Dec. 17, 1957 C. L. JULIAN ET AL 2,816,968

DISTRIBUTOR STRUCTURE

Filed July 28, 1955

Fig. 1

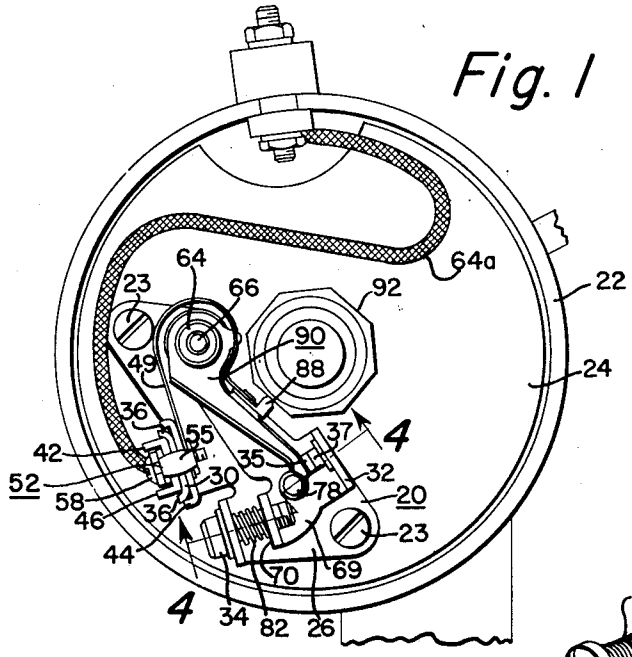


Fig. 4

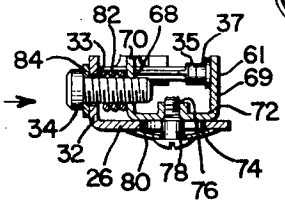


Fig. 2

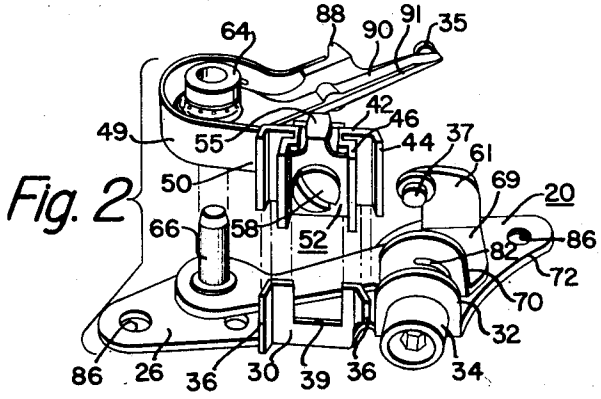
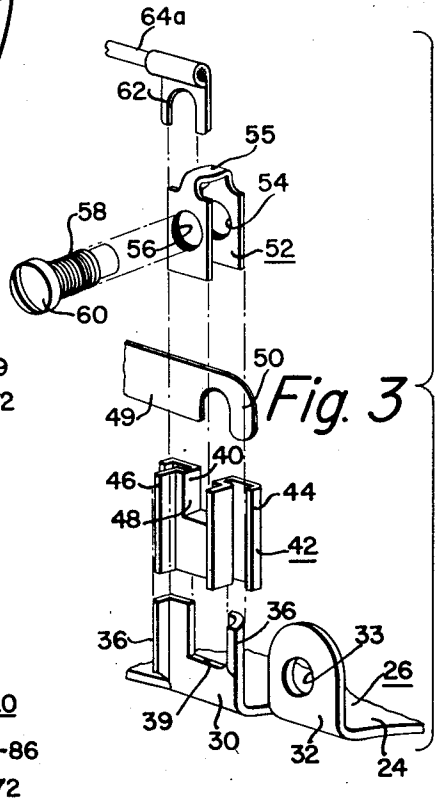


Fig. 3



INVENTOR.
Clarence L. Julian and
David C. Redick

BY John T. Marvin

Their Attorney

United States Patent Office 2,816,968
Patented Dec. 17, 1957

2,816,968

DISTRIBUTOR STRUCTURE

Clarence L. Julian and David C. Redick, Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Application July 28, 1955, Serial No. 524,917

9 Claims. (Cl. 200—30)

This invention relates to ignition distributor structures and is particularly concerned with an improved breaker point assembly for an ignition distributor as used with ignition systems of internal combustion engines.

