Nov. 24, 1959 G. E. HEVERAN 2,914,625

IGNITION BREAKER ASSEMBLY

Filed Feb. 4, 1957

FIG. 1

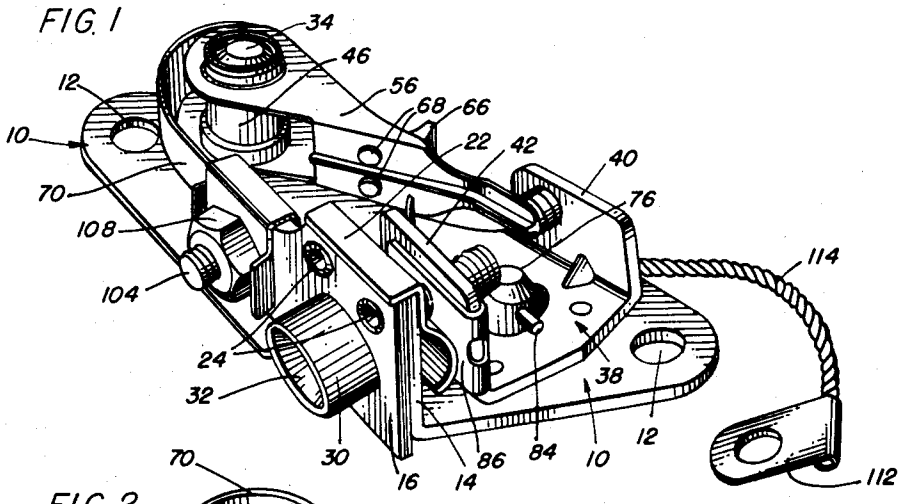


FIG. 2

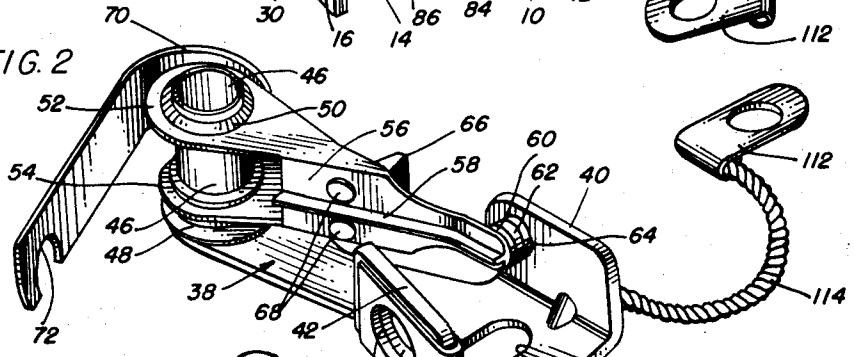


FIG. 4

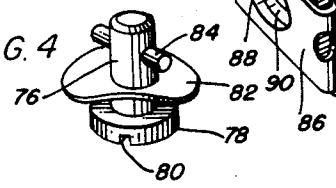


FIG. 5

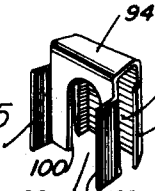


FIG. 3

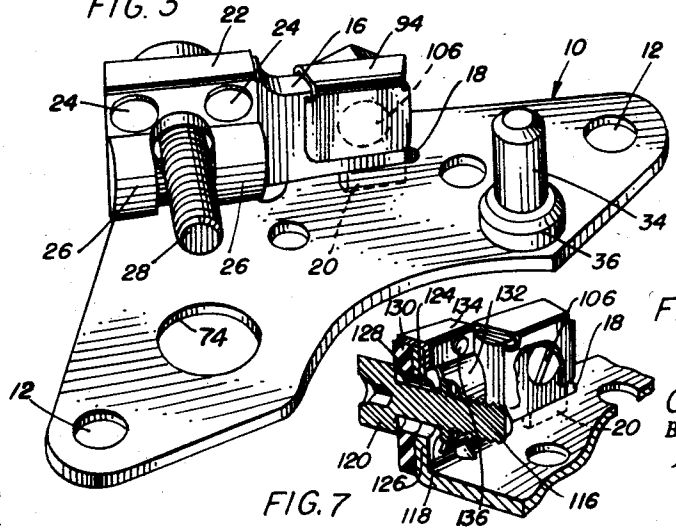


FIG. 6

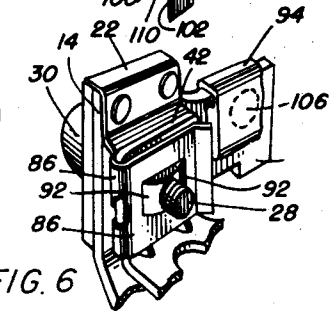


FIG. 7

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IGNITION BREAKER ASSEMBLY

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6 Claims. (Cl. 200—31)

This invention relates in general to a breaker point assembly for distributors of ignition systems for internal combustion engines and includes a pair of breaker points and their respective mountings which may be manufactured, assembled and carefully adjusted and set in a fractory by skilled workmen so that this assembly may be mounted upon and connected to a separate plate which is usually secured to a movable spark advancing and retarding plate of an ignition distributor.

