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Judd

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[54] **BUSHING FOR CARBURETOR PLATE LINKAGE**

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[52] **U.S. Cl.** ..... **261/50 A**; 403/161; 403/243

[51] **Int. Cl.**[2] **F02M 7/22**

[58] **Field of Search** ..... 261/50 A; 403/161, 162, 403/163, 243

[56] **References Cited**

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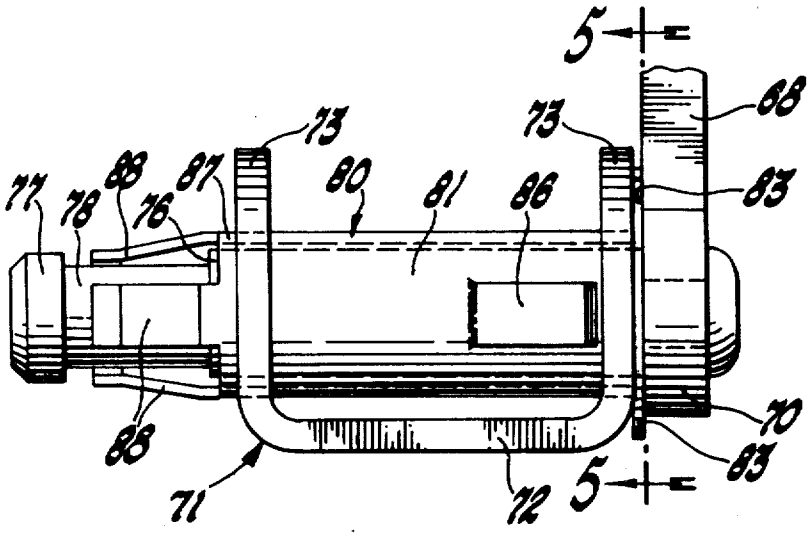
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Primary Examiner—Tim R. Miles
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[57] **ABSTRACT**

In a carburetor induction throat, a plate carries a bracket with two parallel ears having coaxial circular openings therethrough. A bushing inserted through the circular openings has sector-shaped stops at one end for engagement with the plate to prevent rotation of the bushing and for engagement with an ear to prevent withdrawal of the bushing in one direction. The bushing further includes one or more deformable projections for engagement with an ear to prevent withdrawal of the bushing in the other direction and one or more deformable fingers at the other end tapering inward to facilitate bushing insertion. A link member includes a pin for insertion in the bushing having a circumferential groove at its free end to directly engage or hold a clip to engage the deformable fingers at the other end of the bushing in order to prevent withdrawal of the pin from the bushing.