It is one of the objects of the present invention to provide a breaker point assembly for a distributor in an internal combustion engine wherein the breaker points thereof may be adjusted externally of the distributor while the engine is operating and which assembly may be removed or installed as a unit in the distributor without disturbing the other components thereof such as the condenser, connections to the vacuum advance mechanisms, etc.

It is a further object of the present invention to assemble the breaker point assembly from several subassemblies which are arranged so the factory adjustments and calibrations will be maintained when the breaker point assembly is installed as a unit in the distributor.

Another object of the present invention is to provide a breaker point assembly with a support plate which is adapted to be fastened directly to the rotatable advance plate of a distributor, and acts as a support for the stationary contact assembly and the breaker arm assembly to provide a unitary assembly which will have the factory adjustments maintained when the unit is installed in the distributor where it is bodily moved by the advance plate when the advance plate rotates.

It is still another object of the present invention to provide an improved breaker point assembly which may be removed and installed as a unit on a rotatable plate in a distributor without disturbing the remaining parts of the distributor or upsetting the factory adjustments of the breaker arm assembly of the distributor and which breaker arm assembly is provided with an improved spring anchor and terminal connection to facilitate the assembly of parts during manufacture.

In carrying out the above objects, it is another object of the present invention to provide a molded insulated part which will embrace a notched lug which is formed on the support plate of a distributor which molded part may be assembled with the notched end of the breaker arm spring to form a sub-assembly which may be readily assembled with the remaining portions of the distributor breaker point assembly.

It is another object of the present invention to provide an improved connection between the end of the breaker arm spring and a terminal lead in a distributor which connection may be slipped over and embrace a notched lug on a support plate of a distributor breaker point assembly.

It is another object of the present invention to provide a breaker point assembly with an improved spring anchor and terminal connection which will permit the movable breaker arm to be readily assembled to the remaining portions of the breaker point assembly both during manufacture and whenever the distributor requires replacement of the points.

It has been found that the conventional connection between the leaf spring of the movable breaker arm and the remaining portions of the assembly is normally difficult to accomplish. Heretofore the notched end of the leaf spring was secured to the anchor lug by an arrangement which required that a bolt be passed through the notched end of the spring and a grommet in the aperture in the lug. When this structure is employed, it is impossible to remove the distributor breaker arm without disassembling of the notched end of the leaf spring from the grommet. This arrangement considerably increased cost of manufacture of the breaker point assembly and provided a connection which was difficult to achieve whenever the distributor points required replacement. The present invention also is directed to the elimination of these difficulties by providing a spring anchor and terminal connection arrangement whereby the insulating member may be first assembled to the end of the leaf spring before assembly on the remaining portions of the breaker point assembly.

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

In the drawings:

Figure 1 is a plan view of a distributor showing the breaker point assembly with the improved spring anchor and terminal connection according to the present invention.

Figure 2 is a view in perspective showing the subassemblies of the breaker point assembly.

Figure 3 is an exploded view in perspective showing the shape and arrangement of the parts which form the spring anchor and terminal connection as assembled in Figure 2.

Figure 4 is a view along lines 4—4 in Figure 1 showing the external adjustment means for the breaker point assembly shown in Figure 2.

In the drawings and in Figure 1 particularly, a breaker point assembly **20**, according to the present invention, is shown as installed in a distributor **22** which may be of the type disclosed in application Serial No. 400,024, which has been assigned by the inventors to the assignee of the present invention.

The breaker assembly **20** is preferably secured by screws **23** to a plate **24** that is movable within the distributor in response to engine vacuum. The screws **23** extend through mounting holes **86** in the support plate **26** which provides one of the components of the assembly shown in Figure 2.

