March 15, 1949. A. L. BROWNLEE ET AL 2,464,779

BREAKER POINT MECHANISM

Filed Sept. 21, 1945

Fig. 1.

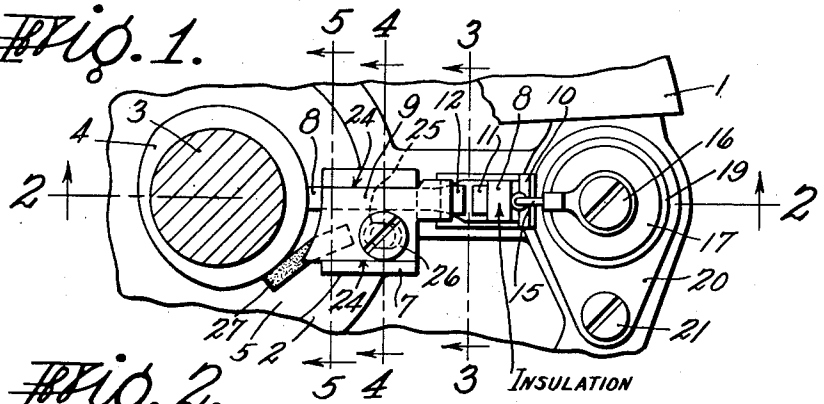


Fig. 2.

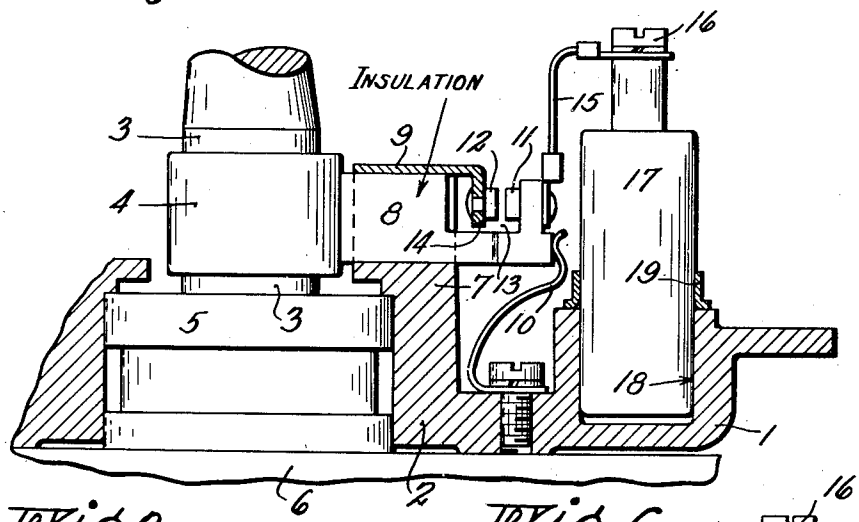


Fig. 3.

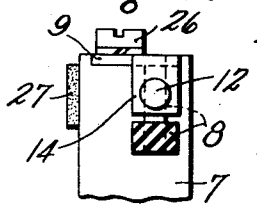


Fig. 4.

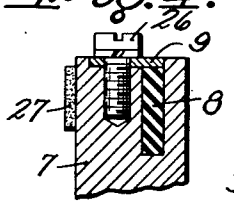


Fig. 5.

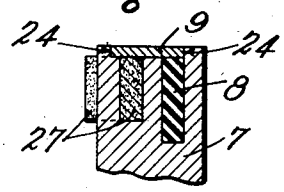
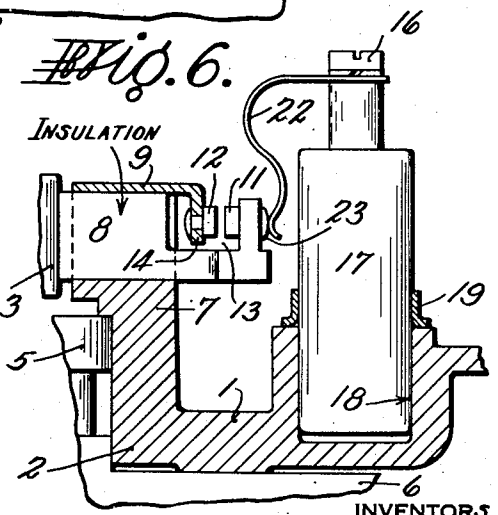


Fig. 6.