2 Claims, 5 Drawing Figures



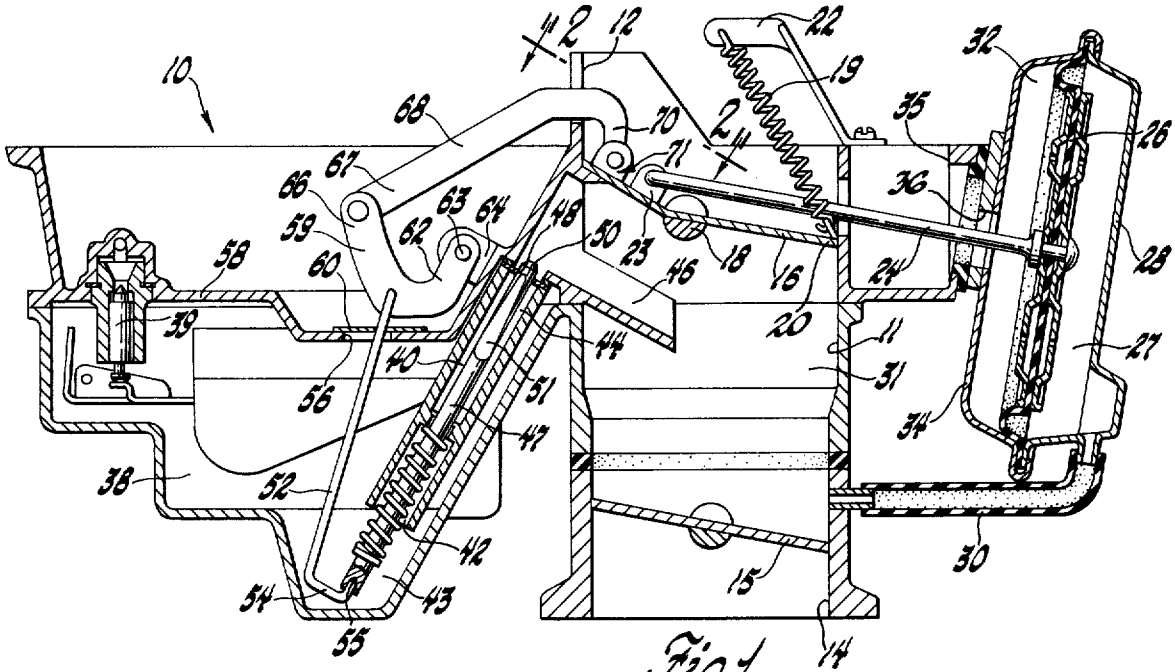


Fig. 1

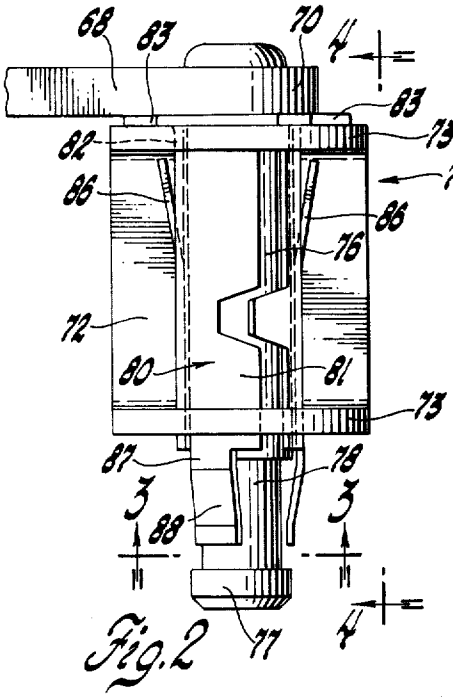


Fig. 2

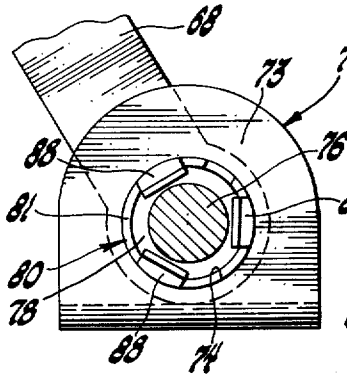


Fig. 3

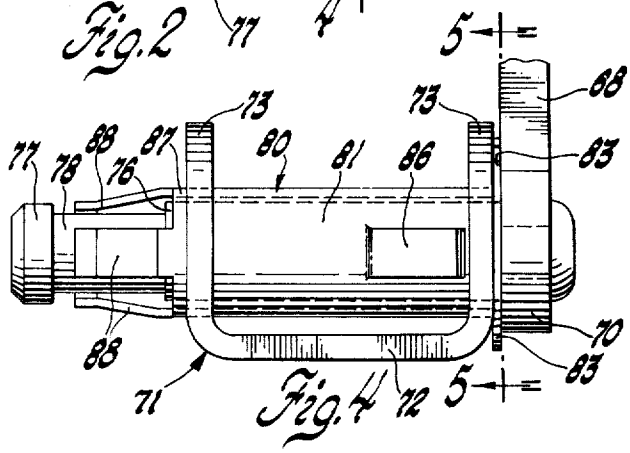


Fig. 4

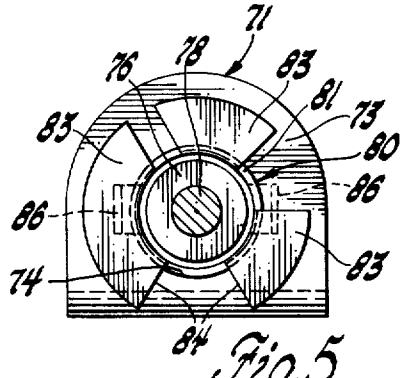


Fig. 5

BUSHING FOR CARBURETOR PLATE LINKAGE

SUMMARY OF THE INVENTION

This invention comprises a bushing for use in a carburetor linkage mechanism such as that used to coordinate movement between an air valve in an induction throat and a fuel metering valve.

In an air valve carburetor, a metering valve allows the flow of fuel into the induction throat in proportion to the flow of air through the throat as determined by an air valve. The proportional movement of the air and fuel metering valves is accomplished by a linkage mechanism connecting them, the mechanism including a link which must be attached to the air valve for movement therewith but remain free to rotate with respect thereto. This invention is directed to a bushing for joining a link to an air valve, which bushing is self-locking, dependable, inexpensive and easy to assemble.

The mechanism includes a bracket fixed to the air valve and having a pair of ears with coaxially circular openings and a pin on the end of the link for insertion through the openings. The bushing, surrounding the pin in the bracket, has a number of tabs and fingers which prevent its being withdrawn from the bracket once inserted and prevent the pin from being withdrawn from the bushing once inserted. Further details and advantages of this invention will be apparent from the drawings and the following description of the preferred embodiment.

SUMMARY OF THE DRAWINGS

FIG. 1 shows a carburetor having a linkage mechanism with a bushing embodying this invention.

