Jan. 8, 1963 B. D. GRIBBEN ET AL 3,072,758

VACUUM CONTROL ASSEMBLY FOR DISTRIBUTORS

Filed Oct. 24, 1960

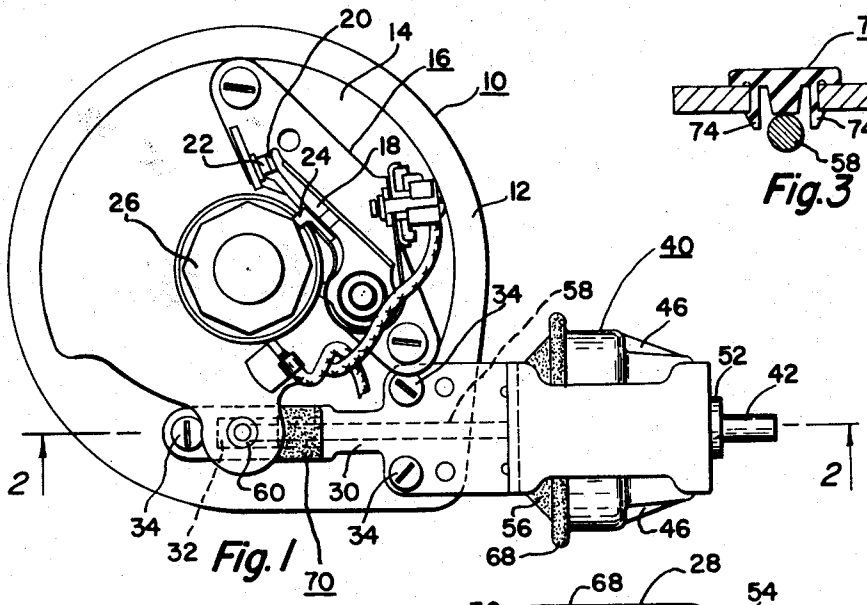


Fig. 1

Fig. 3

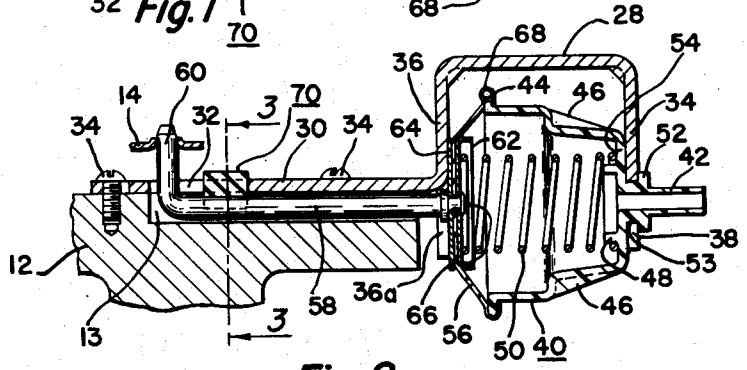


Fig. 2

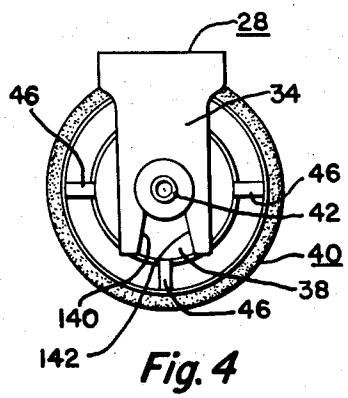


Fig. 4

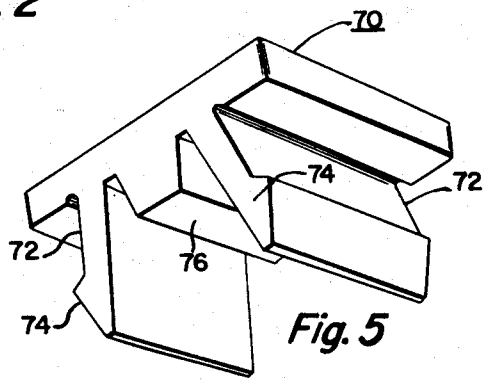


Fig. 5

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United States Patent Office 3,072,758 Patented Jan. 8, 1963

3,072,758

VACUUM CONTROL ASSEMBLY FOR DISTRIBUTORS

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Filed Oct. 24, 1960, Ser. No. 64,621
10 Claims. (Cl. 200—19)

This invention relates to distributors for internal combustion engines, and more particularly to improved vacuum advance apparatus for such distributors.

