

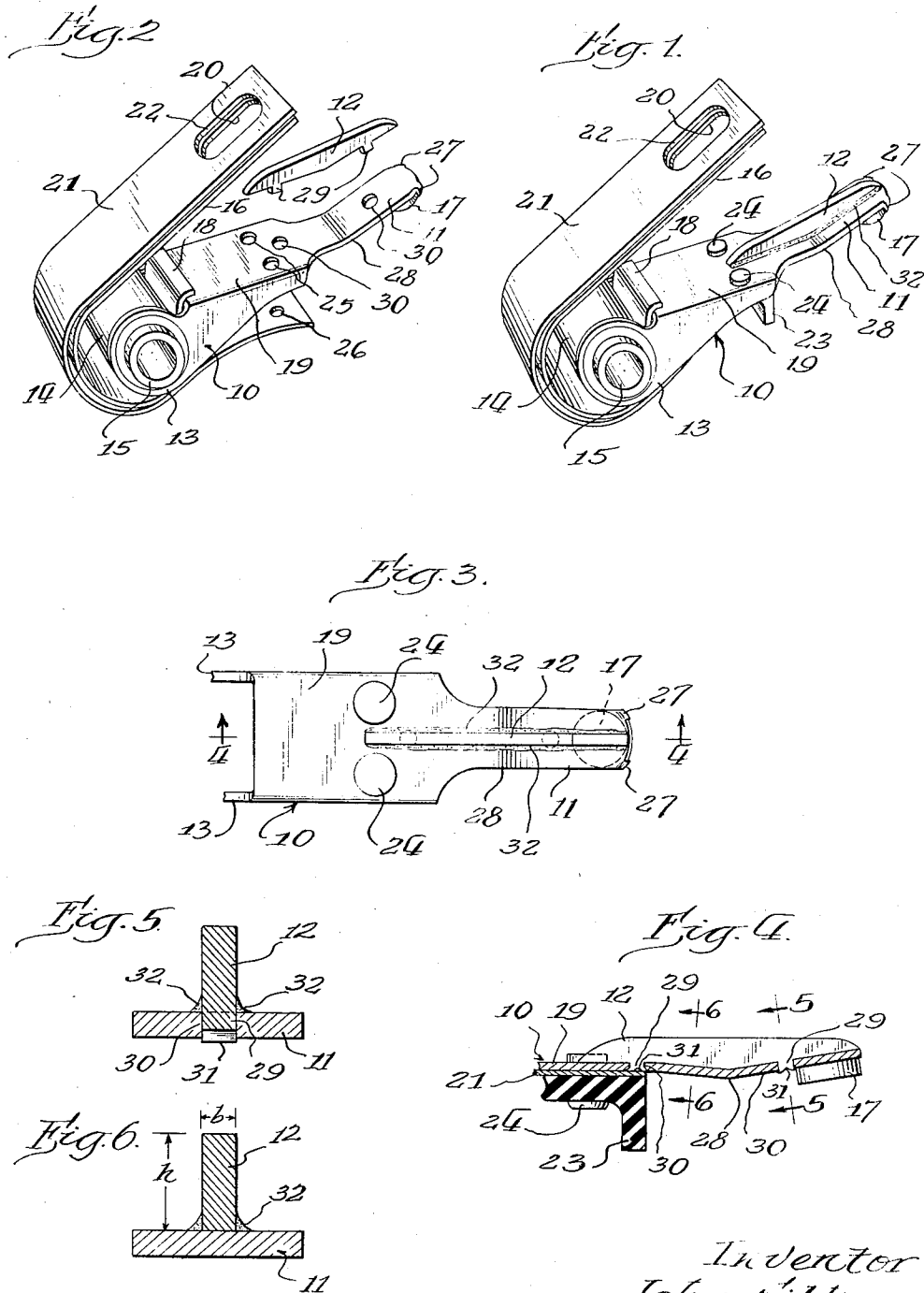
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J. FILKO

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BREAKER ARM FOR IGNITION DEVICES

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Inventor
John I. Filko
By *Manned S. Gay*
Atty

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BREAKER ARM FOR IGNITION DEVICES

John Filke, Chicago, Ill.

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4 Claims. (Cl. 200—166)

This invention relates to ignition devices and more particularly to the construction of a breaker arm for use in such devices. The ignition devices referred to are commonly known as the timer and distributor mechanisms, such as used in an internal combustion engine and constituting in effect circuit interrupters adapted to distribute electricity in proper rotation to cause ignition of fuel in the cylinders of such an engine. Examples of ignition devices of this type are described in United States Patent No. 1,825,720, issued October 6, 1931 to J. T. Fitzsimmons and United States Patent No. 1,317,357, issued September 30, 1919 to F. F. Dorsey.