FIG. 2 shows a view along line 2—2 in FIG. 1.

FIG. 3 is a cutaway view along line 3—3 in FIG. 2.

FIG. 4 is a view along line 4—4 in FIG. 2.

FIG. 5 is a cutaway view along line 5—5 in FIG. 4.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIG. 1, a carburetor 10 has an induction throat 11 including an air inlet 12 and a mixture outlet 14 which discharges to an engine, not shown. A throttle 15 is disposed in mixture outlet 14 in the usual manner.

An air valve 16 is disposed in air inlet 12 on an air valve shaft 18. A spring 19 is hooked over the downstream edge 20 of air valve 16 or otherwise attached thereto and extends to a bracket 22 to bias air valve 16 to the position shown.

A tang 23 reaches upwardly from air valve 16 and is connected by a link 24 to a diaphragm 26. A chamber 27, formed between the right side of diaphragm 26 and a cover member 28, is connected by a tube 30 to a region 31 of induction throat 11 defined between air valve 16 and throttle valve 15.

A chamber 32, defined between the left side of diaphragm 26 and a cover member 34, is subjected to substantially atmospheric pressure through openings such as 35 and 36.

In operation, chamber 27 is subjected to the subatmospheric pressure created in region 31 as throttle 15 is opened, and diaphragm 26 acts through link 24 to pull air valve 16 to an open position. Spring 19 is effective to balance the opening force of diaphragm 26, thereby creating a substantially constant subatmospheric pressure in region 31. By thus establishing a generally constant pressure across air valve 16, the area about air valve 16, and thus the rotational position of air valve 16, is determined by and is a measure of the rate of air flow through induction throat 11.

