March 27, 1951 S. E. ALDRIDGE 2,546,710

BREAKER PLATE ASSEMBLY FOR DISTRIBUTORS

Filed Feb. 28, 1947

Fig. 1.

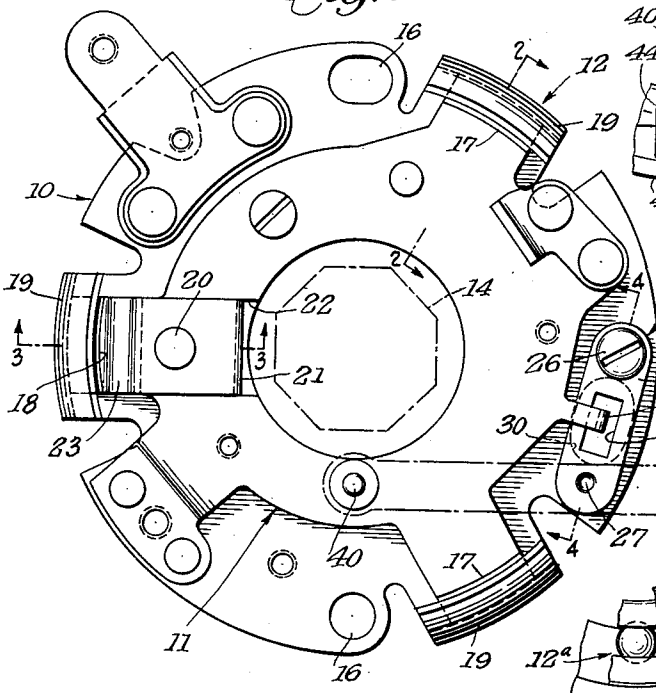


Fig. 7.

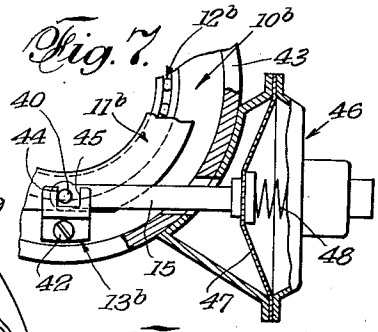


Fig. 8.

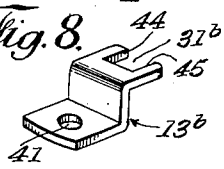


Fig. 5.

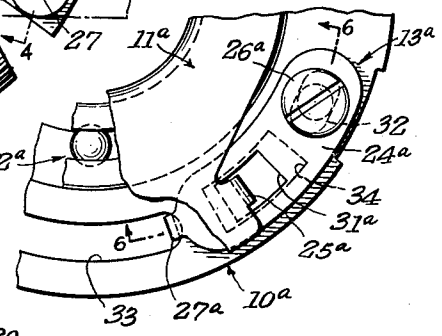


Fig. 2.

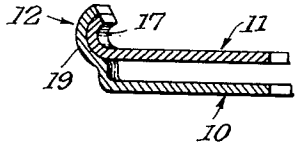


Fig. 3.

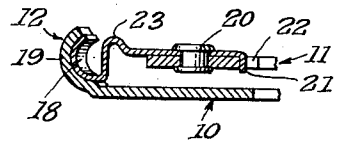


Fig. 6.

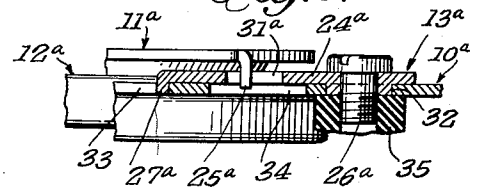
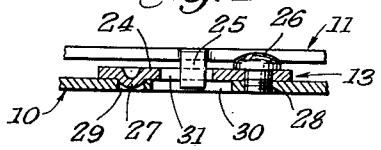


Fig. 4.



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BREAKER PLATE ASSEMBLY FOR DISTRIBUTORS

Seth E. Aldridge, San Diego, Calif.

Application February 28, 1947, Serial No. 731,568

17 Claims. (Cl. 200—19)

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This invention relates to breaker plates for distributors and is a continuation-in-part of my pending application entitled Ignition Timer, Serial No. 641,944, and filed January 18, 1946, now Patent No. 2,444,149, June 29, 1948.

