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2,333,345

FUSE LINK

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Fig. 1

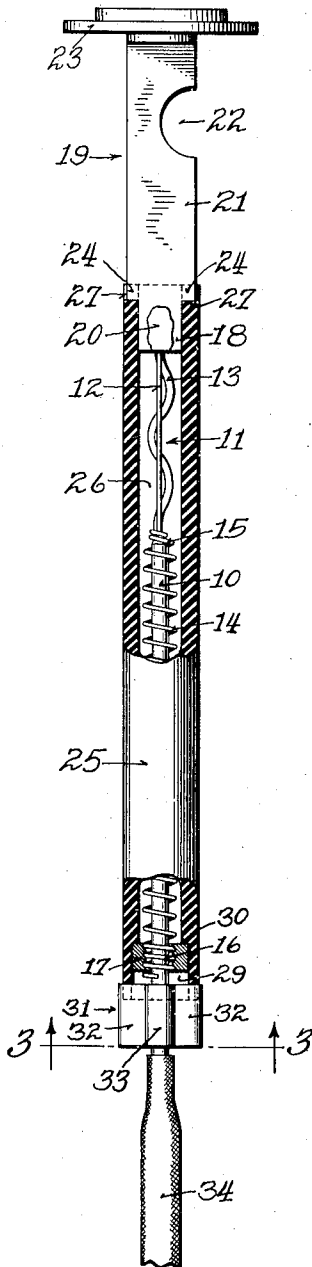


Fig. 2

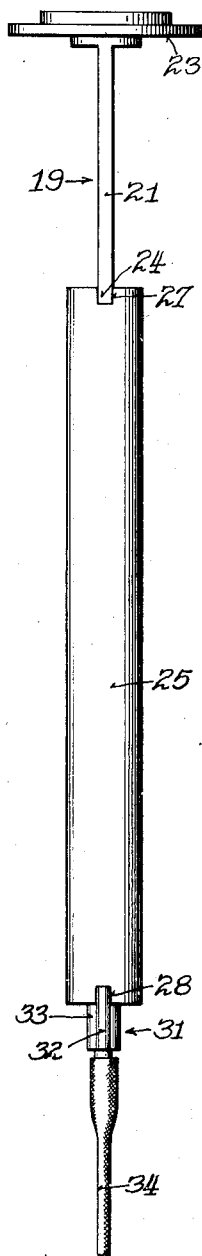


Fig. 3

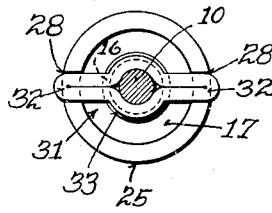
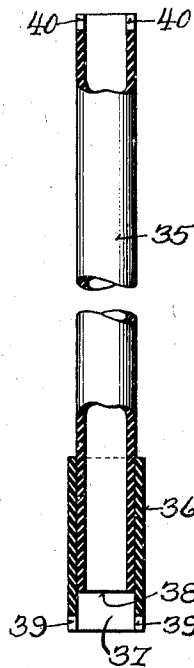


Fig. 4



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FUSE LINK

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4 Claims. (Cl. 200—135)

This invention relates to improvements in fuse links.

Fuse links of a well known type comprise a mechanically delicate fusible section electrically connected to conductor terminals, means for biasing the fusible section, and an insulating tube mounted over the fusible section.

Heretofore assembly of the above noted parts was such as to permit movement, as by twisting or turning, of the conductor terminals relative to each other and to the fusible section. This relative movement of the conductor terminals caused the delicate fusible section to become damaged mechanically, thereby destroying the predetermined electrical characteristics of the delicate fuse wire and causing it to operate at values different from its predetermined calibrated values.

Therefore, it is an object of this invention to provide for a fuse link means adapted to prevent relative twisting or turning movement of the fuse link terminal members.

More specifically, it is an object to provide a fuse link having conductor terminals mounted in interlocked relationship with the fuse tube, thereby preventing turning movement of the terminals relative to each other and to the fusible section.

Another object is to provide a fuse link wherein the conductor terminals are directly coupled against relative turning movement by means of the fuse tube.

In the drawing:

Fig. 1 is a view in side elevation, partly in section, showing the improved fuse link.

Fig. 2 is a view in side elevation taken at a right angle to Fig. 1.

Fig. 3 is an enlarged view taken on the line 3—3 of Fig. 1.

Fig. 4 is a view in side elevation, partly in section, showing a modified form of fuse tube adapted to be interlocked with the fuse link conductor terminals.

Like parts are indicated by the same reference numerals throughout the several views.

The fuse device shown in the drawing comprises a conductor rod 10 to one end of which is secured a fusible section 11 comprising a strain wire 12 and a fusible wire 13, each secured to the rod in any suitable manner as by crimping or solder, not shown. A coil spring 14 is mounted over the rod and secured to the upper end of the rod by reducing the diametric dimension of the upper convolutions 15 of the spring. The lower convolutions 16 of the spring

are closely spaced to receive the threaded portion of the nut 17.

The upper end of each wire 12 and 13 is secured to the reduced portion 18 of the conductor terminal 19 by means of solder 20.

The conductor terminal 19 comprises a flat shank 21 notched at 22 and terminating at its upper end in a contact button head 23.

The reduced portion 18 forms shoulder elements 24 with the shank 21.

A fuse tube 25, having a bore 26, is notched at its upper and lower ends at 27 and 28 respectively. The upper notches 27 are axially aligned to receive the shoulder elements 24 in interlocked relationship, thereby holding the conductor terminal 19 and fuse tube 25 against turning movement relative to each other. The reduced portion 18 of the conductor 19 is received in the upper open end of the tube 25 and prevents lateral movement of the conductor 19 relative to the longitudinal axis of the tube 25.

