United States Patent [19]

Seike

[11] **3,908,102**

[45] **Sept. 23, 1975**

[54] **UNITIZED BREAKER POINT AND CHIP CAPACITOR ASSEMBLY**

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[73] Assignee: **Eltra Corporation,** Toledo, Ohio

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[21] Appl. No.: **510,952**

[52] **U.S. Cl.**..... **200/19 A;** 123/146.5; 200/30 A; 200/31 A; 317/256

[51] **Int. Cl.²** **H01H 19/00**

[58] **Field of Search**.... 200/19 R, 19 A, 31 R, 31 A; 317/101 CC, 258, 261, 256; 339/17 CF; 123/146.5 R, 149 R, 146.5 A

[56] **References Cited**

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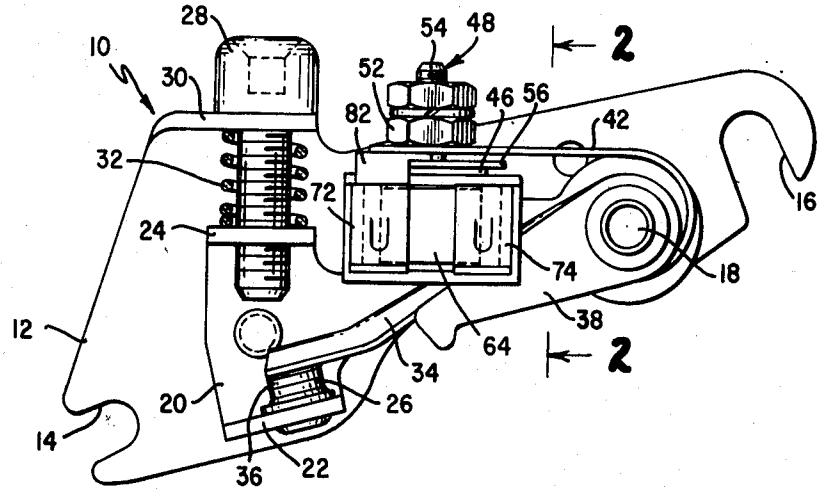
Primary Examiner—James R. Scott

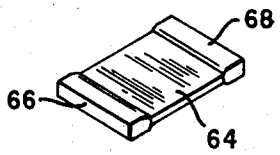
Attorney, Agent, or Firm—Robert H. Johnson

[57] **ABSTRACT**

A unitized breaker point and capacitor assembly for use in engine ignition systems. A chip capacitor is connected in parallel to the breaker point contacts and mounted so that it is substantially within the margins of the assembly and closely overlies the breaker arm.