The mentioned application deals with improvements in the mounting means of breaker plates for timers or distributors in which the wall of the distributor housing mounts the breaker plate. The present invention deals more specifically with a breaker plate assembly fixedly, yet removably mounted in a distributor housing, and which embodies a distributor disc mounted on a fixed plate and relatively rotational under suction power of an engine timed by the distributor. Typical of such conventional breaker plate assemblies, a central and axial ball bearing connects the rotational disc and the fixed plate. The faults, fully enumerated in the mentioned application, inherent in ball-mounted plates, are present also in this type of structure. Further, the angular travel of the movable disc is different for different engines and, accordingly, a great number of otherwise identical plate assemblies are manufactured and stocked, each providing for a different angular travel of said disc.

The present invention, therefore, has for its primary object to provide an improved distributor or breaker plate assembly of the fixed-plate-movable-disc type which embodies improved, accurate and durable mounting means for the disc and which, by a simple interchange of a simple and inexpensive element, is adapted for substantially universal use throughout the range of angular movement of said disc.

Another object of the invention is to provide peripheral and, therefore, widely spaced interconnecting means for the fixed and the movable members of a breaker plate assembly for the maintenance of accurate relationship of said members.

Another object of the invention is to provide a breaker plate assembly of the character indicated which is adapted for ready and inexpensive conversion into an assembly suitable for a specific installation, whereby a small range of such assemblies will fill all the requirements of a great multiplicity of individually different breaker plate assemblies.

A further object of the invention is to provide improved and simple means for converting an existing breaker plate assembly for a specific installation, whereby stocking of a great variety of such assemblies is obviated.

My invention also has for its objects to provide such means that are positive in operation, convenient in use, easily installed in a working position and easily disconnected therefrom, economical of manufacture, relatively simple, and of general superiority and serviceability.

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The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description. However, the drawings merely show and the following description merely describes embodiments of the present invention, which are given by way of illustration or example only.

In the drawings, like reference characters designate similar parts in the several views.

Fig. 1 is a plan view of a breaker plate assembly embodying features of the invention.

Figs. 2, 3 and 4 are fragmentary cross-sectional views as taken on the respective lines 2—2, 3—3 and 4—4 of Fig. 1.

Fig. 5 is a broken plan view of a conventional breaker plate assembly embodying improved means for rendering the same more universal in use.

Fig. 6 is a cross-sectional view as taken on the line 6—6 of Fig. 5.

Fig. 7 is a fragmentary plan sectional view of a modification.

Fig. 8 is a perspective view of a novel element employed in the invention of Fig. 7.

The breaker plate assembly which is illustrated in Figs. 1 to 4 comprises, generally, a fixed plate 10, a disc 11, means 12 connecting said plate and disc for oscillating movement of the latter, and means 13 for limiting said movement to a specified angular amount. In its normal environment, the plate is removably secured in a distributor housing having a breaker point operating cam 14, and said disc is connected by a link 15 to conventional means responsive to changes in the suction of an engine as caused by variations of the load thereof. The holes 16 serve for screws employed for securing the assembly to a distributor housing, and both the plate 5 and disc 6 may be designed in various ways to carry suitable electrical terminals, a condenser, and a spring-loaded arm controlled by cam 14 for effecting periodic separation of breaker contact points, one on the arm and one on the disc.

The means 12 serves the dual function of connecting the plate and disc and mounting them for oscillating movement of the latter. The means 12 thus comprises support and guide means and is shown as comprising a pair of angularly spaced similar shoes 17 and a third spring shoe

18 symmetrically arranged with shoes 17 in isosceles or equilateral triangular form. The shoes 17 and 18 are carried by disc 11 and cooperate with similarly shaped shoes 19 preferably integrally formed as peripheral curved portions of the plate 10.

The shoes 17 may be separate elements applied to disc 11 but are shown as integral portions which are generated on an arc about the center of said disc and are each also transversely curved. The spring shoe 18 is formed as a separate element secured by a rivet or the like 20 to the disc and further held against movement thereon by a tongue 21 engaged in a suitable notch 22 in said disc. The shoes 17 have limited or no resiliency while the shoe 18 is resilient for the purpose of exerting a force necessary to slidably yet firmly engage the shoes of the disc with the shoes of the plate. The resiliency of shoe 18 permits ready assembly and disassembly of the disc and plate by readily snapping into place in, or being as easily dislodged from, the shoe 19 with which it is engaged. A transverse curved hump 23 imparts the desired resiliency to shoe 18.