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BREAKER POINT MECHANISM

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2 Claims. (Cl. 200—30)

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This invention relates to improvements in breaker point mechanisms, such as are used for timing the ignition sparks in internal combustion engines.

The invention has for its general objects to provide a breaker point mechanism of the reciprocating type which is simple in construction, relatively inexpensive to manufacture, compact, readily adjustable and calculated to have a long life.

A particular object of the invention is to provide a mechanism of the class described in which a reciprocating plunger, carrying one of the breaker points, is reciprocable in a groove in a support and the other breaker point is carried by a member which serves to confine the plunger in its groove,—the arrangement providing an exceedingly compact structure capable of being mounted within narrow space limits.

Another object of the invention is to provide in a mechanism of the class described a reciprocating breaker-point-carrying plunger, a rotatable cam engaging one end of the plunger for reciprocating the same and a condenser mounted adjacent the other end of the plunger,—the axes of the cam and condenser being parallel and at right angles to the path of reciprocation of the plunger and said axes and path being located in a common plane.

Another object is to provide a means, carried by the same part which guides the reciprocating plunger, for wiping the cam and lubricating the same and the plunger.

A further object is to provide means for moving the member which retains the reciprocating plunger in its groove, in the direction of reciprocation of the plunger for the purpose of enabling adjustment of the breaker points.

The invention will be disclosed with reference to the accompanying drawings in which—

Fig. 1 is an enlarged plan view of breaker-point mechanism embodying the invention;

Fig. 2 is an enlarged sectional elevational view thereof;

Figs. 3, 4 and 5 are enlarged cross sectional views taken on the lines 3—3; 4—4 and 5—5, respectively, of Fig. 1; and

Fig. 6 is an enlarged fragmentary view taken similarly to Fig. 2 and showing a modification.

Referring to these drawings; 1 represents a support for the breaker point mechanism. This support may be of any suitable form. As shown, it has a hub 2 through which a drive shaft 3, carrying a cam 4, extends. In this particular case, the support is the stator plate of a flywheel magneto and is shown in part only. The hub 2 of the plate encircles a hub 5 on the crankcase 6 of an engine and the shaft 3 is the engine crankshaft. However, the particular form of the support is not material to the present invention.

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The support 1 has a part 7 projecting therefrom and this part is provided with a groove to slidably receive a plunger 8 which is of rectangular cross sectional shape and preferably constructed of insulating material. A member 9 is fixed to part 7, covering the top of the slot and serving as a gib to confine the plunger 8 in its groove. The plunger is free to slide in a radial direction with respect to the shaft 3 and its inner end is adapted to engage the outer peripheral surface of cam 4. A flat spring 10, fixed as indicated at one end to support 1, has its other end engaged with the outer end of plunger 8 and yieldingly holds the inner end of the plunger against cam 4.

The plunger 8 carries near its other and outer end a breaker point 11. A cooperating breaker point 12 is fixed to member 9 and located in the path of movement of breaker point 11. As herein shown, the outer portion of plunger 8 has a recess 13 and the outermost vertical wall of this recess carries the breaker point 11. The member 9 has its outer end turned downwardly, as at 14, into the recess 13 and the breaker point 12 is carried by the outer face of the part 14. The spring 10 tends to hold the breaker points 11 and 12 in engagement and the cam 4 periodically moves the plunger radially outward to separate the points. The member 9, the part 7 and the support 1 are of conducting material and serve as a ground connection for the relatively fixed breaker point 12. The breaker point 11 is electrically connected by any suitable flexible conductor 15 to any suitable insulated terminal,—in this case to the insulated terminal 16 of a condenser 17. This condenser, in the form herein shown, is cylindrical and is located just beyond the outer limit of the stroke of plunger 8 with its axis paralleling that of shaft 3. The axes of shaft 3 and condenser 17 lie in the same radial plane as the longitudinal axis of plunger 8. One end of the condenser sets into a socket 18 in support 1. The condenser has fixed to its metal shell a conducting band 19 to which is fixed an ear 20 and the latter is held by a screw 21 to the support 1. It will be understood that the metal shell of condenser 17 serves as one terminal thereof and such terminal is grounded by means of the band 19, ear 20, and support 1 to the engine crankcase.

