Oct. 30, 1956 A. C. RUSSELL 2,769,045

BREAKER POINT MECHANISM FOR MOTOR VEHICLE DISTRIBUTORS

Filed Feb. 9, 1955

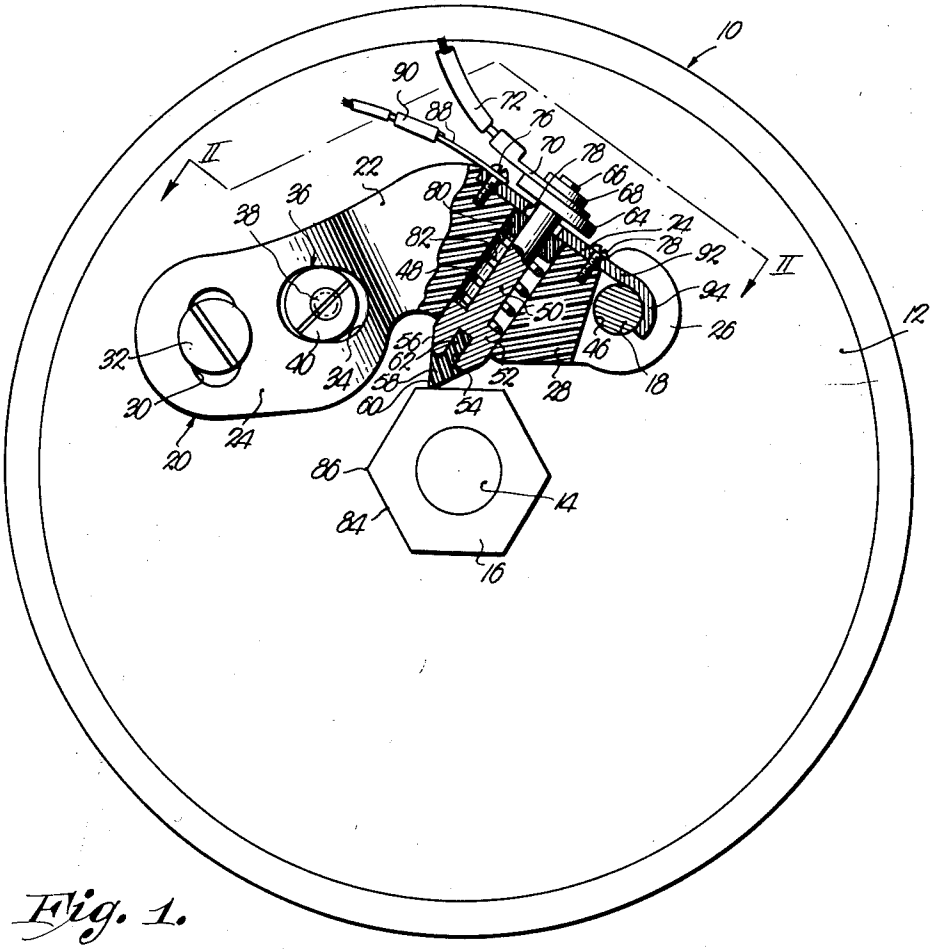


Fig. 1.

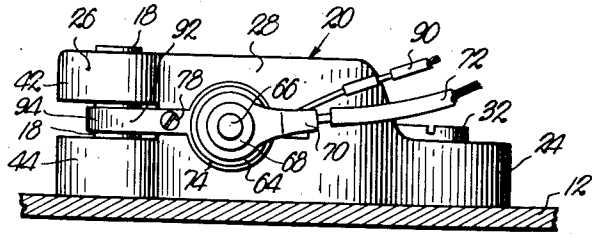


Fig. 2.

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United States Patent Office

2,769,045

Patented Oct. 30, 1956

2,769,045

BREAKER POINT MECHANISM FOR MOTOR VEHICLE DISTRIBUTORS

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Application February 9, 1955, Serial No. 487,101

6 Claims. (Cl. 200—31)

This invention relates to the field of internal combustion engines and, more particularly, to a breaker point assembly or mechanism for use in the distributors of such engines. The invention involves further improvements over the apparatuses disclosed in my co-pending application Serial No. 455,483, new Patent No. 2,729,725, entitled "Breaker Point Assembly for Internal Combustion Engines," filed September 13, 1954; my co-pending application Serial No. 455,613, entitled "Circuit Breaker for Ignition Systems of Internal Combustion Engines," filed September 13, 1954; my co-pending application Serial No. 481,989, now Patent Number 2,735,905, entitled "Pressure Equalizing Breaker Point Assembly," filed January 17, 1955; and my co-pending application Serial No. 481,990 entitled "Breaker Point Apparatus," filed January 17, 1955.