Breaker point assemblies are commonly sold at a separate or replacement part of the ignition system which has separable contacts to cause a spark for the ignition of fuel in the cylinder of an engine. These parts must be precisely set for a timing action to prevent heating, sparking and pitting of the contact surface, and to maintain the registry of the points for efficient operation.

These breaker point assemblies are commonly made and sold for replacement purposes when similar ignition parts are worn out or unserviceable. In replacing the ignition points, the distributor plate or a movable spark advancing and retarding plate thereof may be supplied together with a breaker point assembly but this is unnecesary since it is usually the breaker points which require replacement and therefore it is not necessary to include the supporting plates of a distributor.

The present invention relates to a breaker point assembly having a supporting plate with a fixed upstanding post which is separately applied to any distributor plate for which it is adapted and to which it may be connected in a well known manner in assembled condition. With this plate in place, it is necessary only to mount the assembly contact set upon the post and to adjust the position of the contact arm with respect to an operating cam. To replace the point set, the point assembly plate with its rigid post is not disturbed, but the contact assembly set is mounted on the post, the rubbing block is adjusted in position to engage the ignition breaker cam and the contact arm spring is attached to an insulated supporting plate which has a fastening nut for securing the spring in place and at the same time providing means for suitable electrical connections.

An important object of this invention is to provide a structure which may be assembled with an ignition breaker plate either as original equipment or as a replacement with a separate assembly of the breaker points which may be furnished with the breaker plate or independently thereof as a replacement in which the positions of the points are previously fixed so that no expert service is required in making the point adjustments and no extra time is required for making this adjustment.

A further object of the invention is to provide a new and improved connection between a breaker plate and the breaker points by means of which the breaker point assembly is quickly and easily mounted upon the plate and no relative adjustment of the points is necessary, but the point assembly is movable on the plate relative to an operating cam.

A still further object of the invention is to provide

an improved mounting plate for supporting the breaker point assembly attachment and also for securing the free end of the breaker arm spring in fixed engagement.

Still a further object of the invention is to provide an ignition breaker assembly in which only a mounted pair of ignition breaker points may be replaced and substituted for a similar worn assembly by simply removing the old set from a fixed post and replacing it with a new set applied to the same post without removing or replacing the post upon which the breaker point set is mounted.

Other objects of the invention will appear in the specification and will be more apparent from the accompanying drawings in which:

Fig. 1 is a perspective view of an ignition breaker assembly in accordance with this invention;

Fig. 2 is a perspective view of the breaker set as shown in Fig. 1 but separate from the plate upon which it is mounted;

Fig. 3 is a perspective view of the mounting plate of Fig. 1 with the breaker point set of Fig. 2 removed therefrom;

Fig. 4 is a perspective view of the spring loaded stud of Fig. 1;

Fig. 5 is a perspective view of the fastening clip shown in Fig. 1;

Fig. 6 is a fragmentary perspective view showing the inner side of the spring locking clip of Fig. 1; and

Fig. 7 is a fragmentary perspective view showing an alternate adjustment for the breaker points.

This invention proposes a simplification of the breaker point assembly which includes a breaker plate and a contact set by providing these two parts as an ignition breaker assembly, but in using the same plate with a protecting post applied to the distributor plate and merely substituting a new breaker contact set for that originally included with the plate.

With this construction, the contact set only is replaced and the mounting plate becomes a fixed part of the distributor or is secured to the distributor plate and is not in ended to be removed.

Referring now more particularly to the drawings, this breaker point assembly comprises a somewhat triangular supporting plate **10** having opposite end perforations **12** by means of which it may be fixedly secured to a fixed or movable plate of an ignition distributor, and near the angular corner of the plate is an ear **14** struck up at right angles to plate. To the outside of the ear, an insulating plate **16** of fiber or the like is secured in line with a slot **18** in the plate adapted to receive a projection **20** from the lower edge of the plate **16** which is thereby seated firmly in that position. To secure the plate **16** to the ear **14** and at the same time to attach a spring clip **22** extending over the top of the ear and the plate, these parts are formed with perforations for receiving fastening rivets **24** which hold the parts tightly in place and the insulating plate **16** in its seat in the slot **18**. The lower edge of the spring clip on the side of the ear opposite the insulating plate has bowed extremities **26** which provide projecting spaced spring fingers.

