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DEVICE FOR CONTROLLING CARBURETOR-THROTTLE CLOSING

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Fig. 1.

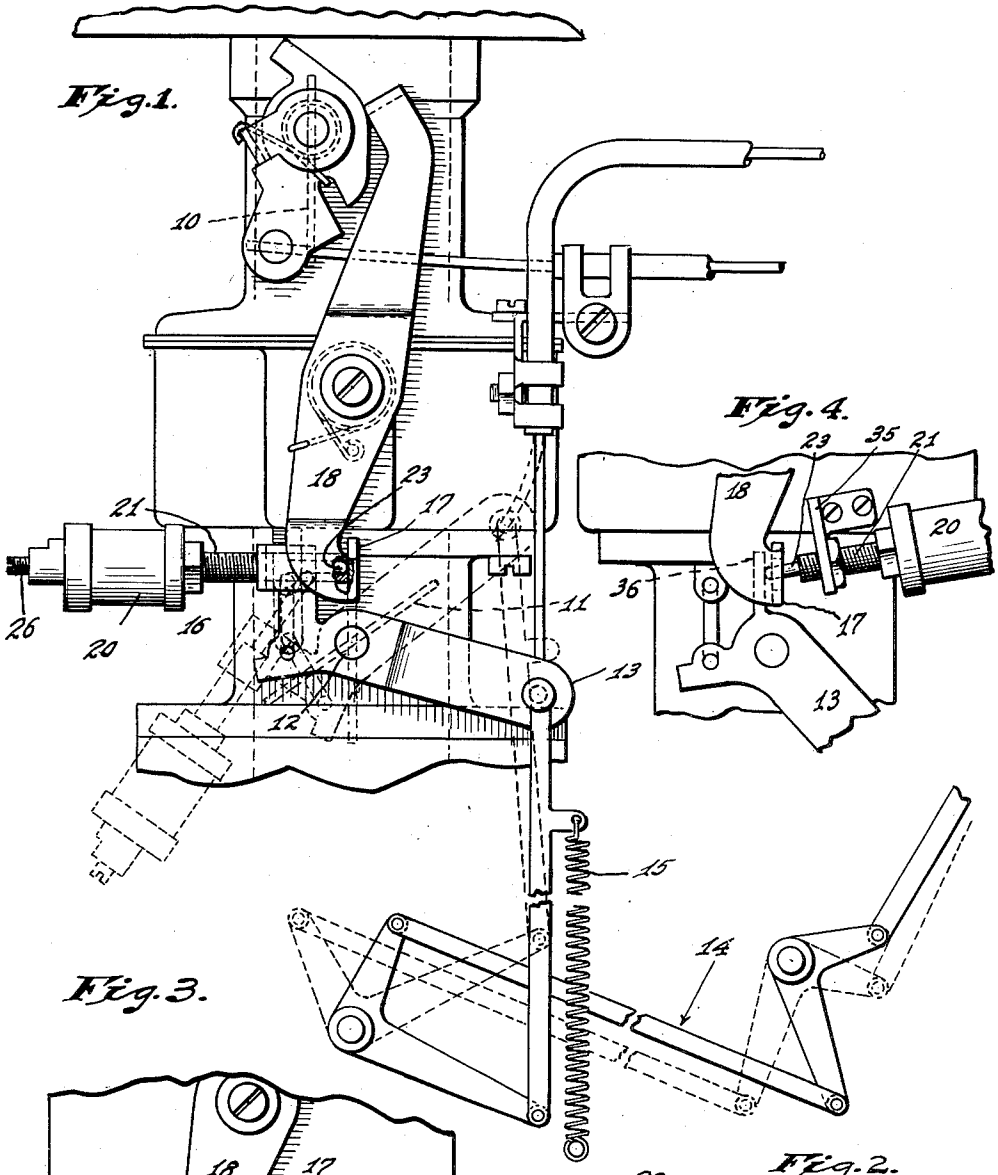


Fig. 4.

Fig. 3.

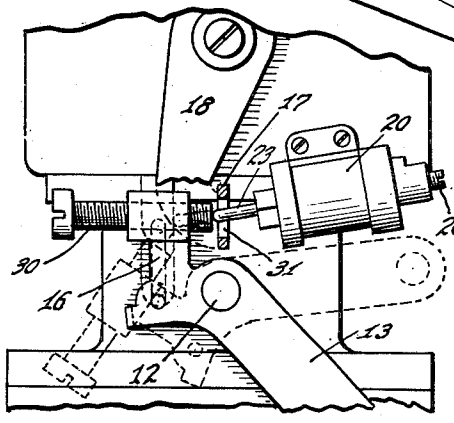
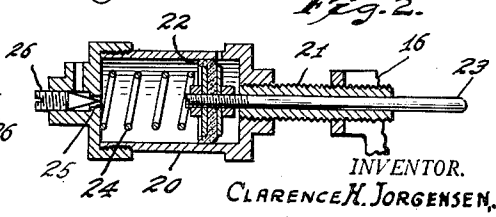


Fig. 2.