The primary object of this invention is to further simplify construction and minimize parts in a breaker point assembly having improved wear-resistant characteristics and capable of greatly improved operational performance, as compared with conventional breaker point devices.

It is another important object of this invention to provide such breaker point apparatus utilizing a unitary body of high wear-resistant nylon plastic material, which may be molded or otherwise formed in a single operation, for adjustably supporting the breaker point switching portion of the apparatus in proper operative disposition relative to the cam of a standard distributor mechanism for internal combustion engines.

It is another important object of this invention to provide such apparatus having a configuration adapting the same for direct pivotal mounting upon the pivot post or pin conventionally forming a part of standard distributors, and to further provide in such apparatus an electrical contact having parts engageable directly with such pivot pin for effecting an electrical grounding connection to such contact.

Another important object of this invention is to provide such apparatus having a reciprocable member provided with a cam engaging insert of wear-resistant nylon plastic material.

Other important objects of this invention, including important details of construction which contribute to the performance characteristics and manufacturing economy of the apparatus, will be made clear or become apparent as the following description of the invention progresses.

Referring now to the accompanying drawing:

Figure 1 is a top plan view of a standard automobile distributor mechanism having the breaker point apparatus contemplated by this invention installed in operative disposition therewithin, parts being broken away and shown in cross section for clarity of illustration;

Fig. 2 is a fragmentary side elevational view of the apparatus of the invention looking from line II—II of Fig. 1.

In the drawing, the numeral 10 generally designates

a conventional or standard distributor mechanism for an internal combustion engine. Mechanism 10 includes a base 12 having a rotatable shaft 14 extending therefrom. Mounted upon and carried by shaft 14 is a hexagonal cam 16. An elongated pivot pin or post 18 extends from base 12 in spaced parallelism to the axis of rotation of shaft 14 and cam 16.

The apparatus of this invention, which is generally designated by the numeral 20, includes a unitary, integrally formed body 22 of nylon plastic or similar wear-resistant and electrically insulating material, the nylon plastic being the currently preferred material. By means and techniques well known in the art of plastics fabrication, the body 22 may be formed by molding or the like in one operation and at extremely low cost. Such nylon plastic material is not only extremely wear-resistant, but has the property of possessing very low surface frictional characteristics adapting the same for use as a bearing material and in other applications where engagement between moving parts is involved. In addition, such material is of very high strength adapted for use in applications such as that here contemplated.

Body 22 includes a mounting extension portion 24 at one extremity thereof, a pin embracing position 26 at the other extremity thereof, and a main block portion 28 between and interconnecting portions 24 and 26.

Mounting extension portion 24 is provided with an elongated slot 30 for clearing a fastening screw 32 adapted to be received by a threaded opening (not shown) provided in the base 12 of standard distributor mechanism 10. Mounting extension portion 24 is also provided with a second elongated slot 34 adapted to receive an eccentric adjusting screw 36 having a threaded portion 38 adapted to be received by a second threaded opening (not shown) provided in the face 12. The dimensions of the head portion 40 of screw 36 are such as to just be cleared by the narrower dimension of slot 34. By virtue of the eccentric location of threaded portion 38 with respect to circular head 40, rotation of screw 36 will move mounting extension portion 24 of body 22 in one direction or the other. Screw 36 may thus be used for making fine adjustments of the positioning of body 22 about the pivotal axis of pin 18, and the holding screw 32 then tightens upon body mounting portion 24 to hold the body 22 in the selected position. Pin embracing portion 26 of body 22 is bifurcated and includes a pair of vertically spaced elements 42 and 44. Elements 42 and 44 are provided with aligned openings 46 for snugly but pivotally receiving pin 18 of distributor mechanism 10, such pin 18 extending from base 12 of distributor mechanism 10 through the opening 46 of element 44, thence across the space between element 44 and element 42, and then through the opening 46 of element 42. The manner of mounting and rendering the body 22 adjustably positionable within distributor 10 should now be clear.

