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## ARC TRIGGERED RELEASE MECHANISM

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2 Claims. (Cl. 200—121)

My invention relates to a release mechanism for visually or audibly performing or causing to be performed, an indication of a circuit condition, or for performing or causing to be performed, a mechanical or electrical function.

Such mechanisms may employ a fusible element as an arresting link for a spring-loaded indicating device; this fusible element being either the primary fusible element of the fuse or a high resistance element in parallel with the primary fusible link. These prior systems have certain basic faults. When subjected to vibration, the primary fusible element under tension will work harden, with consequent increase in resistivity, affecting the accuracy of the fusible element. Sometimes the primary fusible element under tension will reduce its net cross-section when heated, which also affects its accuracy.

When a dual element fuse using a high resistance parallel link as an arresting link is used in series with another dual element fuse of the same rating, production tolerances inherent in the fuse are apt to allow only one arresting wire to melt after both of the primary fuse links have cleared, thus failing to indicate a blown fuse.

The principal object of my invention is to provide a spring-loaded indicating device which will not create a change in the characteristics of the fusible element when in use, or fail when subjected to vibration; which will not permit a non-indication of a blown fuse due to a high resistance parallel link failing to burn out; which does not place any tensional strain on the primary fusible element; and which is not more expensive to make than similar previously known devices.

I accomplish these and other objects and obtain my new results, as will be apparent from the device described in the following specification, particularly pointed out in the claims, and illustrated in the accompanying drawing in which:

Fig. 1 is a longitudinally sectioned view of one form of an arc triggered spring-loaded indicating device, employing my invention.

Fig. 2 is a sectional view of the same taken in the plane 2—2 of Fig. 1.

Figs. 3, 4 and 5 disclose diagrammatically various additional methods of associating the spring-loaded arresting wire with the fusible element.

In the drawing, Figs. 1 and 2, reference 10 designates a housing made of suitable insulating material, such as mineral filled melamine. The housing may terminate in a knob shaped handle 12 having a central aperture 14, containing a mica window 16 through which a plunger or indicator 18 is projected when released. Into the housing is inserted a base plug 20 upon which the indicator mechanism may be completely mounted. The base plug is cemented, as at 22, or otherwise secured to the housing, to position the parts properly within the housing.

Through the base plug 20 projects a conventional pair of contact blades 24 and 26 for engagement with the corresponding contacts of a socket, not shown, positioned in the circuit the condition of which is to be indicated.

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To the inner surface of the blades is secured a fusible element 28 completing the circuit. In the present construction, an aperture 30 is provided in the fusible element through which extends an arresting wire 32, one end 31 of which is secured to the base plug 20, and the remaining end 33 to the indicator 18. A spring 34 is seated in a recess 35 of the indicator, and abuts a platform 36 supported between the blades by screws 38. The arresting wire passes through an aperture 40 in the platform to permit the spring to encircle the wire. The indicator, when released, extends through the recess 14 of the housing and engages the seat 42 with the shoulder 44 of the indicator to hold the end of the indicator in position beyond the knob while seated in the released dot-dash position, as shown in Fig. 1.

The general design of the release mechanism permits the element to fuse in a specified and predetermined portion and the arresting wire is located in the immediate vicinity of the specified and predetermined portion. When the element fuses, an arc forms before the current is interrupted. The arresting wire is so positioned with respect to the fusible element that the resulting arc cuts across the arresting wire inasmuch as the arresting wire represents the low resistance path for the arc to follow relative to the surrounding air.

It has been found that the arc, in passing through the arresting wire, transforms enough electrical energy to thermal energy to melt or soften the arresting wire, reducing its tensile strength so that it is severed, thereby allowing one end of the arresting wire to be freed, providing the desirable trigger action.

The presence of the hole in the center of the fusible element decreases the cross-sectional area of the element and insures that the element will fuse at that point. Inasmuch as the arresting wire passes through the center of the melting area, the arc will cut across the arresting wire.

Fig. 3 illustrates another method for fusing and arcing at a predetermined point on the fusible element. In this scheme, the arresting wire 32a, held by plug 20a, passes the fusible element 28a near the longitudinal center of the fusible element and the two parts are joined together at the intersection by a glob of material 50 that has a low thermal conductivity. The presence of the low thermal conductivity material establishes a heat build-up at the junction of the two parts, causing the fusible wire to melt at this intersection, and consequently the arresting wire will be in the arcing area.

In another construction, shown in Fig. 4, a loop 52 taken in the center of the fusible element 28b causes a fusing of the element somewhere along the periphery of the loop because the concentration of radiant heat energy in the loop causes the fusible element to melt in the loop. The arresting wire 32b, restrained by plug 20b, passes through the loop close to the arc formed by the current interruption upon rupture of the fusible element.

In the other construction illustrated in Fig. 5, the arresting wire 32c held by plug 20c is looped around a reduced cross-section 56 of the fusible element 28c. Section 56, naturally presents a lesser cross-section to the passage of current and the resistance in this area is higher. Consequently, the fusible element will clear in this area. Inasmuch as the arresting wire is looped around the reduced section, the arresting wire will be in the area of arcing.

In the various constructions illustrating my invention, I have avoided placing a tensional force on the primary fusible element, a force which would affect its accuracy, nor do I depend upon the fusing of a high resistance parallel link for indication. In doing so, I have overcome the shortcomings of the conventional trigger mechanisms.

My device may be used to give the desired circuit indica-

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tion, or the release mechanism may be used to mechanically cut off or start the power in other circuits. An example is the disconnection of two remaining phases of a three phase circuit, when one of the phases is faulted.

I have thus described my invention, but I desire it understood that it is not confined to the particular forms or uses shown and described, the same being merely illustrative, and that the invention may be carried out in other ways without departing from the spirit of my invention, and, therefore, I claim broadly the right to employ all equivalent instrumentalities coming within the scope of the appended claims, and by means of which, objects of my invention are attained and new results accomplished, as it is obvious that the particular embodiments herein shown and described are only some of the many that can be employed to attain these objects and accomplish these results.

I claim:

1. A fuse and indicator comprising a hollow body having a neck portion, a pair of contact prongs extending in the same direction from said body, a fusible element contained in said body connecting one prong to the other, a plunger mounted in said body and positioned in said neck portion, a spring contained in said plunger, an arresting wire attached to the inner surface of the body and to said plunger, a window sealed in said neck portion, and means for projecting said plunger through said window

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and out of said neck portions upon the fuse being overloaded.

2. In a release mechanism comprising a fusible element supported in a tension-free position between two supports, a spring-loaded arresting wire, and an indicating mechanism connected thereto, said arresting wire being positioned adjacent the fusible element, and joined thereto by a drop of material having a low thermal conductivity, whereby the arc formed in the fusible element when overloaded will break the arresting wire and release the indicating mechanism.

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