Jan. 29, 1957 J. SCHWEISS 2,779,586

CARBURETOR THROTTLE CONTROL

Filed Aug. 15, 1952

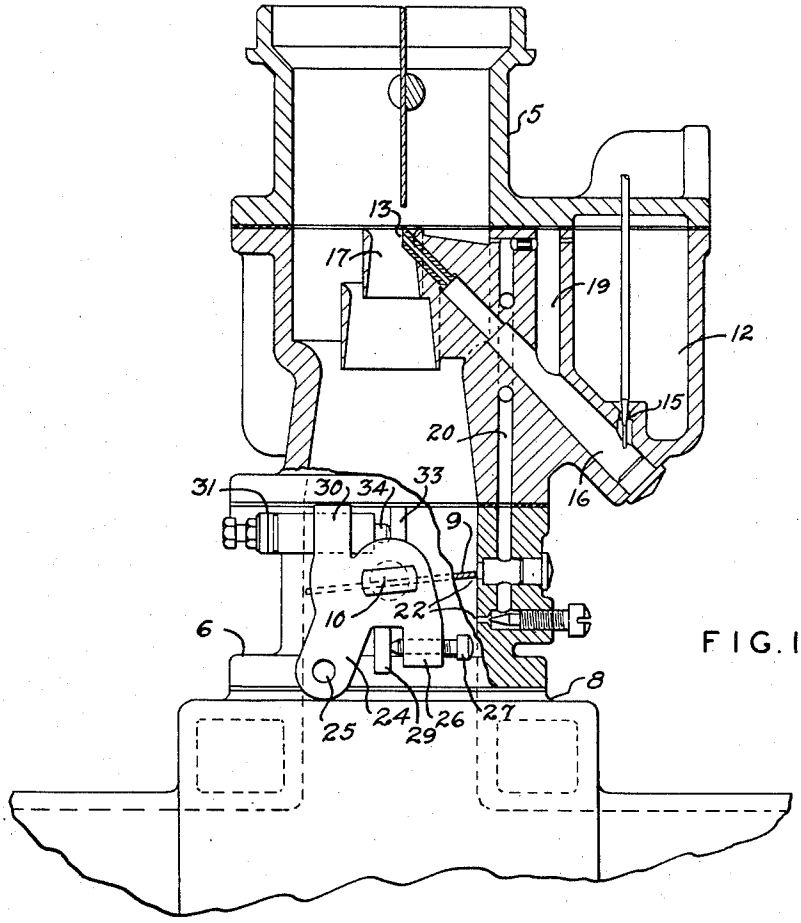


FIG. 1.

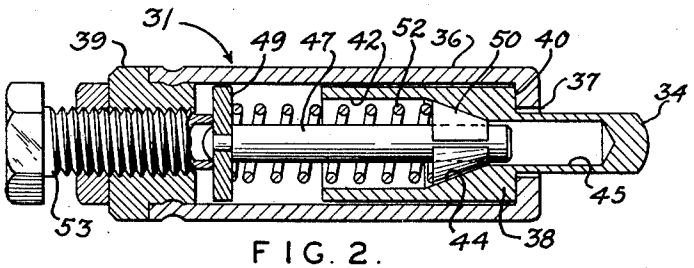


FIG. 2.

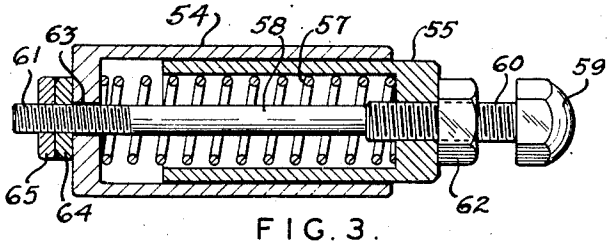


FIG. 3.

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United States Patent Office 2,779,586 Patented Jan. 29, 1957

2,779,586

CARBURETOR THROTTLE CONTROL

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Application August 15, 1952, Serial No. 304,458

1 Claim. (Cl. 267—1)

This invention relates to carburetors for internal combustion engines and consists particularly in novel means for retarding the rate of closing of the throttle valve of such carburetors whereby to prevent stalling of the engine.

When the throttle valve of a carburetor is suddenly returned to its normal idling position, the consequent instantaneous increase in suction in the engine manifold posterior to the throttle valve may cause any excess fuel accumulated on the inner walls of the manifold to be pulled off the walls and swept into the engine. In many instances this action so excessively enriches the mixture in the firing chambers that the engine becomes stalled. This condition can be remedied by slowing down the rate of closing of the throttle valve. Various dash pot devices have been suggested for slowing down the closing of the throttle valve in order to avoid this condition, but these devices are generally bulky, complicated, expensive, and require substantial alterations in the carburetor structure.

It is the principal object of the present invention to provide a simplified, inexpensive and compact means for preventing engine stalling under the conditions above noted.

This object is achieved by providing a spring snubber for retarding closing movements of the throttle as the throttle approaches its normal idling position. In one form of snubber I employ a friction mechanism, and in another I employ a pair of telescopic sprung cylinders, both being provided with adjusting means to permit adjustment according to the particular characteristics of the carburetor and throttle control.

In the accompanying drawing which illustrates the invention:

Fig. 1 is an elevation view of a carburetor, partially sectionalized, embodying the invention.

Fig. 2 is an enlarged longitudinal sectional view of a friction type snubber.

Fig. 3 is an enlarged longitudinal sectional view of a spring type snubber.