4 Claims, 10 Drawing Figures





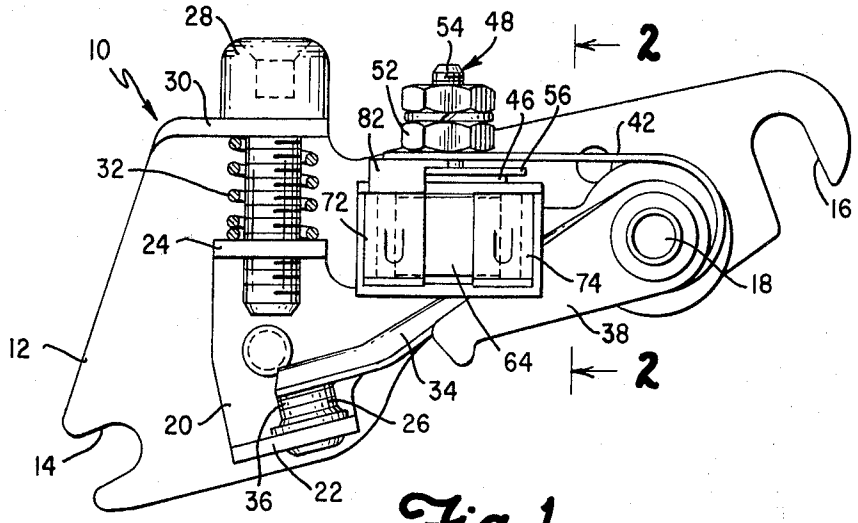


Fig. 1

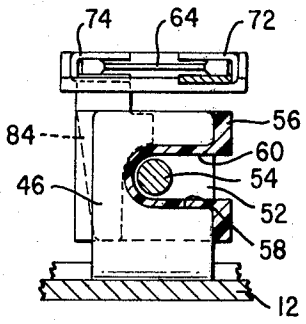


Fig. 3

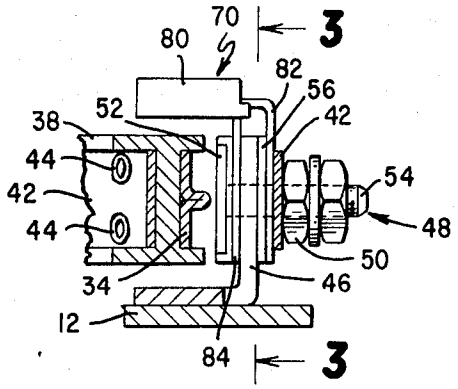


Fig. 2

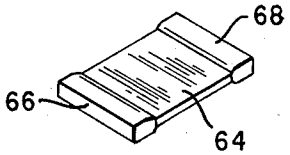


Fig. 4

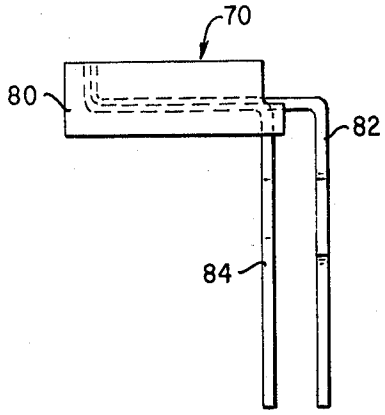


Fig. 5

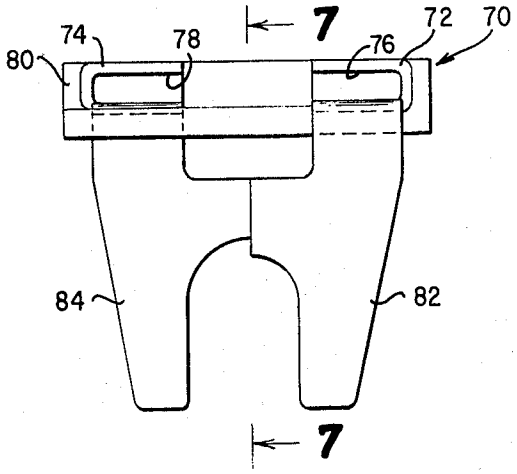


Fig. 6

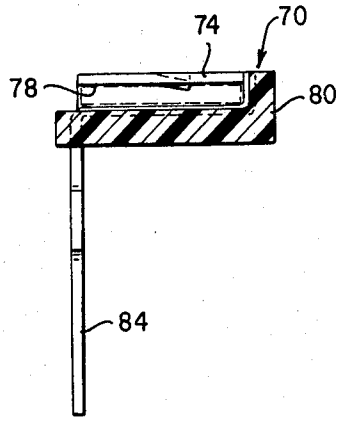


Fig. 7

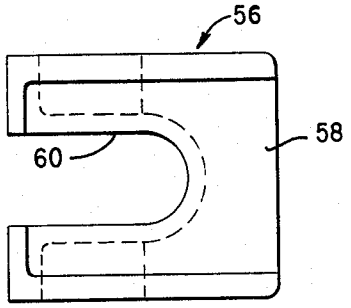


Fig. 9

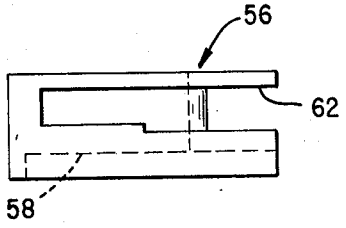


Fig. 10

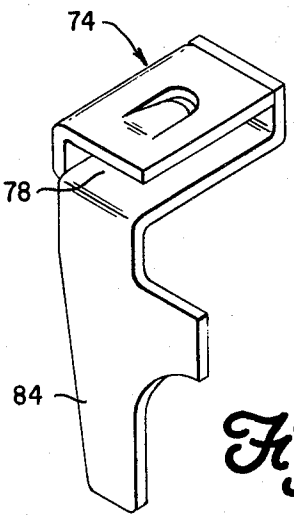


Fig. 8

UNITIZED BREAKER POINT AND CHIP CAPACITOR ASSEMBLY

BACKGROUND OF THE INVENTION

The field of art to which this invention relates includes engine ignition systems, and more specifically to apparatus for causing the charge on the primary winding of an ignition coil to change rapidly.

In engine ignition systems utilizing a breaker point assembly, it is necessary to connect a capacitor in parallel circuit with the contacts of the breaker point assembly in order to prevent the contacts from burning or welding together due to arcing between the contacts. Such an arrangement has been conventional for a long time.