If desired and as indicated in Fig. 6, the plunger return spring can serve also as the electrical conductor for the movable and insulated breaker point 11. Thus, a spring 22, fixed to the insulated terminal 16 of the condenser 17 may bear on the outer end 23 of the stud to which the breaker point 11 is secured.

The member 9 has finished parallel straight side edges 24 which closely fit the corresponding vertical walls of a shallow groove which is formed in part 7 and into which the member 9 fits. These sides and walls parallel the path of reciprocation of the plunger. In the member 9 is an elongated slot 25, also paralleling said path. A single cap screw 26 passing through the slot 25 and threaded into part 7, serves to hold the member 9 to said part. By loosening screw 26, the member 9 may be moved in or out along the path of reciprocation of the plunger 7 for the purpose of adjusting the breaker points. Thus, with the cam 4 positioned to hold the plunger 7 in its outermost position, a feeler gauge may be inserted between the points 11 and 12 and the member 9 moved until point 12 engages the gauge and the latter engages point 11. Then screw 26 is set up to hold member 9 and point 11 in their adjusted positions.

The part 7 may also serve to support a flexible member 27 such as a piece of felt, which engages the outer peripheral surface of cam 4 for the purpose of wiping this surface clean and also lubricating it and the plunger 7. Some lubricant from the cam will pass along the sides of the plunger and enter the groove to lubricate the relatively sliding surfaces. The wiper may be supported by having one end inserted in a groove in the inner vertical wall of part 7.

In operation, the inner end of the plunger 8 is held against cam 4 by spring 10, and when such end leaves the high peripheral part of the cam, the points 11 and 12 will be engaged and, when such end is engaged by the high peripheral part of the cam, the breaker points will be separated. As the cam revolves, the flexible member 27, which is saturated with oil, wipes the peripheral surface of the cam, cleaning and lubricating the same. Lubricant, carried by the cam, reaches the inner end of the plunger 8 and some of it travels along the sides of the plunger and lubricates the latter in its slideway in the part 7.

The condenser 17 is bridged across the breaker points 11 and 12 in the usual manner and for the usual purpose. Conveniently, the shell of the condenser forms one of its terminals and such terminal is connected to the breaker point 12, through the metallic support 1, the part 7 and member 9 and grounded to the engine crankcase 6 by means of the support 1 and hub 2. A single flexible conductor interconnects the insulated breaker point 11 and the insulated terminal 16 of the condenser. If desired, the return spring for the plunger may serve also as the flexible conductor, as suggested in Fig. 6.

The construction is exceedingly simple and relatively inexpensive to manufacture. The two grooves in the part 7, one for plunger 8 and one for member 9, may be machined at the same time by a single milling cut. The plunger 8 may be made of molded impregnated canvas phenolic material. The remaining operations consist of drilling and tapping holes and fastening the breaker points to their respective supports and these are simply and easily performed.

The construction is characterized by its compactness, which enables it to be mounted in space

limits so small that breakers of conventional form cannot be used. The drawings show the mechanism twice actual size. By making the plunger retaining member 9 also serve as a support for the fixed breaker point 11, the overall length of the mechanism is kept within small limits. The width of the mechanism need not be greater than that of the part 7 which slidably supports the plunger 8. The cam 4 is arranged at one end of the plunger and the condenser 17 at the other. By having the axis of the condenser parallel that of the shaft, radial saving of space is effected. The entire mechanism, including cam, breakers and condenser, may be slightly less than three inches in length or radial extent and the maximum width, excluding the cam, is slightly less than three quarters of an inch. The construction is well adapted to fit in the narrow radial space between the two core structures of the stator plate of a small flywheel magneto, as pointed out in our copending application Serial No. 617,845, Pat. No. 2,447,727, Aug. 24, 1948, filed on even date herewith.