One of the objects of this invention is to provide a distributor that has a vacuum control unit that is of a simplified construction in that it includes a diaphragm that is simply fitted onto a flanged portion of the case member to thereby provide a vacuum chamber defined by the diaphragm and case.

Another object of this invention is to provide a distributor that has a vacuum unit that includes a case formed as a plastic molded part and a diaphragm that is fitted to an annular flanged portion of the case.

A further object of this invention is to provide a distributor vacuum control assembly that includes a bracket member that is secured to the distributor base, a bracket member having a U-shaped section with one leg of this U-shaped section having a recess that receives a portion of a plastic case member and another leg of the U-shaped section forming a stop for the diaphragm which is fitted to an annular flanged portion of the case.

Still another object of this invention is to provide a distributor vacuum advance mechanism that has an improved range block for limiting the vacuum advance of the distributor.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings where preferred embodiments of the present invention are clearly shown.

In the drawings:

FIGURE 1 is a top plan view of a distributor that is fitted with a vacuum control assembly made in accordance with this invention.

FIGURE 2 is a sectional view taken along line 2—2 of FIGURE 1.

FIGURE 3 is a sectional view taken along line 3—3 of FIGURE 2.

FIGURE 4 is an end view of the vacuum control assembly made in accordance with this invention.

FIGURE 5 is a perspective view of a range block made in accordance with this invention.

Referring now to the drawings, and more particularly to FIGURE 1, the reference numeral **10** generally designates a distributor for controlling the ignition of an internal combustion engine. The distributor has a metal base designated by reference numeral **12** and this metal base supports a rotatable breaker plate designated by reference numeral **14**. The breaker plate **14**, as in conventional practice, carries a contact set generally designated by reference numeral **16**. This contact set has the usual pivotally mounted breaker arm **18** carrying the contact **20**. The contact **20** cooperates with a fixed contact **22** as is well known to those skilled in the art and the breaker lever **18** has a rubbing block **24** that engages a cam member **26**. The cam member, as is well known to those skilled in the art, is driven by the distributor shaft and causes the breaker contacts **20** and **22** to open and close in synchronism with operation of the engine. The breaker plate **14** is rotated around the longitudinal axis of the cam **26** by the vacuum control assembly which is to be described.

The vacuum control assembly for shifting the breaker

plate **14** includes a bracket member generally designated by reference numeral **28**. This bracket member is formed of a suitable metal material and it is seen that it has a straight section **30** formed with a longitudinally extending slot **32**. The straight section **30** of the bracket member is secured to the distributor base **12** as by the fasteners **34**. The bracket member **28** has a U-shaped section defined by the legs **34** and **36** which are substantially parallel to each other. A slot **38** is formed in one leg **34** of this U-shaped section and this slot has generally converging side walls **140** and **142**.

The vacuum power unit of the vacuum control assembly includes a molded part generally designated by reference numeral **40** which is formed of a plastic material such as nylon. It can be seen that this molded part **40** has a tubular conduit portion **42** and an annular flange **44**. The molded part **40** has a plurality of strengthening ribs **46** extending along part of the length of this part. In addition, the molded part **40** has an internal annular portion **48** which serves as a seat for the spring **50**. The molded part **40** has an annular shoulder **52** which is spaced from an end wall **54** of the case **40**.