The support plate **26** is formed to have a pair of lugs **30** and **32** projecting upwardly therefrom. The lug **32** has an opening **33** which has a diameter greater than the diameter of adjustment screw **34** which is used to externally adjust the opening of the breaker point contacts **35** and **37** as will be hereinafter described. The lug **30** serves as an anchor for the fixed end of the spring **49** and is provided with a pair of ears **36** which serve to strengthen lug **30**. A U-shaped notch **39**, formed to extend downwardly in the lug **30**, is sized to receive the interconnecting web portion **40** of an insulating part **42**. The part **42** is preferably formed of molded nylon to have a pair of channel members **44** and **46** which are interconnected by the web portion **40**. The channel members **44** and **46** are formed and located so that the material of the part **42** will surround the notch **39** and cover the opposed faces of the lug **30**. The web portion **40** of part **42** is formed with a notch **48** which is sized and located to be in alignment with the notch **39** in lug **30** when the parts are assembled, one upon the other. The nylon part **42** serves to insulate the end **50** of spring **49** from lug **30**. The breaker arm assembly **90**, shown in

Figure 2, which includes the breaker arm **91**, the spring **49** and the molded part **42**, also includes a U-shaped clip or part **52** which is formed to have a threaded aperture **54** in one of its arms and a second aperture **56** in another of its arms. These apertures are located to be in alingment with notches **39** and **48** when the U-shaped clip is in position as shown in Figure 2 and there secured by the threaded member **58** which has a head **60** on one end which will maintain the terminal clip **62** on conductor **64***a* in position when the threaded member **58** is threadedly received in aperture **54**.

From the above, it is manifest that the breaker arm sub-assembly **90** which carries the movable contact **35**, may be formed when the clip **52** is positioned to embrace the molded part **42** and the notched end **50** of the spring **49** is held against movement between the clip and the nylon part by the threaded member **58** which engages the threads in aperture **54** of clip **52**. When this sub-assembly **90** is formed, the parts may be readily installed on the remaining portions of the breaker assembly **20** by merely slipping the bearing portion **64** of the breaker assembly over the pivot pin **66** and permitting the channel members **44** and **46** to embrace the opposite sides of lug **30** by slipping the part **42** over lug **30**. At this point, it is to be noted that when the breaker arm sub-assembly **90** is installed on lug **30** of the support plate **26**, the ears **36**, as formed on lug **30**, will limit the rotative movement of part **42** and the portions of channel member **46** will hold the clip member **52** against rotation while the interconnecting web **55** of clip member **52** prevents displacement of the end **50** of spring **49**. When the parts are in position on lug **30**, the terminal clip **62** of conductor **64***a* is positioned behind the headed portion **60** of threaded member **58** which, when tightened, will provide a tight electrical connection between the conductor **64***a* and the spring **49** while simultaneously providing a firm anchor for spring **49**.

The breaker assembly **20** is also provided with a means which will permit the opening between contacts **35** and **37** to be adjusted from a point exterior to the distributor **22**. This is accomplished as shown in Figure 4 by providing the stationary contact sub-assembly **69** with a threaded aperture **68** in a lug **70** which is formed on a base **72** which carries the stationary contact **37**. The plate **26** is also provided with an elongated arcuate opening **74**. This opening is located on the radius from a point located along the axis of pin **66**. The opening **74** is located to cooperate with an aperture **76** in base **72** of the stationary contact sub-assembly **69** so that a securing means which may include a bolt or rivet **78** and a wave-washer type spring member **80** may be used to help maintain the base **72** in position on plate **26**. The external adjustment of the points **35** and **37** is accomplished when the threaded member **34** is rotated through a suitable wrench or screw driver from a point exterior to the distributor **22**. The member **34** is threadedly received in aperture **68** and is loosely received in aperture **33** to have a limited movement therein. When the member is turned in the proper direction, the distance between the stationary contact **37** and the movable contact **35** may be increased or decreased. After the proper adjustment of the points is accomplished, the member **34** is held against further rotation by a spring member **82** which is disposed around the member **34** and between lugs **32** and **70**. The locking is further accomplished by the lock washer **84** which is located between the headed portion of the member **34** and lug **32**.