The breaker arm is a small member adapted to instantaneously make and break an electric current at an enormous rate and because of this it is subject to a great deal of hammering. It must, therefore, be extremely rigid and durable and highly resistant to fatigue and strain. In view of the high frequency of oscillation, it is also essential that there be as little lag as possible in recovery of the breaker arm since variation in the time of spark will affect the engine performance. The breaker arm, therefore, must be as light as possible to reduce inertia lag.

It is the object of this invention to provide a novel and improved construction for a breaker arm which will be exceedingly strong and rigid and at the same time be light in weight.

Still a further object of the present invention is to provide a novel breaker arm construction which will utilize a contact lever portion reinforced by a rib member comprising a separate bar or the like rigidly attached to said lever portion.

Still a further object of the present invention is to provide a novel breaker arm construction which will utilize a contact lever portion reinforced by a rib member comprising a separate bar or the like rigidly attached to said lever portion, said rib member being substantially rectangular in cross section and having the long dimension of the rectangle disposed perpendicularly to said lever portion and in the direction of application of force thereto when said breaker arm is in operation.

Still a further object of the present invention is to provide a breaker arm having a rib reinforcing the contact lever portion thereof, said contact lever portion being free from prefabrication strains or weakening folds or wrinkles.

Still a further object of the present invention is to provide a breaker arm of the character described which will have a rib reinforcing the

contact lever portion thereof, said rib and the blank from which the body of said breaker arm is formed being both of separate strain free prefabrication and being subsequently rigidly joined during assembly.

Still a further object of the present invention is to provide a breaker arm of the character described which will be simple and economical in construction, adapted to require a minimum of fabrication equipment and which will efficiently discharge the purposes for which same is designed.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists in certain novel features of construction, arrangement and combination of parts hereinafter fully described, illustrated in the accompanying drawing, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportion, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

For the purpose of facilitating an understanding of my invention, I have illustrated in the accompanying drawing a preferred embodiment thereof, from an inspection of which, when considered in connection with the following description, my invention, its mode of construction, assembly and operation, and many of its advantages should be readily understood and appreciated.

Referring to the drawing in which the same characters of reference are employed to indicate corresponding or similar parts throughout the several figures of the drawing:

Fig. 1 is a perspective view of the embodiment of my improved breaker arm construction.

Fig. 2 is a perspective partially exploded view of the same in the process of manufacture thereof.

Fig. 3 is a fragmentary plan view of the contact lever portion of my improved breaker arm.

Fig. 4 is a sectional view of the same taken generally along the line 4—4 of Fig. 3.

Fig. 5 is a sectional view through the contact lever portion of my improved breaker arm taken at the line 5—5 of Fig. 4.

Fig. 6 is a sectional view through the contact lever portion of my improved breaker arm taken at the line 6—6 of Fig. 5.

The invention resides in eliminating a large number of steps in the manufacture of breaker arms especially breaker arms in which the con-

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tact lever portion is provided with a strengthening rib.

For the purposes of this application, the entire device will be designated as the breaker arm, the channel member 10 will generally be referred to as the blank, and the narrowed portion 11 forward of the top of the blank 10 will be designated as the contact lever portion, and the reinforcing bar member 12 will be referred to generally as the rib.

For the most part the breaker arm is constructed in a conventional manner. A blank of generally channel shaped cross section is formed having ears 13 in which are disposed a metallic bushing 14 and an insulating bushing 15, said insulating bushing 15 being fixed against rotation within said metallic bushing 14 and said metallic bushing being fixedly held within openings provided therefor in said ears. It is obvious that the breaker arm pivots about the axis of said bushings and is insulated from the pivot pin (not shown) about which said breaker arm is adapted to pivot.

A spring member 16 is provided for urging the breaker arm to rotate in one direction and cause the contact disc 17 disposed upon the contact lever portion 11 to move into electrical engagement with a cooperating contact member (not shown). The member 16 generally follows the curvature of the bushing 14 and is provided with a bend 18 at one end thereof which engages the web 19 of the blank 10 to prevent movement of the spring member 16 when energy is being stored therein while bending the same about the bushings. The other end of the spring member 16 is provided with an opening 20 adapted to receive means for connecting the breaker arm into the electrical circuit of the ignition device with which same is associated.