Main block portion 28 of body 22 is provided with an elongated bore 48, which is preferably of circular cross section, extending therethrough. The longitudinal axis of bore 48 is so disposed within main block portion 28 that, when body 22 is mounted as above described within distributor 10, such longitudinal axis of bore 48 will intersect a portion of the cam 16, which it is noted will be understood to be rotatable in a clockwise direction as illustrated in Fig. 1. An elongated rod 50 having a cylindrical portion of enlarged diameter 52 extends through bore 48 and beyond each end of the latter, enlarged rod portion 52 being slidably received by the wall of the bore 48 to journal rod 50 reciprocably within main block portion 28. Enlarged rod portion 52 is provided with a cavity 54 adjacent the end of rod 52 approximate cam 16. Rod portion 52 is also preferably bev-

eled or of frusto-conical configuration as at 56. Rod 50 is formed of metal and it is provided with an insert 58 of wear-resistant, nylon plastic material having a point 60 engageable with cam 16 and a plug portion 62 press fitted within cavity 54 of enlarged rod portion 52. Insert 58 could conceivably be omitted and the end of rod 50 approximate cam 16 made in pointed configuration for engaging cam 16. However, the decreased friction and increased wear-resistant action provided by the use of a nylon plastic insert 58 has been found so advantageous as to require such construction for achieving optimum performance. Obviously, the insert 58 could be mounted upon rod 50 in other equivalent fashions such as by reducing the diameter of a length of rod 50 adjacent cam 16 and forming the cam engaging plastic member as a sleeve rather than an insert.

Mounted upon the end of rod 50 remote from cam 16 is a preferably circular contact disk 64 of highly conductive material such as a silver alloy. Such mounting may be accomplished in various fashions not herein disclosed in detail, particularly in view of the disclosure thereof in the last two mentioned of my above referred to co-pending applications. Briefly, however, a suggested construction is to provide the rod 50 with a shoulder (not shown) adjacent the end thereof remote from cam 16 and to provide contact disk 64 with a perforation (not shown) adapted to clear the portion of rod 50 adjacent such shoulder. The end of rod 50 may then be crimped upon contact disk 64 as indicated at 66 with a washer 68 and an electrical connecting lug 70 preferably interposed therebetween. A conductive wire 72 is secured to lug 70 for providing an electrical connection with contact disk 64. It will be clear, therefore, that contact disk 64 is mounted for reciprocation toward and away from main block portion 28 of body 22, whenever rod 50 is reciprocated by cam 16 in the manner hereinafter more fully explained.

A stationary contact 74 of highly conductive material and of somewhat greater dimensions than contact disk 64 is provided upon that surface of main body portion 28 adjacent contact disk 64. Stationary contact 74 is preferably held in place by a pair of screws 76 and 78 passing through contact 74 and threaded into main block portion 28. Contact 74 is provided with an opening 78 of sufficient diameter to clear rod 50 without electrical contacting engagement therewith. A washer 80 of nylon plastic or other insulating material is provided within bore 48 adjacent the end of the latter remote from cam 16 and is held within bore 48 by engagement with contact 74. A coil spring 82 is interposed within bore 48 with its extremities oppositely bearing against insulating washer 80 and enlarged rod portion 52. Spring 82 thus yieldably biases rod 50 in a direction toward cam 16 and, accordingly, similarly biases contact disk 64 toward a position in electrical contacting engagement with contact 74. As will be clear from Fig. 1, this maintains point 60 of insert 58 in continuous engagement with the surface of cam 16 so that contact disk 64 will be engaging contact 74 when point 60 is engaging a flat surface 84 of cam 16 and contact disk 64 will be reciprocated out of engagement with contact 74 when point 60 is in engagement with a point 86 on the surface of cam 16.