From the above, it is manifest that when a breaker point assembly **20** is used in a distributor **22**, it may be installed as a unit on the rotatable breaker plate **24**. The assembly **20** will be bodily moved by the plate **24** and the plate **24** rotates in response to engine vacuum. The assembly of the breaker point assembly **20** on the plate **24** is accomplished by aligning the holes **86** on support plate **26** with suitably threaded and located holes, not shown,

in breaker plate **24**. When the parts are in this position, the rubbing block **88**, which is carried on the breaker arm sub-assembly **90**, will be in engagement with the rotatable cam **92**. In this connection, it is to be noted that the tension on spring member **49** is preferably preset at the factory when the sub-assembly **69** and the breaker arm sub-assembly **90** are assembled. This arrangement will minimize the possibility of having the spring incorrectly tensioned which has been found objectionable in the modern automobile. Thus, the arrangement of having the breaker point assembly arranged so that it may be installed as a unit in the distributor of a vehicle is very desirable as it will reduce the cost of servicing the vehicle as well as minimize the possibility of having the vehicle operate incorrectly because of improper tension on the spring of the breaker arm.

While 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. A terminal connection and a spring anchor for use in a distributor breakerpoint assembly, wherein the assembly comprises a plate having a pivot pin and a lug spaced from said pin, said lug having a notch portion and a pair of spaced ear portions projecting from one face thereof, a movable breaker arm pivotally mounted on said pin and having an extending resilient notched arm projecting therefrom, comprising in combination a U-shaped insulating part constructed to be slid into position on the lug and embrace surface portions of said lug surrounding said notch and be held against rotation thereon by said ear portions, a U-shaped member adapted to embrace said U-shaped part, said member having a pair of apertures therein alignable with said notch in said lug when the member part and lug are positioned on one another, and a threaded member having a headed portion for holding the end of a terminal member adapted to be embraced by the notch in the resilient member for holding the resilient member and terminal member in position on said lug when said threaded member threadedly is received in the apertures in said U-shaped member.

2. In a connection for a resilient arm of the movable breaker arm and the terminal end of a conductor in a distributor breaker point assembly wherein the assembly has a notched lug in spaced relation from a pivot for the movable arm, comprising a part of insulating material having spaced walls and a central notched portion arranged to embrace at least two opposed faces of said lug and surround the notch therein when the part is slid into position on the lug, a second part adapted to embrace the notched portion of said first part and a third part adapted to extend through the notched portion in said first part and be threadedly received by said second part for holding all of said parts on said lug, all of said parts being constructed and arranged for holding a notched end of the resilient arm of said movable arm and the terminal end of the conductor in position on said lug for providing an anchor and terminal connection for said resilient arm.

3. In a distributor breaker point assembly, having; a plate having a means providing a pivotal connection for a breaker arm and a lug spaced from said means having a notched portion, a resilient leaf spring arm having an end extending from said breaker arm formed with a notch that is alignable with the notch in said lug when said breaker arm is pivotally mounted on said pivot means, a terminal connection and spring anchor comprising; a unitary part of insulating material having parallelly spaced walls interconnected by a U-shaped web, constructed and arranged to slidingly embrace said lug and provide an insulating surface for the opposite faces thereof and the material of said lug which surrounds said notch, a second unitary part having a pair of spaced arms, interconnected by a web, constructed and arranged to embrace said first part with an aperture in each of the arm por-

tions of said second part aligned with the notch in said lug when said parts are embracing one another and a means adapted to be secured in at least one of said apertures for yieldably maintaining the embracing relation between the parts, said means being constructed and arranged to be embraced by the notched portion of said leaf spring and the terminal end of a conductor to hold the notched end of said spring and said other parts in assembled relation whereby the spring and terminal end of said conductor are insulated from said lug when the assembled parts are positioned on said lug and said means is tightened in said second part.

4. A breaker point assembly adapted to be bodily installed as a unit on a rotatable vacuum advance plate in an ignition distributor so that the breaker point assembly is bodily movable on the plate during rotation thereof, comprising; a support member constructed and arranged to be removably attached on said advance plate having a lug and a pivot pin thereon, a stationary contact assembly adjustably and bodily movable about said pivot pin and a movable contact arm assembly having, a portion on one end adapted to engage a portion of the stationary contact assembly, an intermediate portion journalled on said pivot and a means on the other end slidable on said lug for insulating said arm from said support member.