The carburetor illustrated in Fig. 1 has a downdraft mixture conduit 5 with a flange 6 at its lower outlet end for attachment to the intake manifold 8. The discharge of fuel and air mixture from the mitxture conduit is controlled by the usual disk type throttle valve 9 mounted on shaft 10 which is journalled in the mixture conduit wall structure. The carburetor includes a constant level fuel chamber 12 which provides fuel to main nozzle 13 via variable metering orifice 15 and main fuel passage 16, main fuel nozzle 13 discharging into the venturi portion 17 of mixture conduit 5. Fuel for idling is carried from main fuel passage 16 via passages 19 and 20 to idle ports 22 discharging into the mixture conduit adjacent the throttle valve.

Throttle valve 10 is provided at one end with an operating lever 24 perforated at its outer extremity 25 to receive an end of the foot accelerator linkage. Lever 24 is formed with an extension 26 to receive adjusting screw 27

which cooperates with boss 29 on the carburetor body to adjust the minimum opening of the throttle valve. Operating arm 24 is also provided with a second extension 30 which carries snubber element 31. A boss 33 is provided on the carburetor body to engage the stem 34 of snubber element 31 as the throttle valve approaches its normal idle position. A spring (not shown) associated with the foot accelerator, normally urges the throttle toward closed position.

Snubber device 31 is shown in enlarged detail in Fig. 2 It consists of a cylindrical housing 36 having an opening 37 at one end to permit protrusion of stem 34 of plunger 38, the other end being closed by an inside-threaded plug 39. Plunger 38 is of substantially greater diameter than stem 34, providing a peripheral shoulder at 40 which cooperates with the end wall of cylindrical housing 36 to act as a stop limiting outward movement of the stem. The plunger is hollow, and consists of a relatively large cylindrical cavity 42 at its inner end, an intermediate conical portion 44 and a relatively small diameter cavity 45 in the stem. A rod 47 having an abutment washer 49 at one end is mounted in cylinder 36, with its other end extending into the small cavity 45. A split sleeve 50 having a conical outer surface is slidably mounted on rod 47, and is urged by coil spring 52 into engagement with conical portion 44 of the plunger cavity, the other end of coil spring 52 being seated against abutment washer 49. A bolt 53 passing through the threaded interior of plug 39 abuts the surface of abutment washer 49 and provides means for longitudinally displacing abutment washer 49 so as to adjust the pressure of coil spring 52 on sleeve 50. In operation, as stem 34 is urged inwardly, coil spring 52 is compressed so as to urge sleeve 50 inwardly along the sloping surface of conical portion 44, thereby compressing sleeve 50 into increasingly tighter frictional engagement with rod 47. This obviously results in marked retardation of the rate of movement of the stem in direct proportion to the distance the stem moves inwardly from its outermost portion.

Operation of the device is as follows: With the throttle held open by the foot accelerator and associated linkage against the force of the throttle closing spring, a considerable amount of fuel may become deposited on the inner walls of manifold 8. If foot pressure is removed from the accelerator pedal the throttle closing spring, acting through the accelerator linkages and throttle lever 24, urges the throttle towards its closed position. As the throttle approaches its normal idling position, stem 34 of snubber 31 engages boss 33 on the carburetor body and is urged inwardly against the pressure of spring 52. Spring 52 combined with split sleeve 50 retards the inward movement of stem 34, as described above, thereby progressively slowing down the rate of return of the throttle to its normal idling position. This delay of closing of the throttle permits the excess fuel to be removed and consumed before the throttle fully closes, thereby preventing the sudden over-enrichment of the fuel mixture which would occur had the throttle closed suddenly. Pressure on spring 52 may be adjusted by bolt 53 in accordance with the strength of the throttle closing spring and tendency of the engine to stall due to the above described condition.

Fig. 3 illustrates a modified form of snubber consisting of a pair of telescopic cylinders 54 and 55, cylinder 55 being mounted for axial movement within cylinder 54. Coiled spring 57 seated against the closed end of cylinder 54 exerts pressure against the closed end of cylinder 55, so as to urge cylinder 55 outwardly. A central buffer stem 58 is formed with a buffer head 59, a threaded portion 60 adjacent the head and another threaded portion 61 at its opposite extremity. Buffer stem 58 is screwed into the end of cylinder 55, and is secured in position

therein by lock nut 62. The opposite end of stem 58 extends through an opening 63 in the end of cylinder 54, and is axially positioned in cylinder 54 by adjusting nut 64 and lock nut 65. The purpose of adjusting nut 64 is to permit a variable adjustment of the length of buffer member 58, spring pressure being adjustable by screwing stem 58 into or out of the end of cylinder 55.

Operation of the device of Fig. 3 is similar to that of Fig. 2, except that the only retarding force is the direct pressure of spring 57 on cylinder 55. In all other respects operation of the throttle in returning to closed position is identical with the description above relating to the operation of the device of Fig. 2.

The invention may be modified in other respects as will occur to those skilled in the art and the exclusive use of all modifications as come within the scope of the appended claim is contemplated.

I claim:

In a carburetor valve structure having a movable throttle valve, a device for retarding the final closing movement of said valve, comprising a spring snubber movable relative to a cooperating boss, said snubber including a cylinder having an abutment shoulder, a hollow plunger slidable within said cylinder and normally engaging said shoulder and projecting from one end thereof, the inner surface of said plunger having a conical seat, a rod extending axially within said cylinder and provided with a spring seat, a split frusto-conical sleeve slidably engaging said rod and engaged against said conical seat, a coil spring on said rod compressed between said spring seat and said sleeve normally urging said sleeve into engagement with said conical seat, whereby upon engagement of said plunger against said boss said sleeve is urged into tighter frictional engagement with said rod, and an adjustment screw on said cylinder to move said rod axially of the cylinder to vary the force exerted by said spring against said sleeve.

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