The outer doubly curved face of each shoe 17 and 18 and the co-operating inner doubly curved face of each shoe 19 are in respective sliding engagement to hold the disc against wobble and for smooth oscillating movement as controlled by forces on the link 15.

The means 13 comprises a relatively small and inexpensive element 24 which co-operates with a lug 25 on the disc 11 to limit the range of oscillation of said disc.

The element 24 is secured to plate 10, and as shown, a screw 26 at one end of the element, and a dimple or teat 27 at the other, effect accurate non-displaceable securement of said element. The screw is engaged in a threaded seat 28 and the dimple seats in an opening 29 in plate 10. Said plate is provided with an elongated opening 30 of such radial extent that the lug 25 projecting thereinto can travel angularly the greatest amount that would be required, and in this instance, the element 24, may be omitted. However, since different specific conditions require different angular travel of the disc 11 and said travel varies approximately in ½° increments, the element 24 is formed with a slot or opening 31 superimposed over the opening 30 and the same varies in length, accordingly. Thus, if the maximum travel required is 12°, then the elements 24 are formed with slots 31 which vary in approximate ½° increments from 11½° to the minimum travel required. By the simple selection of a suitably slotted element 24, a standard form of breaker plate assembly can be used for a great number of specific installations and, therefore, the need for manufacturing and stocking such a wide variety of assemblies is obviated.

The foregoing describes a breaker plate assembly designed to replace the wide variety of present assemblies. Figs. 5 and 6 illustrate the invention as applied to such existing assemblies to render them more universal in use. In the assembly shown, the plate 10ª and disc 11ª are connected, for oscillation of the latter, by a radial ball bearing 12ª, and the means 13ª is removably secured to plate 10ª and formed to cooperate with existing portions of said plate. The latter comprises a hole 32 which serves as a mounting hole and with an arcuate slot 33. In existing assemblies the slot 34 varies in angular degree for desired limit of oscillating travel of the disc 11ª as determined by lug 25ª. According to the invention, said slot 34 is extended to maximum length for the greatest required travel, and an element 24ª similar to element 24 is applied to obtain the variation of travel required. In this instance, the screw 26ª serves to hold the element 24ª in place and also to secure the assembly to a portion 35 of a distributor housing. The end of slot 33 is employed to engage a lug 27ª on element 24ª to effect proper location of said element. The opening 31ª functions similarly to slot 31. It is obvious, therefore, that a standard and conventional breaker plate assembly can be converted for a specific installation by a suitable selection and application of element 24ª.

In breaker plate assemblies of the type herein indicated and particularly in those having a ball bearing, such as the bearing 12ª, the applied endwise forces on the link 15 when oscillating disc 11 or 11ª, result in tilt of said disc relative to plate 10 or 10ª respectively. Since the stud 40, which receives the thrust of link 15, is remotely spaced from the lug 25 or 25ª, such tilt of the disc materially affects the accurate relationship of the lug and the movement limiting ends of slot 31 or 31ª. As shown in Figs. 7 and 8, by applying an element 13ᵇ, the counterpart of element 13 and 13ª, for direct association with stud 40 and thereby eliminating the lug 25 and 25ª, such tilt of the disc no longer results.

The element 13ᵇ, best seen in Fig. 8, is provided with a hole 41 for alignment with the lower hole 16 of Fig. 1, and for a screw 42 which serves to secure the element 13ᵇ as it fastens the assembly in the timer housing 43. The slot 31ᵇ in said element, as shown in Fig. 7, has end walls 44 and 45 which limit the retarded and advanced positions of disc 11ᵇ as the latter oscillates on ball bearing 12ᵇ carried by plate 10ᵇ.