It would be desirable to provide a unitized breaker point and capacitor assembly because, for example, a mechanic would have to handle and a service station would have to stock only one part or assembly rather than two as is generally the situation presently. There have been some attempts to provide such unitized assemblies as is illustrated by the disclosures of U.S. Pat. Nos. 3,773,113; 2,786,087 and 3,646,301. In all of these patents it will be noted that a rolled paper and foil capacitor is utilized and that special distributors must be provided. The reduction in physical size of such capacitors is inherently limited because of the various operating parameters the capacitor must meet in an engine ignition system application. As a result it has not been possible to provide a unitized breaker point and capacitor assembly which could be installed in the space provided for a breaker point assembly due to the size of the capacitor.

Therefore, it is a principal object of my invention to provide a unitized breaker point and capacitor assembly which can be installed in an ignition system in the space provided for a breaker point assembly only.

SUMMARY OF THE INVENTION

In carrying out my invention in a preferred embodiment, there is provided a plate to which a breaker arm is connected for pivotal movement. A first contact is attached to the arm and a second contact is mounted on the plate. A spring is connected to the arm and a fastener connects the spring to a lug on the plate so that the first contact is biased toward the second contact. A chip capacitor is connected in parallel circuit with the contacts and located within the perimeter of the plate and in close proximity to the arm.

The above and other objects, features and advantages of my invention will be more easily understood by persons skilled in the art when the detailed description is taken in conjunction with the drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a plan view of a preferred embodiment of my invention,

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

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

FIG. 4 is an isometric view of a chip capacitor of the type utilized in my invention,

FIG. 5 is an end elevation of the capacitor holder,

FIG. 6 is a front elevation of the capacitor holder,

FIG. 7 is a sectional view taken along line 7—7 of FIG. 6,

FIG. 8 is an isometric view of one of the spring clips and tabs embodied in the holder shown in FIGS. 5 through 7.

FIG. 9 is an elevational view of an insulator utilized in my invention, and

FIG. 10 is a plan view of the same insulator.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIGS. 1, 2 and 3, the reference numeral 10 denotes a unitized breaker point and capacitor assembly which includes a support plate 12 of electrically conductive material with notches 14 and 16 which are adapted to accept machine screws so that assembly 10 can be securely fixed in position in a distributor bowl, not shown. Extending upwardly from plate 12 is a pin 18 to which a gap adjustment plate 20 of electrically conductive material is connected for pivotal movement. Plate 20 includes a pair of generally vertically extending portions 22 and 24. Portion 22 carries a contact 26 and portion 24 threadably accepts a gap adjustment screw 28 which passes through an opening in a vertically extending portion 30 of support plate 12. Disposed between portions 24 and 30 and encircling the shank of screw 28 is a compression spring 32 which serves to bias the head of screw 28 into abutment with portion 30, and thus maintain contact 26 in its adjusted position to provide the proper gap with the cooperating contact.

Also connected to pin 18 for pivotal movement is a breaker arm 34 of electrically conductive material and which carries at the outer end thereof a contact 36 which is aligned with contact 26. Arm 34 also includes a portion 38 of suitable bearing material such as nylon. Projecting from portion 38 is a protuberance 40 which functions as a cam follower as is well known in this art.

A leaf spring 42 is connected to arm 34 by means of rivets 44 so that there is an electrical connection between spring 42 and arm 34 as well as a physical connection.

Extending upwardly from support plate 12 is a lug 46 of electrically conductive material which may be connected to plate 12 by a suitable means, such as spot welding or riveting.

Spring 42 is connected to lug 46 by means of a bolt 48 and nut 50 and biases contact 36 toward contact 26. Bolt 48 includes a head 52 and a shank 54. Bolt 48 is electrically insulated from lug 46 by means of an insulator 56 which can best be seen in FIGS. 9 and 10. Bolt 48 is disposed so that shank 54 passes through a slot 58 in lug 46 and head 52 is disposed on the side of lug 46 opposite nut 50.

Referring now to FIGS. 9 and 10, insulator 56 includes a recess 58 adapted to receive head 52 of bolt 48, a slot 60 through which shaft 54 of bolt 48 passes and a stepped slot 62 which receives lug 46 and one of the tabs of the capacitor holder as will be explained shortly.