The molded case **40** carries a diaphragm **56** which may be formed of rubber or other similar flexible material. The diaphragm is connected with a rod **58** having an upturned portion **60** which passes through the slot **32** formed in the bracket member **28**. The connection between the rod **58** and the diaphragm **56** is made by the metal washers **62** and **64** which are positioned on opposite sides of the diaphragm and which engage the rod **58**. The rod **58** is headed over at **66** in order to tightly compress the diaphragm between the washers **62** and **64** and therefore provide an air-tight connection with the end of the rod member **58**. It is important to note that the diaphragm **56** has an annular section **68** that is formed with a groove that receives the annular flanged portion **44** of the molded case **40**. In assembling the diaphragm **56** to the molded case **40**, it is only necessary to fit the diaphragm onto the case with the annular flange snapping into the groove formed in the annular portion **68** of the diaphragm. The spring **50**, as is clearly apparent from FIGURE 2, is interposed between the end wall **54** of the case and the metal washer **62**.

The spring **50** biases the diaphragm in such a direction as to force the washer **64** into engagement with the end wall **36** of the bracket. This end wall has downwardly projecting legs **36***a* which also engage the washer **64** to limit the movement of the diaphragm **56** in one direction. It will, of course, be appreciated that when the tubular conduit portion **42** of the case is connected with vacuum the diaphragm is shifted rightwardly to cause a rightward movement of the rod **58**. The upturned portion **60** of the rod fits within an opening formed in the breaker plate **14** and it therefore can be seen that the shiftable movement of the rod will cause a rotatable movement of the breaker plate.

The molded case member **40** is held in place by slipping the annular portion **53** of the case member into the slot **38** formed in the leg **34** of the bracket member **28**. A part of the bracket member will then be positioned between the end wall **54** of the case **40** and the annular portion **52** and this fit is made as a press-fit to provide a rigid support for the molded case **40**. It has been found that this support is sufficient even when vacuum is applied to shift the metal washer **64** completely away from the walls **36** and **36***a* of the bracket member **28**.

The distributor of this invention is provided with a range block which limits the vacuum advance of the distributor. This range block is generally designated by reference numeral **70** and is shown in perspective in FIGURE 5. The range block has a pair of lugs **72** which are each formed with an outwardly extending tooth por-

tion 74. The range block 70 also has a downwardly extending section 76.

The range block 70 is assembled to the bracket member 28 of the vacuum control assembly by simply pushing the lugs 72 down through the slot 32. When the lugs are moved downwardly in the slot 32 a distance sufficient to clear the bottom edge of the portion 30 of the bracket member, the teeth snap outwardly and engage the underside of the portion 30 of the bracket member to securely hold the range block in place in the bracket member. The range block 70 is preferably formed of a suitable plastic material such as nylon and it will be apparent that when it is inserted in the slot 32 it will limit movment of the rod member 58 to some predetermined amount in a rightward direction in FIGURE 2. This will, of course, limit the amount of vacuum advance that can be achieved when the range block is used.

While the embodiments of the present invention as herein disclosed, constitute preferred forms, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. In combination, a distributor having a base, a breaker plate shiftable relative to said base, breaker contact means carried by said breaker plate, a vacuum control assembly including a bracket member, said bracket member having a section secured to said base and having a generally U-shaped section, a case member formed of moldable plastic material having an annular flanged portion, a diaphragm fitted to said annular flanged portion, a spring member located between a portion of said case member and said diaphragm, said case member and diaphragm being positioned between two of the legs of the U-shaped section with one of the legs limiting movement of the diaphragm in one direction, means securing the case member to the other of said legs, and a rod member connecting said diaphragm and said breaker plate.

2. A vacuum control assembly for shifting the breaker plate of a distributor comprising, a bracket member having a section that is adapted to be secured to the base of the distributor and a generally U-shaped section, a case member formed of a moldable plastic material having an open end, said case member having an annular flanged portion, a diaphragm having an annular extending groove receiving the annular flanged portion of said case member and closing the open end of said case member, a slot in one of the legs of the U-shaped section of said bracket member, said slot receiving a portion of said case member to support one end of said case member, said bracket member having another portion limiting movement of said diaphragm in one direction under the influence of spring means interposed between said case member and diaphragm, and a rod member connected with said diaphragm.