Stationary contact 74 of apparatus 20 is the contact thereof which is normally grounded in use. Although such grounding could, if desired, be accomplished through a lug 88 held in engagement with contact 74 by the screw 76 and provided with a conductive wire 90 connected thereto, the preferred construction and usage contemplates that contact 74 will be provided with an elongated extension portion 92 having an arcuately curved portion 94 adapted to pass between the elements 42 and 44 of bifurcated pin embracing portion 26 of body 22 and to there tightly engage pin 18 of distributor mechanism 10. In the interests of assuring a good contact between extension 92 of contact 74 and pin 18, it is to be preferred that the material used for contact 74 should be of somewhat resilient nature and of normal or initial configuration such that, when contact 74 is tightly held upon body 22 by screws 76 and 78, curved extension portion 94 will be held in tight engagement with the pin 18. This latter described construction obviously provides a grounding contact of good electrical characteristics, while at the same time eliminating the necessity of the lead wire 90 conventionally required in breaker point devices.

It will now be apparent that the improved structure of the breaker point apparatus 20 of this invention involves not only a minimum of working parts but also parts which may be inexpensively manufactured and which, when combined, provide an apparatus 20 capable of improved performance because of the large electrical contact area between contact disk 64 and contact 74, the wear-resistant qualities of the nylon plastic body 22, insert 58 and washer 80, and adaptability of the over-all assembly for precise positioning and adjustment within a distributor mechanism 10.

It will be apparent that certain minor modifications and changes could be made from the exact structural details disclosed for purposes of illustration without departing from the true spirit and intention of the invention. Accordingly, it is to be understood that the invention shall be deemed limited only by the scope of the appended claims.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. Breaker point apparatus for use with an internal combustion engine provided with a distributor mechanism having a base, a rotatable shaft extending from the base of electrically conductive material, a cam mounted on the shaft for rotation therewith, and a pivot pin of electrically conductive material extending from the base in spaced parallelism to the shaft, said apparatus comprising, in combination, a unitary block of wear-resistant, insulating material having a mounting portion adjacent one extremity thereof, an intermediate main body portion and a bifurcated portion adjacent the opposite extremity thereof, said mounting portion having a hole therein, said main body portion being adapted to carry an electrical switching mechanism, said bifurcated portion including a pair of spaced arms each provided with an opening therein, said openings being aligned and of dimension for tightly but pivotally receiving said pin; releasable means adapted to extend through said hole and to be secured to said base for holding said mounting portion and the remainder of said block in predetermined position; and an electrical switching mechanism carried by said main body portion, said mechanism including a pair of relatively shiftable, electrically conductive contacts and means engageable with said cam and operably coupled with one of said contacts for shifting the latter into and out of engagement with the other of said contacts, said other contact being fixedly mounted on the block and including parts extending between said arms and adapted for engagement with said pin.

2. In the apparatus as set forth in claim 1, wherein is provided means including an elongated slot in said mounting portion and an element adapted for rotatable mounting on the base and having a head of circular cross-section and of substantially the same diameter as the minor dimension of the slot adapted to extend into said slot, said head being mounted on the element eccentrically of the axis of rotation of the element, whereby the element may be used to accurately set the block in a predetermined pivoted position while said releasable means are released.

3. In the apparatus as set forth in claim 1, wherein said parts of said other contact comprises an elongated integral extension on said other contact, said contact being of resilient material, said extension having a nor-

mal configuration for disposing a length thereof between and in alignment with said openings.

4. In the apparatus as set forth in claim 1, wherein said other contact has an aperture therein, there is provided an elongated rod assembly extending through the aperture and the block and slidably mounted in the latter for reciprocation along its longitudinal axis, said one contact is rigidly mounted on one end of said assembly, the other end of said assembly is adapted for engagement with said cam, and there is provided compression spring means within the hole and between a portion of the assembly and said contact for yieldably biasing the assembly in the direction of said other end thereof to urge said one contact toward engagement with said other contact.

5. In the apparatus as set forth in claim 4, wherein said assembly includes an elongated metallic rod member provided with a piece of wear-resistant, plastic material mounted on the end thereof adjacent said other end of the assembly, said piece being adapted to engage said cam.

6. In the apparatus as set forth in claim 5, wherein said end of the rod is provided with a cavity therein, and said piece includes a portion of configuration complementary to said cavity and press fitted in the latter and a portion having a pointed extremity adapted to engage said cam.

References Cited in the file of this patent

UNITED STATES PATENTS

1,087,131	McQuown	Feb. 17, 1914
1,426,873	Hunt	Aug. 22, 1922
2,106,721	Chermendy	Feb. 1, 1938