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DEVICE FOR CONTROLLING CARBURETOR-THROTTLE CLOSING

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5 Claims. (Cl. 251—48)

This invention relates to the control of mixture-supply to an automobile engine, particularly to the engine of an automobile equipped with an automatic transmission. It has been noted that in certain types of automobiles equipped with automatic transmissions a sudden opening of the throttle followed immediately by an abrupt closing of the throttle will frequently cause the engine to stop. I have discovered that such stopping of the engine probably has the following explanation: The sudden opening of the throttle is accompanied by the supply of excess fuel to the induction passage in anticipation of the fuel demands incident to acceleration; before this fuel reaches the engine, the abrupt closing of the throttle greatly reduces the rate of air-supply; and the engine stops as a result of over-enrichment of the mixture supplied to it. At least, I have found that stopping of the engine under the conditions noted can be eliminated by retarding throttle-closing, particularly in its last stages.

It is therefore an object of this invention to produce a carburetor in which it will be impossible to effect an abrupt and complete closing of the throttle. Another object of the invention is to provide for incorporation in the throttle-controlling mechanism of the carburetor a device which, without interfering with the opening movement of the throttle at any stage of throttle adjustment and without interfering with the closing movement of the throttle throughout the greater portion of the range of throttle-closing movement, will still prevent an abrupt and complete closing of the throttle. Another object of the invention is to produce a simple and inexpensive device which can be applied to a carburetor of standard construction to retard the last stages of throttle-closing movement.

The throttles of internal combustion engines are commonly biased toward closed position and arranged to be moved away from closed position under the control of an accelerator pedal or other manually operable control member. In embodying my invention in association with such carburetor, I incorporate in the throttle-control mechanism a small dash-pot which becomes effective only as the throttle approaches closed position and limits its continued closing movement under the influence of the biasing means. The dash-pot mechanism is conveniently mounted in association with the idle adjustment of the carburetor and, in one form of the application, may replace the customary idle-adjustment screw.

The accompanying drawing illustrates the invention: Fig. 1 is an elevation of a carburetor in which dash-pot mechanism embodying my invention has replaced the customary idle-adjustment screw; Fig. 2 is an axial section through the dash-pot mechanism employed in Fig. 1; Figs. 3 and 4 are fragmental views similar to Fig. 1 illustrating modifications of the invention.

The carburetor illustrated in the drawing, except for its incorporation of my invention, is of a standard type, having a choke valve 10 and a throttle 11. The throttle 11 is mounted on a shaft 12 which, exteriorly of the carburetor, carries a rigid operating arm 13 connected

to any desired form of throttle-controlling mechanism 14 including a spring 15 which biases the arm 13 in the throttle-closing direction. The arm 13 carries an extension 16 normally serving as a support for an idle-adjustment screw cooperating with an abutment 17 to limit closing of the throttle. As shown, the abutment 17 is carried by an arm 18 forming part of a "fast idle" device adapted to prevent complete closing of the throttle 11 when the choke 10 is closed.

The dash-pot mechanism employed in the construction shown in Fig. 1 is illustrated in detail in Fig. 2. It comprises a cylinder 20 having at one end an axially projecting screw-threaded shank or stem 21 adapted to be received in the arm-extension 16 in place of the customary idle-adjustment screw. Within the cylinder 20 is a reciprocable piston 22 secured to a retarder in the form of a rod 23 which extends axially through the stem 21 and projects beyond the end thereof. A spring 24 located within the cylinder 20 urges the piston to the right, or in a direction to increase the extent to which the rod 23 projects from the stem 21. Air displaced by leftward movement of the piston escapes through a vent opening 25 controlled by an adjustable needle valve 26.

In embodying my invention in a carburetor, the customary idle-adjustment screw may be removed from the arm 16 and the screw-threaded shank 21 of the dash-pot 20 screwed into the arm 16 to replace such screw. The dash-pot spring 24 is designed to be much too light to overcome the spring 15; and, as a result, if the accelerator pedal is elevated the spring 15 will urge the arm 13 and throttle shaft in the clockwise, or throttle-closing, direction while the rod 23 by reason of its engagement with the abutment 17, will be moved to the left in the cylinder 20, carrying the piston 22 with it. The completely closed, or idling, position of the throttle will therefore be determined either by engagement of the end of the cylinder-shank with the abutment 17 or by engagement of the piston 22 with the outer end of the cylinder 20. In Fig. 1, and also in full lines in Fig. 2, the rod 23 is shown as short enough that its outer end may coincide with the shank 21 before the piston engages the outer end of the cylinder; but it will be obvious that if the rod 23 were longer, the piston would engage the outer cylinder end while the rod still projected beyond the end of the shank. In either event, the idling position of the throttle can be varied by adjustment of the screw-threaded shank 21 in the arm-extension 16; and by opening or closing the valve 26, the final stages of throttle-closing movement may be retarded to the extent desired. The most desirable setting of the valve 26 is that which will retard throttle-closing only to the extent necessary to insure against undue enrichment of the mixture under the peculiar circumstances noted earlier in this application. If the accelerator pedal is depressed to open the throttle, the spring 24 acts to move the piston 22 to the right and extend the rod 23, the dash-pot mechanism being designed to impose no substantial opposition to such rod-extension. Upon a subsequent closing of the throttle, the rod 23 engages the abutment 17 as the throttle nears closed position, and continued closing movement of the throttle forces the rod 23 and piston 22 to the left relative to the cylinder 22. Such movement of the piston causes air to be expelled from the cylinder through the opening 25.