During normal operation, the cam 14, which has a clockwise rotation as seen in Fig. 1, engages the breaker arm carried by disc 11ᵇ and urges the latter to rotate in the same direction. Each time the high point of each lobe of said cam exerts a drag on said breaker arm, such rotation of the disc seeks to occur, and does occur, unless said disc is positively held against such rotation. The conventional suction unit 46, which effects movement of link 15 through the medium of a variation in pressure on the surface of diaphragm 47, is typically provided with a spring 48 which acts on the diaphragm and on the link to urge the latter to a retarded position.

In prior devices, no adjustability was embodied to limit the said retarded position of the link and, thus, of disc 11ᵇ. The element 13ᵇ is particularly suitable for effecting such adjustment since, when mounting the same, it can be rotated about the screw 42 to bring the wall 44 into such engagement with stud 40 as to cause desired compression of spring 48 and definitely hold the disc 11ᵇ in adjusted retarded position. Said disc oscillates, under varying engine suction, from this position toward the limiting wall 45. The unit 46 is, thus, pre-loaded by element 13ᵇ; slack in the oscillation of disc 11ᵇ is obviated; and wobble of said disc in bearing 12ᵇ is nullified.

While I have illustrated and described what I now regard as the preferred embodiments of my invention, the construction is, of course, subject to modifications without departing from the spirit and scope of my invention. I, therefore, do not wish to restrict myself to the particular forms of construction illustrated and described, but desire to avail myself of all modifications that may fall within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A breaker plate assembly adapted to be fixedly mounted in a distributor housing, said assembly comprising a pair of members one above the other, and angularly spaced peripheral means connecting said member for oscillation of one with respect to the other, said means comprising slidably engaged doubly curved and fixedly carried peripheral portions of said members, one of which is resilient.

2. A breaker plate assembly comprising a fixed plate adapted to be fixedly mounted in a distributor housing, concentric annularly and transversely curved integral and peripheral portions on said plate, a disc in spaced face-to-face relation to the plate, and means fixedly carried by said disc having sliding engagement with the mentioned peripheral portions of the plate to mount said disc for oscillating movement with respect to the plate.

3. A breaker plate assembly comprising a fixed plate adapted to be fixedly mounted in a distributor housing, concentric annularly and transversely curved integral and peripheral portions on said plate, a disc in spaced face-to-face relation to the plate, and means on said disc having sliding engagement with the mentioned portions of the plate to mount said disc for oscillating movement with respect to the plate, said latter means comprising fixedly connected portions similar in form to the mentioned peripheral portions of the plate and slidably fitting thereinto.

4. A breaker plate assembly comprising a fixed plate adapted to be fixedly mounted in a distributor housing, concentric annularly and transversely curved integral and peripheral portions on said plate, a disc in spaced face-to-face relation to the plate, and means on said disc having sliding engagement with the mentioned portions of the plate to mount said disc for oscillating movement with respect to the plate, said latter means comprising fixedly connected portions similar in form to the mentioned peripheral portions of the plate and slidably fitting thereinto, at least one of the disc portions being resilient.

5. A breaker plate assembly adapted to be fixedly mounted in a distributor housing, said assembly comprising a pair of members one above the other, angularly spaced and fixedly carried peripheral means on each member for connecting the members for oscillation of one with respect to the other, said means comprising slidably engaged peripheral sections of the members, and means for limiting the degree of oscillation.

6. A breaker plate assembly adapted to be fixedly mounted in a distributor housing, said assembly comprising a pair of members one above the other, angularly spaced and fixedly carried peripheral means on each member for connecting the members for oscillation of one with respect to the other, said means comprising slidably engaged peripheral sections of the members, and means for limiting the degree of oscillation, said latter means comprising a lug on one member having engagement in an oscillation-limiting opening in the other member.

7. A breaker plate assembly adapted to be fixedly mounted in a distributor housing, said assembly comprising a pair of members one above the other, angularly spaced and fixedly carried peripheral means on each member for connecting the members for oscillation of one with respect to the other, said means comprising slidably engaged peripheral sections of the members, and means for limiting the degree of oscillation, said latter means comprising a lug on one member and an element secured to the other member and having an oscillation-limiting opening into which said lug projects.

8. In a breaker plate assembly, a fixed plate having an elongated opening adjacent its outer peripheral edge, an element carried by the plate and having an elongated opening of lesser extent than the opening in the plate and in superimposed relation therewith, a second plate, means mounting the latter for oscillating movement with respect to the fixed plate, and a lug on said second plate extending into the opening in the element and adapted to engage the ends thereof to limit said oscillating movement.