5. A breaker point assembly adapted to be bodily installed and detached as a unit from the vacuum advance plate in an ignition distributor, comprising; a support plate apertured to receive a fastening means for securement to said vacuum plate said support plate having a pivot pin and a pair of spaced lugs located in spaced relation from a rotatable cam carried by said distributor, a stationary contact assembly having an apertured end adapted to embrace said pivot pin and the other end bodily movable carrying a pair of spaced lugs one of which has a stationary contact carried thereon and the other of which is disposed in alignment with one of the lugs on the support plate when the stationary contact assembly is positioned on said support plate, means associated with the aligned lugs on said stationary contact assembly and said support plate accessible from the exterior of said distributor for adjustably and bodily moving said stationary contact assembly about said pivot and maintaining the position of said stationary contact when moved relative to said distributor cam, a movable breaker arm assembly pivotally mounted on said pivot pin having; rigid and resilient arms extending in opposite directions from said pivot pin, said rigid arm having a contact on one end spaced from said pivot pin and engageable with the contact carried on the stationary contact assembly, a rubbing block spaced intermediate said contact and pivot pin engageable with said distributor cam, resilient arm having a notch on one end and means carried by the notched end of said resilient arm for connecting said resilient arm with the other of the lugs on said support plate for providing an anchor and terminal connection for the resilient arm of said movable breaker arm assembly.

6. A breaker point assembly adapted to be bodily installed as a unit on a rotatable advance plate in an ignition distributor so that the breaker point assembly is bodily movable on the plate during rotation thereof by the vacuum advance mechanism that is operably connected with the engine wherewith the distributor is associated; said assembly comprising; a support member constructed and arranged to be removably attached on said advance

plate, a stationary contact assembly adjustably and bodily movable about a pivot carried by said support member, a means operably connected with said stationary contact and support member accessible from the exterior of said distributor for adjustably and bodily moving said stationary contact assembly about said pivot and yieldably maintaining said contact assembly in position on said support member, and a movable breaker arm assembly having a means connected to one end portion adapted to slide on and embrace an upstanding lug on said support member, a contact on the other end portion arranged to engage a stationary contact on said stationary contact assembly and a portion intermediate said end portions movable on said pivot.

7. A breaker arm assembly adapted to be installed as a unit in a distributor having a pivot pin, a stationary contact and a lug in spaced relation to each other, comprising means on said arm for pivoting said arm on said pin, a spring on said arm for urging a contact on said arm into engagement with said stationary contact when said arm is pivoted on the pin, and a preformed insulating part means carried by said spring and constructed to slide on and embrace said lug during assembly of the arm on the pin for forming an insulated attachment between said lug and spring.

8. In a unitary and adjustable circuit breaker assembly adapted to be removably mounted in a distributor having a breaker plate, the combination comprising; a support plate adapted to be removably attached to the breaker plate, a stationary contact arm pivotally mounted on said plate and carrying a stationary contact, a breaker arm pivotally mounted on said support plate and carrying a movable contact which is positioned for mating relation with the stationary contact, a spring acting between the breaker arm and support plate, an adjustment screw acting between said support plate and a portion of the stationary contact arm for moving the stationary contact arm relative to the support plate into a predetermined adjusted position therewith and means for attaching the support plate to the breaker plate.

9. In a unitary and adjustable circuit breaker assembly adapted to be removably mounted in a distributor having a rotatable breaker plate, the combination comprising; a support plate adapted to be removably attached to the breaker plate, a pivot post mounted on said support plate, a stationary contact arm pivotally mounted on said pivot post and carrying a stationary contact, a breaker arm pivotally mounted on said pivot post and carrying a movable contact which is positioned for mating relation with the stationary contact, a spring acting between the breaker arm and a portion of the support plate, an upturned flange on said support plate, an adjustment screw acting between said flange and a portion of the stationary contact arm for moving the stationary contact arm relative to the support plate into a predetermined adjusted position therewith, and means for attaching the support plate to the breaker plate.

References Cited in the file of this patent

UNITED STATES PATENTS

2,290,078	Thomas	July 14, 1942
2,594,447	Kerr	Apr. 29, 1952
2,640,891	Buck et al.	June 2, 1953
2,713,094	Zocchi	July 12, 1955
2,727,104	Filko	Dec. 13, 1955