Carburetor 10 includes a fuel bowl 38 with a float-operated valve assembly 39 to admit fuel thereto in the usual manner. A fuel passage 40 has a lower end 42 disposed to receive fuel from a well 43 formed in the bottom of fuel bowl 38. The upper end 44 of fuel passage 40 has an opening 46 through which fuel is discharged into region 31 of induction throat 11. It will be appreciated, therefore, that the fuel in fuel bowl 38 is subjected to a substantially constant metering head — from the substantially atmospheric pressure in the upper portion of the fuel bowl to the generally constant pressure in region 31. A metering rod 47 is disposed in fuel passage 40; and a metering jet or orifice 48 is disposed in fuel passage 40 around the tip 50 of metering rod 47. Metering rod 47 has flat tapered surfaces 51 on opposite sides which, upon reciprocation of metering rod 47 in jet 48, vary the area available for fuel flow through jet 48.

Coordination of the metering rod 47 with air valve 16 is accomplished by a linkage mechanism including a hanger 52, the lower end of which has a hook 54 received in a recess 55 formed in metering rod 47. Hanger 52 extends upward through an opening 56 in the cover 58 of fuel bowl 38 and is pivotably attached to a lever 59. Opening 56 is closed by a slider 60 which shifts horizontally during movement of hanger 52.

One end 62 of lever 59 is pivoted about a pin 63 attached to a tang 64 fixed to fuel bowl cover 58. The other end 66 of lever 59 is pivotably attached to one end 67 of a link 68, the other end 70 of which is pivotably attached, in a manner to be described below, to a bracket 71 mounted on air valve 16.

In operation, as air valve 16 opens via clockwise rotation link 68 rotates lever 59 in a clockwise direction. Lever 59 then lifts hanger 52 to move metering rod 47 generally upward and rightward in fuel passage 40. Thus as air valve 16 is opened to increase the area available for air flow through air inlet 12, metering rod 47 is shifted to increase the area available for fuel flow through metering orifice 48. By this means, a substantially constant air-fuel ratio may be maintained, the precise proportion being controlled by the geometry of tapered surfaces 57 and of the linkage between air valve 16 and metering rod 47.

Referring to FIGS. 2 through 5, the means by which link 68 is attached to bracket 71 will be described in detail. Bracket 71 is shown to be a generally U-shaped bracket having a flat horizontal portion 72 for attachment by welding or other means to air valve 16 and a pair of parallel ears 73 projecting outward from opposite ends of horizontal portion 72 perpendicularly to air valve 16. Each ear 73 has a circular opening 74 therethrough, circular openings 74 being coaxial with each other on an axis which, in this embodiment, is parallel with the axis of air valve shaft 18.

Link 68, in this embodiment, is a flat stamped piece of metal which can be chosen from similar pieces of different length to set the initial air-fuel ratio of carburetor 10. Link 68 is provided, at end 70, with a generally cylindrical pin 76 projecting perpendicularly outward therefrom. Pin 76 is provided, near its free end 77, with a peripheral groove 78.

A bushing **80** is inserted through circular openings **74.** Bushing **80** is stamped and formed out of sheet stock into a generally cylindrical sleeve **81** extending through circular openings **74** with a number of fingers and stops projecting therefrom. At one end **82** of sleeve **81,** one or more sector-shaped stops **83** project radially outward perpendicularly to the axis of sleeve **81.** When viewed along the axis of sleeve **81,** as in FIG. **5,** these stops **83** are seen to be formed in the shape of sectors of an annular ring. The outer radius of the annular ring is somewhat greater than the distance between the axis of sleeve **81** or openings **74** and air valve **16.** A gap is provided between adjacent ends **84** of two adjacent stops **83,** or of the one stop **83** if there is only one; and the gap is of such size that one or the other of ends **84** engage air valve **16** upon any attempted rotation of bushing **80** to prevent such rotation. Stops **83** also engage the adjacent ear **73** to prevent withdrawal of the bushing from bracket **71** in one direction by being pushed completely through and serve as a washer between that adjacent ear **73** and link **68.**