3. A vacuum control assembly for actuating the breaker plate of a distributor comprising, a bracket member having a section adapted to be secured to the base of the distributor, a case member formed of a moldable plastic material having an open end, said case member having an annular extending flange, a diaphragm formed with an annular groove receiving the annular flange of said case member and closing the open end of said case member, conduit means connecting the interior of said case member with the exterior thereof, a spring interposed between said diaphragm and one end of said case member for urging said diaphragm in one direction, a slot formed in a portion of said bracket member, said slot receiving a section of said case member and being positioned between an end wall of said case member and an annular extending portion of said case member to fix said case member from movement relative to said bracket member, said bracket member having another section limiting movement of said diaphragm in one direction under the influence of said spring, and a rod member connected with said diaphragm.

4. A vacuum control assembly for actuating a breaker plate of a distributor comprising, a case member formed

of a moldable plastic material having an open end, said case member having an annular flange, a diaphragm closing said open end and including an annular groove receiving said annular flange, a bracket member having a first section that is adapted to be secured to the base of the distributor, said bracket member having a second second section formed with a slot, said case member having a section fitting within said slot and having sections positioned on opposite sides of the second section of said bracket member for securing one end of said case member to said bracket member, passage means formed in said case member passing through the slot formed in the second section of said bracket member, said bracket member having integral means limiting movement of said diaphragm in one direction under the influence of a spring that is interposed between one wall of said case member and said diaphragm, and a rod member connected with said diaphragm.

5. In combination, a distributor having a base, a breaker plate shiftable relative to said base member, breaker contact means carried by said breaker plate, a bracket member secured to said base having a slot, a rod member shiftable in said slot and connected with said breaker plate for shifting the same, vacuum power means for shifting said rod member, and a range block positioned within said slot for limiting movement of said rod member in one direction, said range block having a pair of lugs passing through said slot and having teeth engaging a portion of said bracket member.

6. In combination, a distributor having a base, a breaker plate shiftable relative to said base, breaker contact means carried by said breaker plate, a bracket member secured to said base having a slot, a rod member shiftable in said slot and connected with said breaker plate for shifting the same, vacuum power means for shifting said rod, and a range block fitted within said slot for limiting movement of said rod in one direction, said range block being formed of a plastic material and having means that snap under one wall of the bracket member when the block is fitted within said slot.

7. In combination, a distributor having a base, a breaker plate shiftable relative to said base, breaker contact means carried by said breaker plate, a bracket member secured to said base, said bracket member having a slot formed with side walls and end walls, a rod member shiftable in said slot and connected with said breaker plate for shifting the same, vacuum power means for shifting said rod member, and a range block fitted within said slot engaging one of said end walls for limiting movement of said rod member in one direction.

8. In combination, a distributor having a base, a breaker plate shiftable relative to said base, breaker contact means carried by said breaker plate, a bracket member secured to said base, said bracket member having a slot, a rod member shiftable in said slot and connected with said breaker plate for shifting the same, vacuum power means for shifting said rod member, and a range block having lugs passing through said slot and having portions engaging one side of said bracket member for preventing removal of said range block from said bracket member, said range block limiting movement of said rod member in one direction and having a portion in sliding engagement with said rod member.

9. In combination, a distributor having a base, a breaker plate shiftable relative to said base, breaker contact means carried by said breaker plate, a vacuum control assembly, said vacuum control assembly including a generally cup-shaped housing having an open end, said cup-shaped housing having an annular flanged portion, a diaphragm having an annular groove receiving the annular flanged portion of said cup-shaped housing enclosing the open end of said cup-shaped housing, said flanged portion and groove forming the sole means for securing said diaphragm to said cup-shaped housing, a unitary bracket member having a portion secured to said base member,

said bracket member having a first integral portion supporting one end of said cup-shaped housing and having a second integral portion serving as a stop means for said diaphragm, said second integral portion performing no clamping function on said diaphragm, and a rod member connecting said diaphragm and said breaker plate.

10. The combination according to claim 9 wherein the cup-shaped housing is formed of a moldable plastic material.

References Cited in the file of this patent

UNITED STATES PATENTS

1,785,902	Hardman	Dec. 23, 1930
2,049,531	White	Aug. 4, 1936
2,131,019	Arthur et al.	Sept. 27, 1938
2,473,170	Ostling	June 14, 1949
2,769,047	Hartzell et al.	Oct. 30, 1956
2,794,879	Clason	June 4, 1957