Referring now to FIGS. 4 through 8, a chip capacitor 64 is provided. Capacitor 64 is a generally rectangular wafer having a terminal 66 at one end and a terminal 68 at the opposite end. Capacitor 64 is a ceramic capacitor and uses, for example, barium titanate as the dielectric material. This capacitor must withstand transient voltages upwards of 400 volts, provide a capacitance of 0.22 microfarads and operate over a temperature range from −20 to more than −100° Celsius in an

ozone environment and withstand the shocks and vibration present in the distributor of an automotive ignition system. In addition to the considerable reduction in size, another advantage of chip capacitor **64** is that its series inductance is smaller than a rolled or wound paper and foil capacitor which means that the radio frequency interference suppression of the chip capacitor will be more effective.

Capacitor **64** is removably disposed in a holder **70** which includes a pair of spring clips **72** and **74.** Clips **72** and **74** define a pair of inwardly facing slots **76** and **78,** respectively, which are adapted to receive terminals **66** and **68** of capacitor **64.** Clips **72** and **74** are connected together by a rigid molded-in-place dielectric plastic portion **80.** Clip **72** includes a downwardly extending tab **82** and clip **74** includes a similarly shaped downwardly extending and parallel tab **84.** Tabs **82** and **84** are arranged (see FIG. **2**) so that when holder **70** is in place tab **82** will be in electrical contact with spring **42** and tab **84** will be in electrical contact with lug **46.** With tabs **82** and **84** in the location shown in FIG. **2** it will be obvious that bolt **48** and nut **50** will maintain holder **70** in position and further that capacitor **64** will be located substantially entirely within the perimeter or margin of support plate **12** as viewed in FIG. **1.** Further, capacitor **64** will be located in close proximity to and overlie breaker arm **34** with the result that the unitized assembly **10** can be used in the space provided in a distributor for a breaker point set only.

The particular mounting of capacitor **64,** utilizing the short tabs **82** and **84,** has the further advantage of improving radio frequency interference suppression because the tabs replace the lead otherwise conventionally used with a wound capacitor, which lead provides a source of radio frequency interference.

As should now be apparent, when nut **50** is tightened on bolt **48** and holder **70** is in place with a capacitor **64** held in spring clips **72** and **74,** the capacitor **64** will not only be held in position as described above, but also will be electrically connected in parallel circuit with contacts **26** and **36.** That is, one terminal of capacitor **64** makes contact with spring clip **72** and is electrically connected via tab **82** to spring **42** and hence to arm **34** via rivets **44** and thus contact **36.** The other end of capacitor **64** is in contact with spring clip **74** and thus is electrically connected via tab **84** to lug **46** and hence to plates **12** and **20** and thus contact **26.** Insulator **56,** as will be seen, serves to insulate tab **82** and bolt **48** from lug **46.**

The above detailed description is intended to be illustrative only. My invention is subject to various modifications, changes and the like without departing from the scope and spirit of it. Consequently, the limits of my invention should be determined from the claims appended hereto.

What is claimed is:

1. A unitized breaker point and capacitor assembly comprising a support plate, a breaker arm pivotally connected to said plate, a spring connected to said arm, a lug extending from said plate, a fastener connecting said spring to said lug, an insulator for electrically insulating said fastener and spring from said lug, a chip capacitor, a first tab connected to one side of said capacitor and a second tab connected to the other side of said capacitor, said first tab being disposed between said lug and insulator and said second tab being disposed adjacent said spring so that said fastener also holds said capacitor in place.

2. An assembly as set forth in claim **1** wherein a first contact is carried by said arm and a second contact is connected to said plate, said tabs connecting said capacitor in parallel circuit with said contacts through said lug, spring, arm and plate.

3. An assembly as set forth in claim **2** wherein said tabs support said capacitor in a position substantially within the perimeter of said plate and in close proximity to said arm so that said unitized assembly can be used in the space provided in a distributor for a breaker point set only.

4. A unitized breaker point and capacitor assembly comprising a support plate, a breaker arm pivotally connected to said plate, a first contact mounted on said plate, a second contact mounted on said arm and moveable into abutment with said first contact upon pivotal movement of said arm, a lug extending from said plate, a spring connected to said arm, a fastener connecting said spring to said lug so that said arm is biased to bring said second contact into abutment with said first contact, an insulator disposed to electrically insulate said fastener and spring from said lug, a chip capacitor and a capacitor holder adapted to removably receive said capacitor and including a first spring clip with a tab, a second spring clip with a tab and a rigid dielectric portion connecting said clips, said tabs being arranged so that one of said tabs is disposed in contact with said lug and the other of said tabs is disposed in contact with said spring, whereby said capacitor is connected in parallel circuit with said contacts and said fastener also holds said holder and capacitor in place within the perimeter of said plate and in close proximity to said arm.

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