June 15, 1943. E. M. BIMBERG 2,322,109

CARBURETOR

Filed April 4, 1941

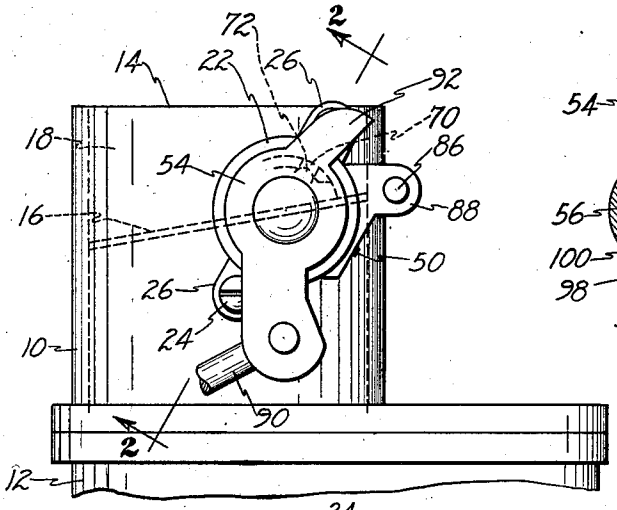


Fig. 1

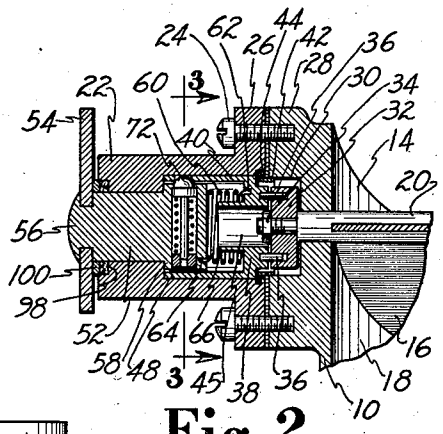


Fig. 2

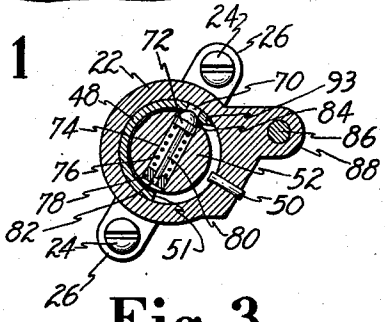


Fig. 3

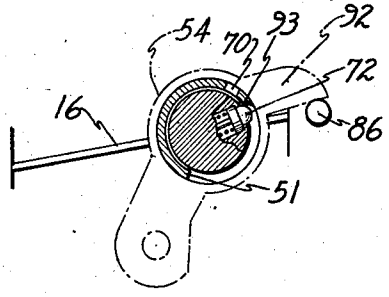


Fig. 4

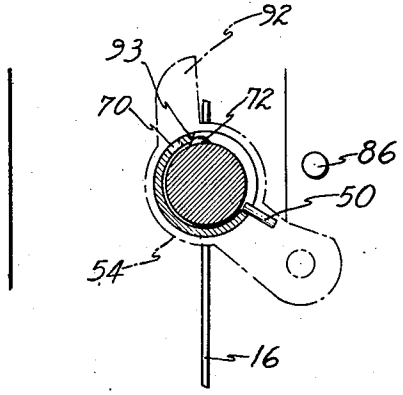


Fig. 5

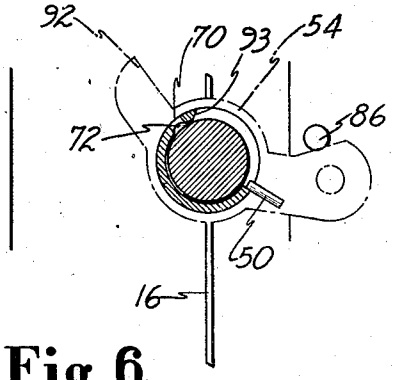


Fig. 6

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CARBURETOR

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13 Claims. (Cl. 137—139)

This invention relates generally to carburetors and particularly to control means for carburetor choke valves.

It is a common practice to provide carburetors with spring loaded choke valves operable by vacuum in the carburetor induction passage. However, certain difficulties in the operation of such valves may be encountered. For example, friction from dirt and carbon accumulation on the choke valve stem and associated and adjacent parts may prevent proper closing of the valve or may otherwise interfere with the operation thereof.