In order to provide a good electrical contact, an auxiliary strip 21 of material of high conductivity, such as for example copper, overlies the spring member 16 for the most part, being attached at one end to the underside of the web 19 and having an opening 22 cooperating with the opening 20 at the other end thereof. The blank 10 is provided on the underside of the web 19 with a substantially L-shaped rubbing block 23 for contacting a cam member (not shown) and thereby causing motion to be imparted to the breaker arm. Said block 23 is attached to the web by means of rivets 24 extending through openings 25 provided therefor in the web 19. Prior to riveting the block 23 in place the end of the strip 21 is disposed between said block and the web 19 and the rivets 24 are passed through openings 26 provided therefor in the strip 21 which cooperate with the openings 25.

The blank 10 is provided with a narrowed portion 11 extending from the web 19 thereof and constituting the contact lever portion to the lower side of the end of which the contact disc 17 is fixed as by welding. Small ears 27 are provided on said contact lever portion 11 for the purpose of seating said contact disc 17. It will be noted that the lever portion 11 is provided with a bend 28 which is necessary in order to provide exact face to face contact between the disc 17 and its cooperating contact (not shown).

The contact lever portion 11 is provided with a strengthening rib 12 the shape of which follows generally the contour of the lever portion 11 and the cross section of which is substantially rectangular. The rib 12 is fixed to the contact lever portion in a manner to be presently de-

scribed with the long dimension of said rectangular cross section disposed perpendicularly to the face of said lever portion. Thus the force being applied to said lever portion parallel to said long dimension of the rectangle, the greatest strength of the rib is available. The laws governing bending moment of a beam in which h/b is greater than unity apply (h representing height of the cross section and b representing breadth of the cross section as shown in Fig. 6). This type of beam has the greatest bending resistance of all types of beams.

Prior to attachment of the rubbing block 23, as shown in Fig. 2, the rib 12 is attached to the lever portion 11. Lugs or projections 29 are provided on the lower edge of said rib 12 and these are adapted to engage in openings 30 provided therefor as shown. The rib 12 is placed in position and the ends thereof are peened over as shown at 31 in order to secure the rib 12 to the contact lever portion 11. It will be noted that the projections are adapted to engage portions of the contact lever on each side of the bend 28 thereby insuring a constant angle bend. Following the peening or riveting of the lugs, the rib is welded or soldered to the lever portion 11 at all engaging edges thereof as shown at 32, thereby causing extreme rigidity in the construction. Further assembly of the breaker arm may continue in any convenient manner.

Note that after the breaker arm is assembled in the order outlined above the attachment of the rubbing block 23 helps secure one of the peened lugs 30 of the rib 12.

It will be seen that I have devised a breaker arm having a solid rib reinforcing the contact lever portion thereof, said contact lever portion being free from fabrication strain or weakening wrinkles or folds. It will be seen further that my invention does away with a large number of steps, tools, dies and machinery formerly used in the manufacture of this type of breaker arm. It will further be seen that by separate pre-fabrication of the rib and blank and subsequent attachment of one to the other, I have produced an extremely strong and rigid lightweight device of the character described.

It is believed that my invention, its mode of construction and assembly, and many of its advantages should be readily understood from the foregoing without further description, and it should also be manifest that while a preferred embodiment of the invention has been shown and described for illustrative purposes, the structural details are nevertheless capable of wide variation within the purview of my invention as defined in the appended claims.

What I claim and desire to secure by Letters Patent of the United States is:

1. In a breaker arm of the character described, including a body blank having a substantially flattened bent contact lever portion extending therefrom, means for strengthening said contact lever portion at said bend comprising a pre-fabricated rib rigidly attached to said lever portion in the crook of said bend.

2. In a breaker arm of the character described, including a body blank having a substantially flattened bent contact lever portion extending therefrom, means for strengthening said contact lever portion at said bend comprising a pre-fabricated rib rigidly attached to said lever portion in the crook of said bend, said rib having its longest cross-sectional dimension disposed sub-

stantially perpendicular to the widest cross sectional dimension of said lever portion.

3. In a breaker arm of the character described, including a body blank having a substantially flattened bent contact lever portion extending therefrom, means for strengthening said contact lever portion at said bend comprising a pre-fabricated rib rigidly attached to said lever portion in the crook of said bend, said lever portion being provided with openings on either side of said bend, said rib having projections adapted to fit into said openings and be fixed therein to thereby

aid in the rigid attachment of said rib to said lever portion.

4. In a breaker arm of the character described, including a body blank having a substantially flattened bent contact lever portion extending therefrom, means for strengthening said contact lever portion at said bend comprising a pre-fabricated rib rigidly attached to said lever portion in the crook of said bend, said rib having portions thereof extending through said lever portion and being riveted thereto.

JOHN FILKO.