Jan. 24, 1956 M. G. BALES 2,732,465

IGNITION DISTRIBUTOR

Original Filed Nov. 16, 1950




Fig. 5.

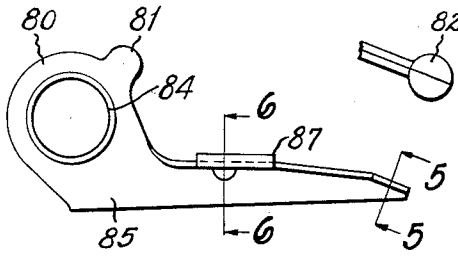



Fig. 2.




Fig. 4.

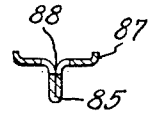



Fig. 6.

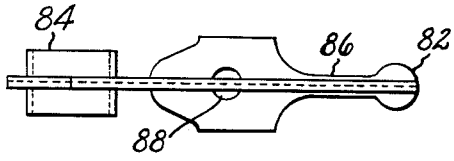



Fig. 3.

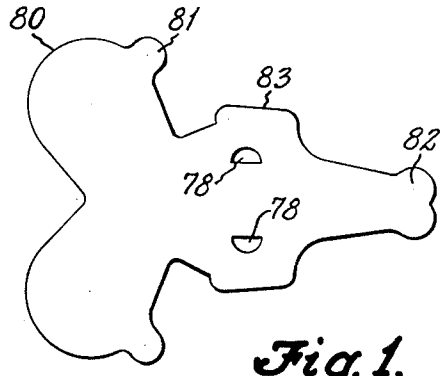



Fig. 1.

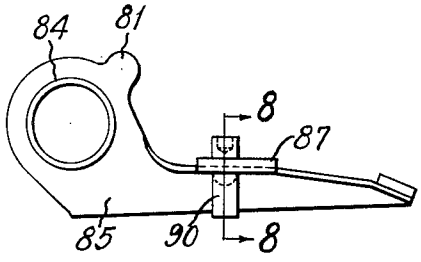



Fig. 7.

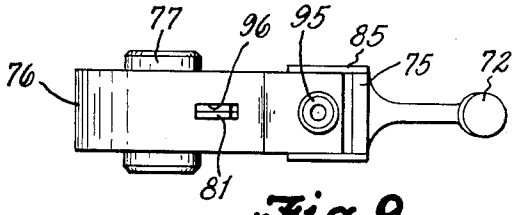



Fig. 9.

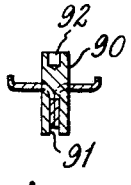



Fig. 8.

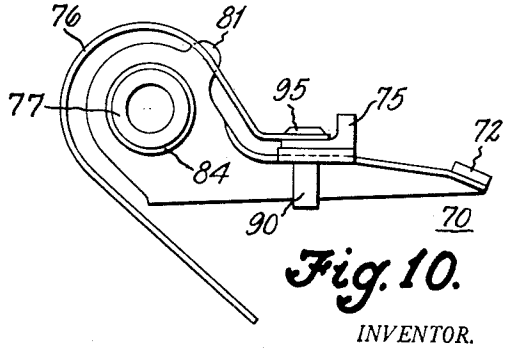



Fig. 10.

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# IGNITION DISTRIBUTOR

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Original application November 16, 1950, Serial No. 196,045. Divided and this application September 7, 1951, Serial No. 245,470

4 Claims. (Cl. 200—166)

This invention relates to improvements in circuit breaker arms for use in ignition apparatus having a distributor rotor and a cam. This is a division of my copending application Serial No. 196,045, filed November 16, 1950.

An object of the present invention is to simplify the construction and reduce the cost of manufacture of a durable circuit breaker which operates at high speed without chattering and rebounding of the contacts. This object is accomplished by forming the circuit breaker from thin sheet metal of symmetrical shape having openings surrounded by annular flanges at right angles to the plane of the blank. The blank is folded at the line of symmetry to provide a pair of leaves or laminations from which the annular flanges extend at right angles and in alignment to provide a hub portion to receive a bearing bushing. The periphery of the hub is provided with aligned ears extending radially from the periphery of the hub portions. The edges of the leaves are deformed to provide flanges which extend from the hub portion to the free end of the lever and extend at right angles to the planes of the leaves. These flanges provide contact receiving platforms at the free end of the lever and a cam rubbing element platform intermediate the ends of the lever. A single rivet which passes through an aperture provided by the element platform straddles the leaves and is attached thereto and secures to said platform the element and a spring. The spring has an opening to receive the ears to prevent the spring from turning relative to the lever and element.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

Fig. 1 shows a blank of metal drawn to a large scale from which the lever is formed.

Figs. 2 and 3 are side and top views of the blank after it has been folded.

Fig. 4 is a fragmentary view showing the contact platform.

Figs. 5 and 6 are sectional views taken on lines 5—5 and 6—6 respectively of Fig. 2.

Fig. 7 shows the lever with a rivet attached thereto.

Fig. 8 is a sectional view taken on line 14—14 of Fig. 13.

Figs. 9 and 10 are bottom and side views respectively of the completed lever.