Previous practice includes the use of a manual control positively closing and opening the choke valve and provided with an intermediate position of the control device whereat the choke valve is spring loaded and operable by suction in the carburetor induction passage, but to my knowledge the mechanisms for effecting such action are not entirely satisfactory because the valve when thus closed is positively held against opening movement by vacuum in the induction passage.

It is therefore an important object of the invention to provide choke valve control means whereby the choke valve may be selectively spring loaded or rigidly connected with the valve control mechanism.

Another object of the invention is the provision of a device of this character wherein there is increased resistance to the opening and closing movements of the choke valve control mechanism immediately preceding actuation of the latching mechanism.

Still another object of the invention is to provide a device of this character which is manually operable and wherein the changes from solid or rigid choke action to spring loaded action or from the spring loaded action to rigid choke action is effected by appropriate movements of the manual control mechanism for opening and closing the choke valve.

The above and other novel features of the invention will appear more fully hereinafter from the following detailed description when taken in connection with the accompanying drawing. It is to be expressly understood, however, that the drawing is employed for purposes of illustration only and is not designed nor intended as a definition of the limits of the invention, reference being had for this purpose to the appended claims.

In the drawing, wherein similar reference characters refer to similar parts throughout the several views:

Figure 1 is a partial side elevation of a carburetor showing a preferred embodiment of the invention attached thereto;

Figure 2 is a sectional view of the invention taken on line 2—2 of Figure 1;

Figure 3 is a sectional view of the device taken on line 3—3 of Figure 2;

Figures 4, 5 and 6 are diagrammatic views of the invention showing the latching mechanism of the device in various operative positions.

The invention is shown in the drawing attached to a downdraft carburetor although it may be used in connection with any other type of carburetor such as an updraft or horizontal delivery type.

Referring more particularly to the drawing, reference numeral 10 indicates the air horn section and 12 the body section of a carburetor. The air horn section has an air entrance 14 controlled by the usual unbalanced butterfly type of choke valve 16 operable by suction in the induction passage 18 of the carburetor posterior to said choke valve, said choke valve being secured to a shaft 20.

The choke valve control device comprises a cylindrical body or housing 22 axially aligned with the choke valve shaft 20 and said body 22 is secured to the air horn section 10 of the carburetor by screws 24 received in openings through lugs 26, which are integral with the body 22, and screwed into a flattened lateral extension 28 integral with the air horn section 10. The lateral extension is provided with an annular recess 30 concentric with the choke valve shaft 20, one end of which extends into said recess. Said end of shaft 20 is reduced in diameter and threaded adjacent its free end, and a collar 32 is secured thereon by a nut 34.

Collar 32 is provided with diametrically disposed recesses in which are received shaft-driver pins 36 longitudinally slidable therein and fixed in the adjacent end wall 38 of a sleeve-like shaft-driver 40 rotatable in a cylindrical bore in the housing 22 and extending longitudinally of the housing throughout a portion of its length, said driver 40 being retained against longitudinal movement toward the collar 32 by a flanged retaining ring or guide bushing 42 received in an annular recess in the adjacent end of the body 22 and secured in said recess by swaging the end of said body at 44 or otherwise turning a portion of said end over the ring 42. The bore 30 of the extension 28 should be of the same diameter as the retaining ring or bushing 42 as such construction aids in the location of the driver assembly while it is being attached to the carburetor. It

should be noted that wall 38 of driver 40 is provided with an opening 45 in which the adjacent end of shaft 20 extends.

The inner end of driver 40 is cut away to leave a flange portion 48, the free end of which abuts against the inner end of the longitudinal bore in housing 22 which limits inward longitudinal movement of said driver 40. A pin 50 fixed in the body 22 and extending into the bore thereof is so positioned that the end 51 of the flange 48 will impinge against it to limit rotation of the driver 40 for a purpose to be hereinafter described.

