

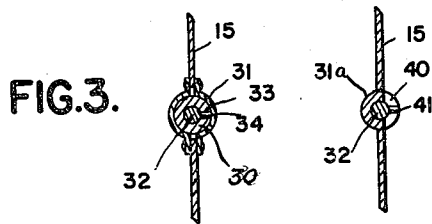
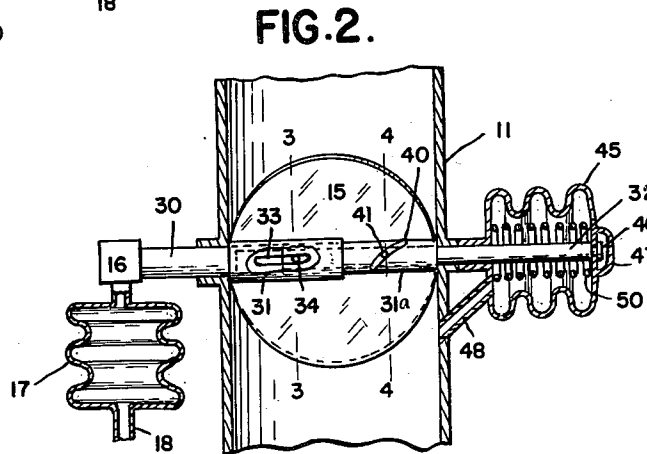
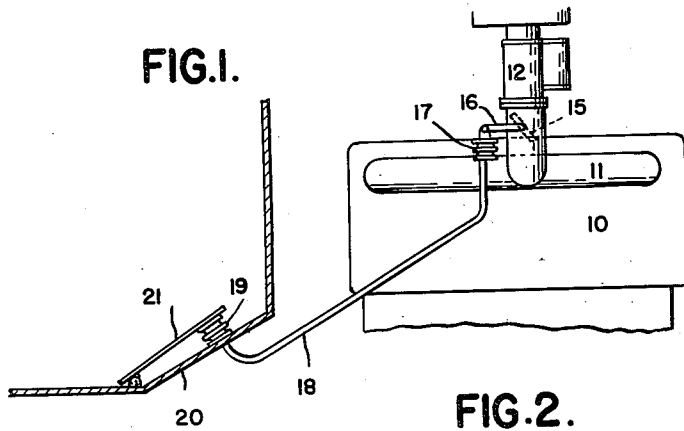
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THROTTLE CONTROL FOR INTERNAL COMBUSTION ENGINES

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THROTTLE CONTROL FOR INTERNAL COMBUSTION ENGINES

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The present invention relates to control means for internal combustion engines and specifically to throttle valve control means.

In the conventional automobile engine, the mixture of fuel and air is controlled by means of a throttle valve usually operated by means of a foot pedal and, not infrequently, the operator, when desirous of accelerating engine speed quickly, will open the throttle suddenly and too wide for the best results.

As a result of such rapid and complete opening it often happens that the engine receives too much mixture and chokes. Another result is that sudden breaking of the manifold vacuum or suction down to near atmospheric pressure seriously interferes with proper distribution of the mixture. And a third result is a temporary but often serious interference with the operation of suction actuated accessories such as the windshield wiper.

Among the objects of the present invention is means to prevent these occurrences by preserving at all times a predetermined reduced pressure or vacuum in the intake manifold.

Another object is a throttle actuating means which may be preadjusted to accord with the manifold vacuum desired and which will retard the opening of the throttle by the operator sufficiently to maintain such vacuum.

Still other objects will readily occur to those skilled in the art upon reference to the following description and the accompanying drawing, in which—

Figure 1 is a partial side elevation of an automobile engine showing an installation involving the present invention.

Figure 2 is a vertical central section of a portion of the intake manifold taken at right angles to the plane of Figure 1.

Figures 3 and 4 are respectively sections on lines 3—3 and 4—4 of Figure 2.

