion, said liquid filling partly said reservoir and completely said chamber, the weight of said ball in said vertical nozzle constantly urging said ball towards said perforated disc and holding said ball in engagement with said disc until a movement of said push member in the direction in which said retarding action is to take place forces a certain quantity of said liquid through said nozzle to move said ball towards said stop.

5. A dashpot for progressively retarding the movement of a push member in one direction, which comprises a float-chamber, another chamber formed in the bottom of said float-chamber, one wall of said other chamber consisting of a flexible diaphragm on which said push member is rigidly secured, a passage connecting said other chamber to said float chamber, a nozzle in said passage which is bound on the side of said other chamber by a perforated disc, said nozzle communicating with said float-chamber through a frusto-conical portion having its small end on the side of said float-chamber, a ball located in said nozzle, an adjustable stop disposed in the passage portion connecting said nozzle to said float-chamber to prevent said ball from engaging said frusto-conical portion of said nozzle, a liquid filling partly said float-chamber and completely said other chamber, and means urging said ball towards said perforated disc and holding said ball against said disc until a movement of said push member in the direction in which said retarding action is to take place forces a certain quantity of liquid through said nozzle to push said ball towards said stop.

6. A dashpot for progressively retarding the movement of a push member in one direction, which comprises a float-chamber, another chamber located in the bottom of said float-chamber, one wall of said other chamber consisting of a flexible diaphragm on which said push member is rigidly secured, a passage connecting said other chamber to said float-chamber, a vertically-disposed nozzle in said passage which is bound at its lower end towards said other chamber by a perforated disc and communicates at its upper end through a frusto-conical portion with said float-chamber, the small end of said frusto-conical portion being located towards said float-chamber, a relatively heavy ball located in said nozzle, an adjustable stop disposed in axial alignment in said passage above said nozzle and adapted to prevent said ball from contacting said frusto-conical portion of said nozzle, and a liquid filling partly said float-chamber and completely said other chamber, the weight of said ball in said vertical nozzle pushing said ball towards said perforated disc and holding it thereagainst until a movement of said push member in the direction in which said retarding action is to take place forces a certain quantity of liquid through said nozzle to urge said ball towards said stop.

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