The cylindrical bore in body 22 has an extension of reduced diameter in which is rotatably received a driver actuating member 52 which extends outwardly of the body 22, a portion of the free end of said member 52 is of reduced diameter and carries a lever 54 which is rigidly retained on said member 52 by spinning over the reduced end thereof at 56. However, said lever may be secured to member 52 by any other suitable means. The inner end of member 52 is enlarged at 58 but is of slightly smaller diameter than the interior diameter of the sleeve-like driver 40 and abuts against the inner end of the cylindrical bore to limit longitudinal movement of member 52 outwardly of the body 22.

Actuating member 52 is connected with shaft-driver 40 by a spring 60, one end 62 of which is received in a hole in wall 38 and the other end 64 is received in a hole in the enlarged end 58 of member 52, said spring 60 being disposed about an interior sleeve 66 formed integral with wall 38, the end of said sleeve being spaced from the adjacent end of portion 58. The function of this spring connection is to provide spring loading of the choke valve under conditions to be hereinafter described.

To provide a releasable solid or rigid connection between driver 40 and member 52, the flange 48 of driver 40 has a perforation 70 adapted to receive the rounded extension of a plunger 72 slidable in a bore 74 in portion 58 and yieldingly urged outwardly by a plunger spring 76 reacting between the inner end of the plunger and a retainer 78 pressed or otherwise secured in the bore 74. The plunger is provided with a guide stem 80, the free end of which is slidable in a perforation 82 in the retainer 78, and spring urged outward movement of the plunger is limited by a flange 84 extending inwardly of the bore 74.

The operation of the device is as follows:

With the choke valve in the wide open position shown in Figure 6, wherein the rounded head of plunger 72 is latched in perforation 70, there is a rigid connection between the driver 40 and member 52, and lever 54 is in abutment with stop pin 86 fixed in flange 88 which is integral with the body 22. Lever 54 is actuated by a rod 90 connected with any well-known choke control device, not shown, such as may be attached to the dash of an automobile or other instrument panel. With the rigid connection thus provided, the choke valve may be positively closed or opened. It will be noted in closing the choke valve through the rigid connection, resistance to further closing movement will occur when extension 92 of lever 54 is spaced somewhat from stop pin 86 due to the impingement of the edge of the choke valve against the wall of the air inlet which stops further rotation of the shaft driving member 40. Further rotation of member 52 will then effect disengagement of the plunger 72 from the hole 70. Considerable additional force is necessary, however, to effect said disengagement so that the operator will be apprised that the choke valve is fully closed and may open said valve through the rigid connection or apply the additional force necessary to disengage the latching mechanism and effect spring loading of said valve as desired. Should the operator effect disengagement of the latching mechanism, the extension 92 of lever 54 will move into abutment with pin 86 thereby limiting further rotative movement of said lever. The member 40 is then rotatable to the valve open position as the rounded head of plunger 72 is in the space between edges 93 and 51 of flange 48, as shown in Figure 4, and said space is wide enough to permit complete opening of the choke valve.

When the engine has warmed up sufficiently so that it is desirable to open the choke valve and render it inoperative, the lever 54 is moved in the valve opening direction. During the opening movement of lever 54 the head of plunger 72 engages edge 93 of flange 48 thereby causing corresponding rotation of driver 40 until further movement thereof is stopped by impingement of edge 51 of flange 48 against stop pin 50, the various parts being in the position shown in Figure 5. In order to engage the plunger 72 with perforation 70, it is necessary to exert additional force on lever 54 in the valve opening direction. By exerting such additional force the rounded head of plunger 72 will slide up the inclined surface of the beveled edge 93 of flange 48 and will enter perforation 70 at which position lever 54 will be held against further opening movement by stop pin 86. The rigid connection between members 40 and 52 is thus reestablished for positive actuation of the valve.

From the foregoing, it will be apparent that the invention provides means for positively opening and closing the choke valve as well as providing means for spring loading said valve when closed for starting the engine. Thus, when the valve is spring loaded, over-choking is prevented and the engine is allowed to continue to run after starting. However, the lock or latch may be varied as to structure, et cetera, the invention not being confined to the particular type herein disclosed.

A felt washer 98 received in a recess in the free end of the body 22 and retained by a washer 100, prevents leakage of air through the assembly.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a carburetor for internal combustion engines, an unbalanced choke valve, a shaft therefor, and means for controlling said choke valve comprising an actuating member, means for locking said actuating member and shaft together for simultaneous movement, means for releasing the locking means, and means for spring loading the choke valve when said locking means is released.