Extending centrally through the ear **14** and through the insulating plate **16** is a screw **28** having a socket head **30** on the outside of the insulating plate with a recess **32** for inserting a screw driver for turning the screw.

At the relatively opposite edge of the plate **10** is a metal post **34** having an enlarged base **36** seated on top of the plate **10** and the bottom of the post riveted in an opening (not shown) or otherwise firmly connected to the plate **10**.

A detachable and removable breaker point assembly for application to the supporting plate **10** is clearly shown in Fig. 2 separate from the plate and in Fig. 1 as

assembled thereon. This breaker point assembly comprises a breaker plate **38** having opposite ears **40** and **42** struck up at right angles to the plate with an adjustment opening in the form of a slot **44** extending in the plate between the ears. At the opposite end of this plate, a hollow post **46** in the form of a metal shell is securely fastened to the plate **38** with an enlarged portion **48** at the bottom of the hollow post adapted to fit over the enlarged base **36** of the post **34** secured to the supporting plate **10**. Surrounding the hollow post **46** is an insulating sleeve **50** which may be secured in place against the enlarged portion by upsetting or beading the upper edge of the hollow post **46** which projects above the upper end of the insulating sleeve.

Surrounding and rotatable upon the insulating sleeve **50** are parallel branch extremities **52** and **54** of a breaker arm **56** which has a central strengthening rib **58** extending to the other end of the arm where a movable breaker point contact **60** is secured in a well known manner. Opposite the contact **60** and supported by the breaker plate ear **40** is a fixed breaker point contact **62**. Between the contact **62** and the adjacent surface of the ear **40**, a thin disc **64** of metal such as copper is usually inserted to make a better connection between the contact and the ear.

Between the branch extremities **52** and **54** and secured at the outer side of the breaker arm **56** is a contact block **66** preferably of a hard long wearing fiber such as nylong secured to the breaker arm by rivets **68** one on each side of the rib **58**. A flat metal spring **70** preferably has one end secured between the contact block **66** and the breaker arm **56** by the same rivet **68**, the intermediate portion bent around the breaker arm post and having an attachable free arm with an attachment notch **72** in one edge thereof for making a connection as hereafter described.

In mounting the breaker plate **38** carrying the point contacts **60** and **62** upon the supporting plate **10**, the hollow post **46** is inserted over the fixed post **34** on the supporting plate, the slot **44** in the breaker plate is located over a hole **74** in the supporting plate and a stud **76** having a head **78** with a turning slot **80** in its outer face is adapted to be inserted through the opening **74** and through the slot **44** against a spring washer **82** which is interposed between the inside of the head **78** and the under side of the plate **10**. In the outer portion of the stud is a cross pin **84** extending through the stud and projecting on both sides thereof adapted to be inserted through the hole **74** and the slot **44** and to be turned substantially at right angles to the latter so that the projections of the cross pin engage the top surface of the breaker plate **38** and hold it tightly in place. The slot **80** in the head of the stud is for turning the stud into and out of such locking engagement.

With the breaker plate thus mounted in position upon the supporting plate, the contact block **66** may be adjusted toward or from an operating cam (not shown) in a well known manner by the adjustment screw **28**. When the breaker plate is mounted upon the supporting plate, the ear **42** of the breaker plate is adjacent the fixed ear **14** of the supporting plate and substantially in line with the adjustment screw **28**. The ear **42** has a spring metal clip **86** embracing both sides of the ear and extending over one end thereof, the clip having an opening **88** on one side and the ear having an opening **90** which registers therewith and both openings admitting the threaded end of the screw **28** therethrough. The other side of the clip **86** as shown more clearly in Fig. 6 has relatively opposite spring tongues **92** preferably offset from the material of the spring clip and adapted to engage the threads of the screw **28** forming the threading adjustment engagement between the adjustment screw **28** and the movable end of the breaker point assembly. This adjustment of the screw **28** can be made even though the stud **76** is in its locking position as shown in Fig. 1.

The bowed extremities **26** of the spring clip **22** engage the perforated side of the spring metal clip **86** and the spring tongues **92** of the clip **86** engage the threaded end of the screw **28** so that the inner end of the screw head **30** and the threaded end of the screw are pressed apart thereby maintaining a tight connection between the engagement of the screw with the outer ear **14** of the supporting plate **10** and the insulating plate **16** thereof, and the ear **42** of the breaker contact plate assembly within the limits of movement of one plate with respect to the other. This maintains the breaker contact assembly plate in accurate adjusted position at all times and permits a fine adjustment and positioning of the breaker plate **38** and the contact block **66** at all times.