9. In a breaker plate assembly, a fixed plate having an elongated opening adjacent its outer peripheral edge, an element carried by the plate and having an elongated opening of lesser extent than the opening in the plate and in superimposed relation therewith, means removably mounting said element and holding the same against movement with respect to said plate, a second plate, means mounting the latter for oscillating movement with respect to the fixed plate, and a lug on said second plate extending into the opening in the element and adapted to engage the end thereof to limit said oscillating movement.

10. In a breaker plate assembly, a fixed plate having an elongated opening adjacent to its outer peripheral edge, an element carried by the plate and having an elongated opening of lesser extent than the opening in the plate and in superimposed relation therewith, means removably mounting said element and holding the same against movement with respect to said plate, said means comprising a screw engaged through one end of said element and in a screw seat in said plate and detent means inter-engaging said element and said plate, a second plate, means mounting the latter for oscillating movement with respect to the fixed plate, and a lug on said second plate extending into the opening in the element and adapted to engage the ends thereof to limit said oscillating movement.

11. In a breaker plate assembly having relatively oscillating plate members, one of which is formed with an elongated opening adjacent its edge and the other provided with a lug extending into said opening, an element secured to the plate member having the opening and formed with a smaller registering opening through which the lug extends.

12. In a breaker plate assembly having relatively oscillating plate members, one of which is formed with an elongated opening adjacent its edge and the other provided with a lug extending into said opening, an element secured to the plate member having the opening and formed with a smaller registering opening through which the lug extends, and a single screw means securing the element to its plate member.

13. In a breaker plate assembly, a plate adapted to be fixedly secured to and within the housing of a distributor and having a central opening through which the breaker point-operating cam of said distributor is adapted to extend and also having an elongated opening therein adjacent to the peripheral edge thereof, a disc above and in spaced relation to said plate, annular interengaged portions of said plate and disc connect-

ing the same for oscillatory movement of said disc relative to said plate, and a projection on said disc extending downwardly into the mentioned elongated opening to limit the oscillatory movement of said disc.

14. In a breaker plate assembly, a plate adapted to be fixedly secured to and within the housing of a distributor and having a central opening through which the breaker point-operating cam of said distributor is adapted to extend and also having an elongated opening therein adjacent to the peripheral edge thereof, a disc above and in spaced relation to said plate, annular interengaged portions of said plate and disc connecting the same for oscillatory movement of said disc relative to said plate, a projection on said disc extending downwardly into the mentioned elongated opening to limit the oscillatory movement of said disc, and a stud on the disc extending in a direction opposite to said projection and adapted to be moved to oscillate said disc.

15. In a breaker plate assembly, a plate member adapted to be fixedly secured to and within the housing of a distributor, a disc member above and in spaced relation to the plate member, the members having a central opening through which the breaker point-operating cam of said distributor is adapted to extend, one of the members having shoe means supporting the disc member for oscillatory movement upon the plate member, and the shoe means movably supporting the disc member in spaced relation to the plate member, the members having an opening on one member and a projection on the other member to limit oscillatory movement of the disc, and a stud on the disc member extending away from the plate member and adapted to be moved to oscillate said disc member.

16. In an ignition timer having spring-loaded suction diaphragm-operated means and a breaker assembly comprising a fixed plate and a relatively oscillating disc, there being an operative connection between said means and said disc to oscillate the latter, the improvements that comprise a stud on the disc, and an element carried by the fixed plate and provided with spaced abutments in the path of movement of said stud to limit the oscillatory movement of said disc.

17. In an ignition timer having spring-loaded suction diaphragm-operated means and a breaker assembly comprising a fixed plate and a relatively oscillating disc, there being an operative connection between said means and said disc to oscillate the latter, the improvements that comprise a stud on the disc, an element carried by the fixed plate and provided with spaced abutments in the path of movement of said stud to limit the oscillatory movement of said disc, and a single screw connecting said element to said fixed plate to rotationally adjustably mount said element to bring one of its abutments into firm engagement with said stud in the retarded position of the disc whereby to pre-load the diaphragm-operated means.

SETH E. ALDRIDGE.

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