2. In a carburetor, an unbalanced choke valve mounted on a shaft, an actuating member, releasable latching means controlled by said actuating means and adapted to effect a rigid connection between the actuating member and shaft when said member is moved to its limit of operative movement in one direction and to be released

when said member is moved to its opposite limit of operative movement, and means for abruptly increasing resistance to movement of the actuating member when it approaches its limits of movement and preceding actuation of the latching means.

3. In a control device, a housing, a rotatable actuating member, a rotatable shaft-driver in axial alignment with the actuating member, a spring loading the driver, a longitudinally extending arcuate flange on the driver and overlapping a portion of the actuating member, said flange having an orifice therein, a plunger in the actuating member in circumferential alignment with the orifice and engageable therewith in one relative position of the actuating member and the driver, and a stop member between adjacent sides of the flange and adapted to limit rotation of the driver.

4. In a carburetor, a shaft, an unbalanced choke valve on the shaft, means for limiting opening movement of the choke valve, an actuating member, latching mechanism controlled by the actuating member, movement of said actuating member in one direction being effective in moving the choke valve in the opening direction to its limit of movement, further movement of said member in the same direction being adapted to actuate the latching mechanism whereby a rigid connection is provided between the actuating member and shaft, means for limiting closing movement of the choke valve, said actuating member being movable in another direction to move the valve into engagement with the last-mentioned limiting means, further movement of said member in the last-mentioned direction being adapted to actuate the latching mechanism in a manner to permit the actuating member and shaft to move independently of each other.

5. In a carburetor for an internal combustion engine, an induction passage, a choke valve in said induction passage operable by a differential of pressure on opposite sides thereof and having a predetermined range of movement, yielding means for closing said valve, an actuating member, releasable means for effecting a solid connection between the actuating member and the valve whereby the latter may be variously positioned by the actuating member throughout its range of movement and positively held in such positions respectively.

6. In a carburetor for an internal combustion engine, an induction passage, a driving member, a spring loaded unbalanced choke valve in said passage and attached to the driving member, an actuating member, and yielding means adapted to rigidly connect the driving member and the actuating member together whereby the choke valve may be rigidly held in various adjusted positions.

7. The invention defined in claim 6 wherein the yielding means is releasable and is carried by one of the members and when released is adapted to permit substantial relative movement of at least one of said members.

8. In a carburetor, an induction passage, a choke valve therein openable by a differential of pressures on opposite sides thereof, means for yieldingly urging said valve toward its closed position, means for positively actuating the valve, and means for releasing the positive actuating means only when the valve has been closed thereby, said valve being substantially fully openable immediately upon release from control of said positive actuating means.

9. In a carburetor, an unbalanced choke valve, a shaft therefor, an actuating member, a latch, said latch being adapted to rigidly connect the actuating member and shaft together when said actuating member is moved in one direction to its limit of movement and said latch is adapted to be released when said actuating member is moved to its opposite limit of movement.

10. In a carburetor, a shaft, a choke valve of the unbalanced type mounted on the shaft, an actuating member, a spring connection between the actuating member and the shaft whereby the choke valve may be yieldably closed by said spring, and releasable latching means for rigidly connecting the actuating member and the shaft whereby they may be actuated as a unit, the spring connection being rendered inoperative at such times as the actuating member and shaft are rigidly connected together.

11. In a carburetor, a shaft, an unbalanced choke valve on the shaft, means for limiting the opening and closing movements of the choke valve, an actuating member, latching means, means whereby the actuating member is adapted to move the choke valve to either limit of movement respectively, said actuating member being adapted to be moved an additional amount beyond the respective positions whereat it moves the choke valve to either limit of movement, said latch being adapted to be actuated upon said additional movements of the actuating member.

12. The invention defined by claim 11 wherein there is means for effecting abrupt and substantial resistance to at least one of said additional movements of the actuating member.

13. In a carburetor, an induction passage, a choke valve therein openable by a differential of pressures on opposite sides thereof, means for spring-loading said valve, means for positively moving the valve to its closed position, means for releasing the valve after same has been closed, the valve being substantially fully openable immediately upon release from the control of said second mentioned means, and means for apprising the operator that the valve has reached its closed position and that actuation of the third mentioned means may be effected.

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