In the drawing, an engine indicated at 10 is shown as provided with an intake manifold 11 into which is fed fuel-air mixture through a carburetor 12, the amount of the mixture flowing in being controlled by a butterfly valve 15.

The valve 15 is shown as provided with a short crank arm or lever 16 pivoted upon the movable end of a bellows 17 suitably stationarily supported, while the latter is connected through a tube 18 to a second bellows 19 located upon the floor 20 of the driver's compartment under a foot lever or pedal 21. The two bellows 17 and 19 preferably will be filled with a suitable liquid. Obviously, pressure upon the pedal 21 would ex-

pand bellows 17 and, through arm 16, open valve 15, if the valve shaft were directly connected to arm 16.

In the present invention, however, the arm 16 is not connected directly to the valve 15 but to a short shaft portion 30 extending through the wall of the manifold and into a sleeve 31 fixed to the valve 15, the end of shaft portion 30 being at a point intermediate the width of the valve and being bored axially to receive the end of a rod 32, and also being slotted longitudinally, as at 33, to receive a laterally projecting pin 34 fixed in the rod 32 near its inner end.

The rod 32 extends from the bore in shaft 30 loosely through a second sleeve or sleeve portion 31a and through the manifold wall, the rod 32 and shaft 30 serving to support and pivot valve 15.

Intermediate the ends of sleeve portion 31a there is cut a helical cam slot 40, and arranged to cooperate with this slot is a pin 41 fixed at a suitable location in rod 32.

As shown in Figure 2, the rod 32 projects some distance from the manifold 11 and into a suitable bellows 45, or other expansible and collapsible element, being swivelled in the outer end wall thereof as at 46, suitable means, such as a cap 47, being used to render the bellows or other element air tight at this point.

This bellows 45 is fixed in position over the rod 32 and its interior communicates through a suitable passage 48 with the manifold 11 on the engine side of the valve 15. It also is provided with a suitable spring 50, the compression resistance of which is selected or adjusted to accord with the manifold vacuum desired to be maintained.

In the operation of the valve 15, the arm 16, turning shaft 30, also rotates the rod 32 through the action of slot 33 and pin 34, and the rod 32, through pin 41 and cam slot 40 turns the sleeve 31a and thereby the valve 15. When, however, this opening of valve 15 reduces the vacuum in the manifold 11 to below the predetermined amount, the bellows 45 will immediately expand and move rod 32 outwardly. This movement, through the action of pin 41 and cam slot 40, will turn the valve 15 with reference to shaft 30 and move it back toward closed position sufficiently to restore the desired vacuum.

In making an installation of the above described device, the location of pin 41, cam slot 40 and the selection or adjustment of spring 50 and bellows 45 will be made so that these parts will respond to the desired pressure in the intake

manifold—say two inches of mercury. Of course, any other amount of vacuum may be selected if desired.

I claim:

1. A throttle valve for the intake manifold of an internal combustion engine, said valve consisting of a plate pivoted in said manifold and having a sleeve at its pivoted axis, an operating shaft extending into said sleeve, a second and coaxial shaft extending into said sleeve and movable longitudinally thereof, means connecting said shafts and fixing them against relative rotation, cam means carried by said sleeve, means carried by said second shaft and coacting with said cam means, and means for moving said second shaft longitudinally whereby to vary the angular position of said valve plate with respect to the shaft.

2. A throttle valve for the intake manifold of an internal combustion engine, said valve consisting of a plate pivoted in said manifold and having a sleeve at its pivotal axis, an operating shaft extending into said sleeve, a second and coaxial shaft extending into said sleeve and movable longitudinally thereof, means connecting said shafts and fixing them against relative rotation, cam means carried by said sleeve, means carried by said second shaft and coacting with said cam means, and pneumatic means responsive to intake manifold pressure for moving said second shaft longitudinally whereby to vary the angular position of said valve plate with respect to the shafts.

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