A circuit breaker 70 is formed from a blank of thin sheet metal, preferably of steel or other hard metal, as shown in Fig. 1. This blank is formed with spaced openings 78. At one end the blank is provided with a pair of oppositely extending hub portions 80, each having a radial ear 81. The other end of the blank is provided with a pair of pads 82. At an intermediate point of the blank a pair of oppositely, extending platforms 83 are provided. In the process of making the lever 70 in its



final form as shown in Fig. 10, holes are punched in hub portions 80 thereby providing cylindrical flanges 84 at right angles to the normal plane of the blank. The blank is then folded on itself on the axis of symmetry to provide contiguous laminations or leaves 85 to form a stiffening rib and so that the cylindrical flanges are in alignment on an axis perpendicular to the plane of the leaves 85. The leaves are shaped as shown in Fig. 9 to provide flanges 86 which extend from the inner portions of the hub portions 84 and include pads or platforms 83 and 82 in the same plane and at right angles to the leaves. The sides of the pads or platforms 83 are bent at right angles to provide flanges 87 thus forming a channel formation. The platforms 83 are bent so that the fold is diametrically between the holes 78 so that when the flanges are together they form a hole 88, Fig. 6. The pads 82 provide a platform for the contact 72.

A rivet 90 is provided with a slot 91 to straddle both leaves 85 and a recess 92 at its upper end as viewed in Figs. 5 and 8. The rivet is passed through the opening 88 formed by the openings 78 so that the slot portion 91 of the rivet will straddle the leaves and the rivet is then spot welded to the leaves. The L-shaped cam rubbing block 75 of molded or other insulating material and a leaf spring 76 having holes for receiving the rivet are assembled on the platform 83 and the rivet portion including the recess 92 is deformed over the spring 76 as at 95 to secure the block 75 and the spring 76 to the lever 70. The rubbing block fits between the flanges 87 to prevent the block from turning on the rivet 90.

The leaf spring 76 partially surrounds the hub portions 80 of the leaves 85 and this portion of the spring has an opening 96 to receive the ears 81 on the hub portions 76 to prevent the spring from turning on the rivet 90. The free end of the spring is provided with a suitable notch, not shown, to be received by a suitable terminal. The annular flanges 84 support the bearing bushing 77.

The flange 86 which extends from the hub portion 76 to the end of the lever makes for a rigid circuit breaker lever. Further the lever can be made from thin metal stock to produce a light lever that performs satisfactorily at high speeds. The lever in this instance uses only a single rivet for attaching the rubbing block 75 and the spring 76 to the lever 70 which reduces the weight of the lever, and the spring is provided with an opening to receive ears 81 in the hub portions 80 to prevent the spring from turning relative to the rivet 90. This arrangement provides for easy assembly of the spring with the lever.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. A spring biased circuit breaker having a contact arm portion and a pivot portion on one end thereof comprising in combination, a radially extending ear on said pivot portion and a leaf spring having a single point of attachment on said arm portion and a portion spaced from said pivot portion having an elongated aperture therein adapted to receive said extending ear only to prevent said spring from pivoting about said point of attachment.

2. A spring biased circuit breaker having a contact arm portion and a pivot portion on one end thereof comprising in combination; a leaf spring having a single point of attachment on said arm portion and having an apertured portion in radially spaced relation from said pivot portion and means including an ear on said pivot portion constructed to extend through the aperture in said portion to prevent said spring from pivoting about said point of attachment.

3. A circuit breaker arm formed from a single sheet of sheet metal including; a contact carrying rib portion, a hub portion adapted to provide a pivot for said contact

carrying portion and an ear portion radially extending from said hub portion in combination with a leaf spring having at least two spaced openings and an end portion curved about and in radial spaced relation to said hub portion, one of said spaced openings being located on the end remote from said curved portion and adapted to provide a single point of attachment with said contact carrying portion and the other of said openings being located between said first opening and the curved portion end and adapted for loosely receiving said ear portion for preventing said spring from pivoting about said single point of attachment.

4. A circuit breaker arm formed from a blank of sheet metal to provide a longitudinally extending rib portion, a hub portion including oppositely extending flange portions surrounding aligned holes, and an integral ear portion integrally formed with and radially extending from the periphery of the hub, said rib portion having two spaced pads, one adapted to support a contact and the other adapted to support a cam engaging member, said pads being at right angles to the plane of said rib and said cam support pad being apertured to expose an edge portion of said rib, a rivet extending through said aperture and having a notch straddling said rib portion for irremovably attaching said rivet thereto, an apertured cam engaging element adapted to fit over said rivet and nonrotatably carried by the cam supporting pad, in combination with a leaf spring having at least two spaced openings and an end portion curved about and radially spaced to said hub portion, one of said openings being located on an end remote from the curved portion of said spring and adapted to provide a single point attachment when said rivet is peened over said spring and the other of said openings being elongated and located between said first opening and the curved end portion and adapted for loosely receiving said radial ear portion therein for preventing said spring from pivoting about said rivet point of attachment while permitting relative radial movement between said hub and the curved portion of said spring, and a bearing bushing attached to said flanges.



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