The lower end of the tube 25 is counterbored at 29 to form the seat 30 against which the nut 17 is received. The nut 17 and seat 30 cooperate to bias the spring 14 against the rod 10 which in turn is held against movement by the strain wire 12 which in turn holds the terminal 19 and tube 25 against axial movement away from each other.

The rod 10 is held against turning movement relative to the tube 25 by an anchor means 31. Before the anchor means 31 is crimped into fixed position with the rod 10 it is circular in form. The circular collar means is then placed in any suitable forming machine (not shown) and partially flattened to form the ears 32 extending laterally from opposite sides of the circular hub portion 33. The hub portion 33 is oversized, thereby permitting it to be slidably received over the lower end of the rod 10. The anchor means 31 is moved upwardly on the rod 10 to interlock the ears 32 with the notches 28. The hub portion 33 of the anchor means is then crimped onto the rod 10, securing the anchor means in fixed position with the rod and holding the rod against turning movement relative to the tube 25.

A flexible conductor 34 is secured to the lower end of the rod 10 in any suitable manner.

Fig. 4 shows a further method of providing a seat against which the nut 17 may be anchored. An insulating tube 35 is provided at its lower end with a short length of tube 36 telescopically received thereon and positioned relative to

each other to provide a nut receiving chamber 37 having a seat 38.

The tubes 35 and 36 are held against movement relative to each other in any suitable manner.

The lower end of the tube 36 is notched at 39 to receive the ears 32 of the anchor means 31, whereby the rod 10 is held against turning movement relative to the tubes 35 and 36.

The upper end of the tube 35 is notched at 40 for the purpose and in the manner described with reference to Fig. 1.

Under short circuit conditions the fusible section 11 melts, permitting the expanded spring 14 to eject the conductor rod 10 out of and away from the lower end of the tube 25. The extended arc established between the ruptured ends of the fusible section is extinguished by the expulsion action of the tube 25. After the arc has been cleared, all of which occurs in a comparatively short interval of time, the tube 25 falls clear of the terminal 21.

It is to be noted that the fusible section 11 is protected against mechanical damage through being turned or twisted, by the interlocked relationship of the fuse tube 25 to the conductor terminals 10 and 19 to each of which the fusible section is directly connected.

From the foregoing description it is apparent that the objects of this invention have been accomplished by providing a fuse link having conductor terminals interlocked against movement relative to each other, whereby the fusible section directly connected therewith is protected against electrical damage.

I claim:

1. A fuse link comprising spaced conductors, a fusible section connecting said conductors, a first tube notched at one end, a second tube forming an anchor receiving chamber with said first tube, and being notched adjacent said chamber, biasing means anchored in said chamber and to one of said conductors, and means on each of said conductors received in said notched tube ends whereby said conductors are coupled against relative turning movement and free to move axially apart under short circuit conditions.

2. In a fuse-link, a tube of insulating material, a fusible section within the bore of said tube and extending lengthwise thereof, said fusible section being torsionally weak, a rigid terminal member extending lengthwise into one end of said tube and projecting externally thereof away from said tube in a direction parallel to the axis of said tube, said tube being notched to normally engage said terminal member whereby to prevent rotation of said terminal member relatively to said tube, one end of said fusible section being connected to said terminal member, a rod-like terminal member connected endwise to the other end of said fusible section within said tube, said rod-like terminal member extending lengthwise of and projecting out of and beyond the other

end of said tube, and a collar secured to said rod-like terminal member and having a pair of ears extending laterally from said member, said other end of said tube being notched to normally engage said ears and thereby prevent relative rotation between said tube and said rod-like terminal member, the arrangement being characterized in that said rod-like terminal member is free to drop out of said tube upon severance of said fusible section.

3. In a fuse link, an elongate tube of insulating material having a diametrically extending notch formed in each of its two ends, a conductive terminal member of flat strip stock telescoped at one end into one end of said tube and in engagement with the aforementioned notch in said one end of said tube whereby to prevent relative rotation between said terminal member and tube, said terminal member extending beyond said tube in a direction lengthwise of said tube, a rod-like conductive member projecting into the bore of said tube at the other end thereof, a torsionally weak fusible section within said tube and interconnecting said terminal member and said rod-like conductive member, a spring operative to eject said rod-like conductive member from said tube upon severance of said fusible section, but normally restrained by said fusible section, and means secured to said rod-like conductive member and engaging the notch in the other end of said tube whereby to prevent relative rotation between said rod-like conductive member and said tube.

4. In a fuse-link, an elongate tube of insulating material having a diametrically extending notch formed in each of its two ends, a conductive terminal member of flat strip stock telescoped at one end into one end of said tube and having shoulders which engage the notch in said end of said tube and which determine the extent to which said terminal member projects into said tube while preventing relative rotation between said terminal member and tube, said terminal member extending beyond said tube in a direction axial of said tube, a rod-like conductive member projecting into the bore of said tube at the other end thereof, a torsionally weak fusible section within said tube and interconnecting opposed ends of said terminal member and rod-like conductive member, respectively, a normally tensioned helical spring coiled around said rod-like conductive member, said spring being detachably anchored at one end to said tube and at the other end to said rod-like conductive member, said spring being operative, upon severance of said fusible section, to eject said rod-like conductive member from the bore of said tube, and means for preventing relative rotation between said tube and rod-like conductive member, said means being secured to said member and in engagement with the notch in the other end of said tube.

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