The breaker points are conveniently accessible for easy adjustment when required. They are exposed from the top so that they not only can be inspected but so that a feeler gauge can readily be inserted between the points. Also, the adjustment of member 9 is accessible for convenient use. A single screw holds this member in place and when loosened, allows the member to be slid in its ways in part 7 to effect the desired adjustment.

The invention thus provides an improved breaker mechanism which is simple, compact and may be manufactured in quantities at low unit cost and which is also efficient in operation and calculated to have a long life of useful service.

We claim:

1. Breaker point mechanism, comprising a support having a projecting part provided in its outer end with a relatively wide and shallow groove of rectangular cross section and a relatively deep and narrow groove which is also of rectangular cross section and which extends from the bottom of the first-named groove inwardly into said part, said grooves each having two parallel side walls and the side walls of each groove being parallel with the side walls of the other, said grooves each having a bottom wall and these bottom walls being in spaced parallel relation, a reciprocable plunger of the same rectangular cross section as the second-named groove and having a bottom wall and two parallel side walls closely fitting and slidably engaging the bottom wall and side walls respectively of the relatively deep and narrow groove, said plunger projecting beyond both ends of said part and having fixed to one projecting end a breaker point, a thin flat member in the relatively wide and shallow groove having a bottom wall in part resting on the bottom wall of the first-named groove and in part overlying and closing the second-named groove and having two parallel side edges which closely fit and slidably engage one with each of the side walls of the first-named groove, the said overlying portion of the bottom wall of said member slidably engaging the top wall of the plunger and serving as a gib to hold the plunger in its groove, said member projecting beyond one end of said part and carrying a breaker point adapted to be engaged with and disengaged from the breaker point on the plunger as the latter moves back and forth, said member having a slot therein paralleling the sides of said grooves, a screw passing through said

slot and threading into said part and clamping said member against the bottom of its groove, said member when said screw is loosened being manually movable in the direction of reciprocation of the plunger to adjust the position of the stationary breaker point, the other end of said plunger adapted to be engaged and periodically moved in one direction by a cam to separate the breaker points, and a spring for moving the plunger in the other direction and holding the breaker points engaged.

2. Breaker point mechanism, comprising a support having a projecting part provided in its outer end with a relatively wide and shallow groove of rectangular cross section and a relatively deep and narrow groove which is also of rectangular cross section and which extends from the bottom of the first-named groove inwardly into said part, said grooves each having two parallel side walls and the side walls of each groove being parallel with the side walls of the other, one side wall of each groove lying in the same plane, said grooves each having a bottom wall and these bottom walls being in spaced parallel relation, a reciprocable plunger of the same rectangular cross section as the second-named groove and having a bottom wall and two parallel side walls closely fitting and slidably engaging the bottom wall and two side walls respectively of the relatively deep and narrow groove, said plunger projecting beyond both ends of said part and having fixed to one projecting end a breaker point, a thin flat member in the relatively wide and shallow groove having a bottom wall in part resting on the bottom wall of the first-named groove and in part overlying and closing the second-named groove and having two parallel side edges which closely fit and slidably

engage one with each of the side walls of the first-named groove, the said overlying portion of the bottom wall of said member slidably engaging the top wall of the plunger and serving as a gib to hold the plunger in its groove, said member projecting beyond one end of said part and carrying a breaker point adapted to be engaged with and disengaged from the break point on the plunger as the latter moves back and forth, said member having a slot therein paralleling the side walls of said grooves, a screw passing through said slot and threading into said part and clamping said member against the bottom wall of its groove, said member when said screw is loosened being manually movable in the direction of reciprocation of the plunger to adjust the position of the stationary breaker point, the other end of said plunger adapted to be engaged and periodically moved in one direction by a cam to separate the breaker points, and a spring for moving the plunger in the other direction and holding the breaker points engaged.

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