The modified form of the invention shown in Fig. 3 is adapted for use in situations where clearance conditions are such as to interfere with movement of the dash-pot cylinder 20 to the open-throttle, dotted-line position shown in Fig. 1. In such a situation, the customary idle adjustment screw (shown at 30), is retained in the arm-extension 16, and the dash-pot 20 is supported from the body of the carburetor on the opposite side of the abutment 17 from the idle-adjustment screw. The abutment 17 is pro-

vided with a slot **31** through which the piston rod **23** of the dash-pot may extend into a position such that it will be engaged by the idle adjustment screw **30** as the throttle approaches closed position. The slot **31** has a width less than the diameter of the screw **30**, so that the abutment **17** can exercise its normal function by engaging the end of the screw **30** to limit throttle closing.

The device shown in Fig. 3 operates in substantially the same way as does that shown in Fig. 1. With the throttle in an open position, as indicated by the dotted-line position shown for the arm **13**, the spring **24** within the dash-pot cylinder causes the rod **23** to extend through the slot **31** into the path of movement of the end of the adjustment screw **30**. As the throttle nears closed position, the adjustment screw **30** engages the end of the rod **23**, and closing movement of the throttle is then retarded by the dash-pot action, as before.

In the modification of Fig. 4, the threaded cylinder shank **21** is received in a stationary bracket **35** in such a position that the piston rod **23** may project through a slot in the ear **17** for engagement with an abutment **36** on the throttle-arm **13**. This structure functions much the same as that shown in Fig. 3, except that adjustment is provided by rotating the cylinder to advance or retract it in its screw-threaded mounting in the bracket **35**. Closing movement of the throttle may be limited either by the dash-pot or by engagement of the abutment **36** with the ear **17**.

In all the structures illustrated, the dash-pot cooperates either with the "fast-idle" lever **18** or with the throttle-arm abutment engageable with that lever. It is to be understood, however, that the dash-pot, when stationarily mounted, may be associated with any element which moves with the throttle and, when mounted to move with the throttle, may cooperate with any appropriate abutment.

I claim as my invention:

1. In a carburetor having a throttle and a member movable therewith, a first yielding means biasing the throttle toward closed position, a dash-pot having a cylinder, a piston, and a piston rod, means mounting the dash-pot on the member with the piston rod projecting from the cylinder in the direction of throttle-closing movement of the member, an abutment positioned to engage the outer end of the piston rod as the throttle nears closed position, and a second yielding means urging the piston rod toward said abutment, the dash-pot being so constructed and arranged as to retard throttle-closing movement under the influence of said first yielding means after the piston rod has engaged the abutment.

2. The invention set forth in claim 1 with the addition that said mounting means is adjustable to vary the point in the throttle-closing movement at which the piston rod engages the abutment.

3. In a carburetor having a throttle and a member movable therewith, a first yielding means biasing the throttle toward closed position, an abutment, a retarder carried by said member and movable toward said abutment by throttle-closing movement of said member and away from said abutment by throttle-opening movement of the member, said retarder being movable relatively to said member toward and away from the abutment, a second yielding means acting between the member and retarder and urging the latter toward the abutment, and retarding means acting between the member and retarder for retarding throttle-closing movement of the member under the influence of said first yielding means after the retarder has engaged the first abutment.

4. In a carburetor having a throttle and a member movable therewith, yielding means biasing the throttle toward closed position, a first abutment movable with said member, a second abutment engageable by said first abutment to limit throttle-closing movement of said member, and dash-pot means mounted on said member including a movable retarder engageable with said second abutment as the throttle nears closed position for controlling the rate at which said abutments approach each other under the influence of said yielding means.

5. The invention set forth in claim 4 with the addition that said dash-pot means is adjustably mounted on said member to vary the point in throttle-closing movement at which the retarder engages the second abutment.

References Cited in the file of this patent

UNITED STATES PATENTS

2,033,396	Perrine	Mar. 10, 1936
2,117,421	Holden	May 17, 1938
2,130,915	Whisler	Sept. 20, 1938
2,166,866	Hansen	July 18, 1939
2,314,570	Ball	Mar. 23, 1943