In order to connect the outer free end of the spring **70** with the insulating plate **16**, a U-shaped fastening clip **94** has one closed side **96** with side flanges **98** and the opposite side with a slot **100** open from the bottom and projecting side flanges **102**. A fastening screw **104** has a relatively flat head **106** which is inserted at the back of the insulating plate **16** above the slot **18** in the supporting plate **10**, the notch **72** of the spring **70** is hooked over the forward projecting end with the screw **104** and the spring clip **94** is slipped from the top downwardly over the upper edge of the insulating plate **16**, the closed side **96** of the clip extending over the head **106** of the screw, thereby maintaining the screw in place, and the outer slotted side of the clip is inserted over the outside of the slotted end of the spring **70**. A fastening nut **108** is applied to the outer end of the screw **104** and threaded in place between the outer side flanges **102** of the fastening clip. The screw **104** extends through a slotted opening **110** in the insulating plate **16** which extends longitudinally thereof to vary the tension applied to the breaker arm operating sleeve **70**.

With this construction, the screw **104** will be held in place by the engagement of the closed side of the clip **94** whether the nut **108** is in place or not and will also hold the end of the spring **70** in this position when the nut is removed. This prevents disengagement of the screw from its connection with the other parts thereby preventing loss and displacement of the screw in making contact adjustments. The rear side flanges **98** assist in seating the head of the screw at the back of the insulating plate and the front side flanges **102** provide means for engaging contact clips which are inserted on the threaded end of the screw **104** either by winding a wire around the screw **104** when the nut **108** is loosened, or by removing the nut **108** and placing on the screw a small perforated clip like a clip **112** shown at the end of a conductor **114**. The other end of this conductor is soldered or otherwise permanently connected to the ear **40** to make a positive electrical connection.

An alternative adjustment means is shown in Fig. 7 which may be substituted for the spring clip **22** and the adjustment screw **28** as shown in Fig. 3. In this form, a socket headed screw **116** has a fixed collar **118** spaced at a distance from the inner side of its head **120** so that the collar may be inserted freely through an opening **124** in an ear **126** corresponding to the ear **14** of the plate **10** and an opening **128** in the insulating plate **130** corresponding to the insulating plate **16**. When the stem of the screw is inserted through these openings of the ear and plate, the collar **118** is at the inside of the ear **124** allowing space for a bowed spring clip **132** having a central slot extending upwardly from the lower edge, to be inserted between the ear and the collar, the slot being narrower than the collar so that the bowed spring holds the screw tightly in place at all times. At its upper end, the spring clip has an angular projection **134** and rivets **136** extend through the spring clip **132**, the ear **126** and the insulating plate **130** to hold them all tightly together.

The threaded end of the screw **116** thus projects through the opening **90** of the ear **42** and the opening **88**

of the spring clip 86 and into engagement with the spring tongues 92 at the outer side of the ear 42 as previously described. With this engagement of the shouldered screw with the spring clip 132, there is no disengagement of the screw from the supporting plate but the screw may be easily and rapidly connected to and disconnected from the breaker contact plate 38 by simply rotating the screw 116 in the proper direction.

With these constructions, the contact assembled set is replaceable on the supporting base plate and is held in place with a spring loaded stud which may be applied and removed with a quarter turn. Thus the assembly set may be furnished separately from the supporting base plate thereby proportionately reducing the cost and making it simpler to apply a contact assembled set of this kind. The adjustment of the spring contact arm in the assembled set is made in an expert manner at the factory or before the contact set is applied to a base plate, the fixed and movable contacts being adjusted for flat direct contact, thereby insuring proper line up and correct electrical and mechanical operation. The adjusting means and the connection for the operating spring remains and is supplied with the supporting plate so that it is necessary only to substitute a new contact assembly set in changing the ignition point contacts.

While preferred constructions have been described in some detail, it should be regarded as an illustration or example rather than as a limitation or restriction of the invention, since various changes in the construction, combination and arrangement of parts may be made without departing from the spirit and scope of the invention.