A pair of projections are punched out of the sleeve **81** so that they extend toward stops **83** and are bent slightly radially outward. Projections **86** begin near the center of sleeve **81** and extend to a point near stops **83** and are deformable inward upon insertion of bushing **80** through openings **74** but spring outward on the far side of the ear **73** from stops **83** to prevent removal of the bushing in the other direction. Projections **86** can be formed in many other ways with different shapes or designs, as long as they are deformable to allow insertion through the openings **74** but engage ear **73** to hinder withdrawal of bushing **80.**

From the other end **87** of bushing **80,** a number of fingers **88,** three in this embodiment, extend axially and are bent somewhat radially inward to facilitate insertion of bushing **80** through openings **74.** The separation of end **87** into fingers **88** makes it easier to manufacture bushing **80** with the desired taper in end **87.**

To prevent the withdrawal of pin **76** from bushing **80,** the fingers **88** can either drop into groove **78** upon insertion or engage a standard "C"-clip inserted in a narrower groover **78** after pin **76** is inserted through bushing **80.** It is unimportant to this invention which method is used, as long as pin **78** is provided with some means to engage fingers **88** and prevent withdrawal of pin **78** from bushing **80.**

It can be seen from the preceding description that the bushing and pin mechanism is easy to assemble: pin **76** is simply inserted in bushing **80** and bushing **80** in bracket **71,** with either insertion first, followed by the addition of a C-clip in groove **78,** if desired. After assembly, in normal operation, pin **76** cannot be withdrawn from bushing **80;** and bushing **80** cannot be withdrawn from openings **74** in bracket **71.** Of course, if some portion of the linkage needs repair or replacement, a mechanic can remove the pin from the bushing or the bushing from the bracket by manually deforming the appropriate retaining projections or fingers.

The embodiments described above are preferred embodiments only; and equivalent embodiments, some of which have already been described, will occur to those skilled in the art. Therefore the invention should be limited only by the claims which follow.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A carburetor comprising, in combination: a housing defining an induction throat; a plate disposed rotatably in the induction throat; a bracket disposed on the plate, the bracket including a pair of projecting ears, each ear having a circular opening therethrough, the circular openings being coaxial; a plate-following link having a cylindrical pin projecting therefrom through the circular openings; a bushing including a generally cylindrical sleeve extending through the circular openings around the pin, one or more stops at the end of the sleeve adjacent the link, the stops being engageable with the plate to prevent rotation of the bushing with respect thereto and further engageable with the ear adjacent the link to prevent withdrawal of the bushing from the circular openings in one direction, the bushing further including one or more projecting members being deformable to allow insertion of the bushing through the openings but engageable with the ear adjacent the link to prevent withdrawal of the bushing from the ears in the other direction, the end of the bushing opposite the link being tapered to assist insertion of the bushing through the openings; and means provided for the pin near its end opposite the link for engaging the tapered end of the bushing to prevent the withdrawal of the pin from the bushing.

2. A carburetor comprising, in combination: a housing defining an induction throat; a plate disposed rotatably in the induction throat; a bracket disposed on the plate, the bracket including a pair of projecting ears, each ear having a circular opening therethrough, the circular openings being coaxial; a plate-following link having a cylindrical pin projecting therefrom through the circular openings; a bushing including a generally cylindrical sleeve extending through the circular openings around the pin, one or more sector-shaped stops radiating from the end of the sleeve adjacent the link, the sector-shaped stops having peripheral edges with a radius greater than the distance between the axis of the circular openings and the plate and being engageable with the plate to prevent rotation of the bushing with respect thereto and with the ear adjacent the link to prevent withdrawal of the bushing from the circular openings in one direction, the bushing further including one or more projecting members being deformable to pass through one of the circular openings upon insertion of the bushing therethrough but engageable with the ear adjacent the link to prevent withdrawal of the bushing from the circular openings in the other direction, the end of the bushing opposite the link including a plurality of inward tapering fingers to assist insertion of the bushing through the circular openings; and means provided for the pin near its end opposite the link for engaging the tapered fingers to prevent the withdrawal of the pin from the bushing.

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