I claim:

1. An ignition breaker assembly comprising a supporting plate having a fixed post projecting upwardly therefrom, an ear projecting upwardly from the plate at a distance from the post with an opening in the plate opposite the ear, and a slot substantially in line with the ear, an insulating plate secured to the ear and having a projection therefrom to engage in said slot, an adjusting screw extending through the ear and the insulating plate toward the said opening in the supporting plate; in combination with a breaker point assembly having a supporting plate with a hollow pivot and insulating post fixed at one end and adapted to be inserted over the fixed post, a breaker arm mounted to swing with the hollow post, a movable breaker point contact at the end of the arm and a contact block intermediate the ends of the arm, a return spring secured at one end between the contact block and the arm and extending around the hollow post with a notch at the other end means connecting the notched end of the spring to the insulating plate, the breaker point plate having upright ears between which the free end of the arm is movable, one of said ears having a fixed breaker point contact engaged by the movable breaker point contact and the other ear being disposed relatively parallel to and spaceable from the said ear of the supporting plate, both the supporting and assembly plates having registering unthreaded openings adjacent to each other and in their respective parallel ears, screw means inserted through said openings for adjustably holding the plates together, and resilient adjusting means connected separately to the supporting plate ear and to said other ear of the breaker point plate and engaging said screw means for varying the position of the breaker point plate yieldingly about its pivot post and the location of the contact block relative to the supporting plate.

2. In an ignition breaker assembly, a supporting plate with perforations for fixed attachment to a distributor, the plate having an upward fixed supporting post and an ear projecting upwardly from the plate at a spaced distance from the post, an insulating plate secured to the ear; a breaker point assembly comprising a plate with a hollow insulated post at one end fitting over the fixed supporting post, a pair of upright ears spaced from the hollow post, an arm movable on the hollow post and between the said pair of ears, one of said ears and the free end of the arm having cooperating fixed and movable contacts the supporting and assembly plates having a registering perforation and a slot between the said pair of ears respectively, means comprising a stud extending through the perforation and slot and including a spring washer mounted on the stud and a cross pin extending through the end of the stud for detachably holding the plates yieldingly together, and screw means extending through the ear of the supporting plate and including resilient threaded means engaging the other of said pair of ears for rotating the entire breaker point assembly plate yieldingly about its hollow post without disengaging said means for holding said plates together.

3. In an ignition breaker assembly in accordance with claim 2, spring means attached to the ear of the supporting plate and including resilient bowed portions projecting at the sides of said screw means to engage the other of said pair of ears for limiting the movement of the breaker point assembly toward the said ear of the supporting plate.

4. In an ignition breaker assembly in accordance with claim 2, the screw means comprising a headed screw which extends through the ears of the supporting plate and the breaker point assembly with the under side of the head abutting the outer side of said insulating plate, the openings through the ears being of larger diameter than the screw threads and the said other ear of the breaker point assembly having a spring metal clip attached thereto with tongues projecting toward and engaging the opposite sides of the threads of the screw so that the rotation of the screw will cause a movement of the breaker point assembly toward and from the ear of the supporting plate depending upon the direction of rotation of the screw.

5. In an ignition breaker assembly, a supporting plate with perforations for fixed attachment to a distributor, the plate having an upward fixed supporting post and an ear projecting upwardly from the plate at a spaced distance from the post, an insulating plate secured to the ear; a breaker point assembly comprising a plate with a hollow insulated post at one end fitting over the fixed supporting post, a pair of upright ears spaced from the hollow post, an arm movable on the hollow post and between the said pair of ears, one of said ears and the free end of the arm having cooperating fixed and movable contacts, the plates having a registering perforation and a slot between the said pair of ears respectively, screw means extending freely through the ear of the supporting plate and having flexible threaded means engaging the other of said pair of ears for rotating the entire breaker point assembly plate about its hollow post, and a stud extending through the perforation and slot respectively of the two plates, the stud having a cross pin near its outer end which will pass through the said perforation and slot to remove the breaker point assembly plate but may be rotated transverse to the slot in the breaker point assembly plate to hold the plates together, and a spring washer interposed between the cross pin and the breaker point assembly plate tending to hold the stud resiliently in any adjusted position with respect to the plates.

6. In an ignition breaker assembly in accordance with claim 3, the screw means having a head at one end to engage the insulating plate, said resilient threaded means comprising an intermediate collar embracing both sides of the said other of said pair of ears with a threaded portion at the outer side of said other ear engaged by the screw means, and the spring means comprising a bowed plate with tongues embracing the screw and engaging the inner side of the collar, the threaded portion of the collar on the other of said pair of ears of the breaker point assembly engaging the threaded portion of the

screw so that the movement of the breaker point assembly toward the ear of the supporting plate is limited by the bowed plate but the breaker point assembly may be adjusted resiliently by the engagement of said means attached to the other said ear engaging the threaded portions of the screw.

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