Nov. 14, 1950 A. J. CIHLAR ET AL 2,530,228

ELECTRICAL PROTECTIVE DEVICE

Filed Sept. 8, 1949

FIG. 1

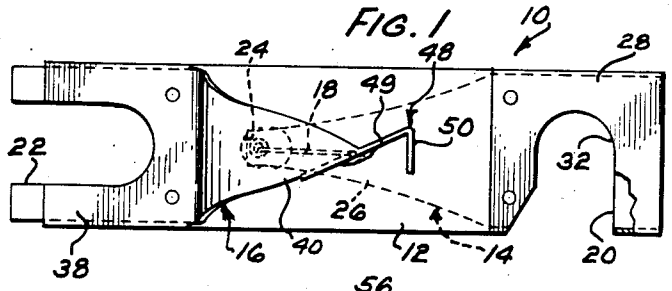


FIG. 2

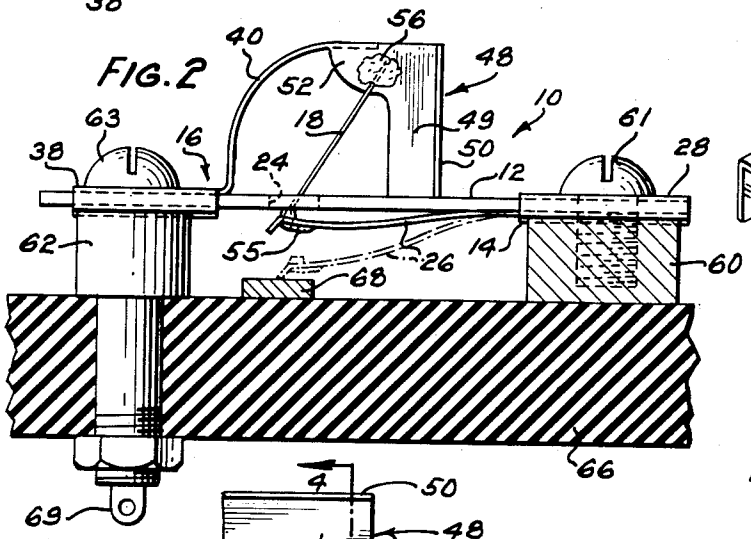


FIG. 6

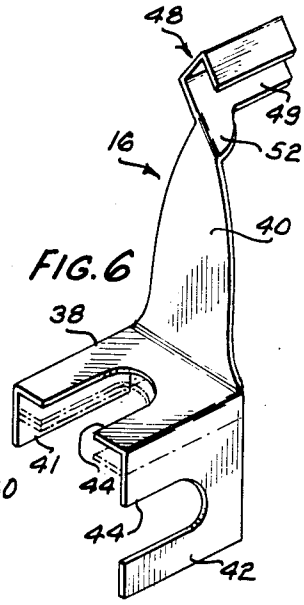


FIG. 7

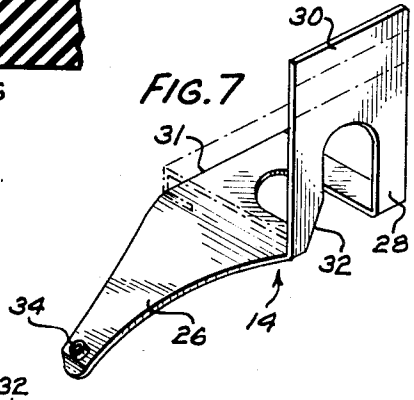


FIG. 3

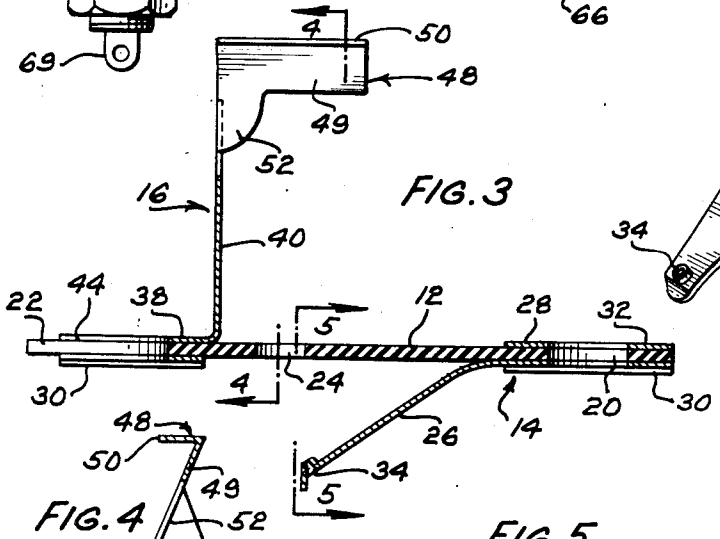


FIG. 4

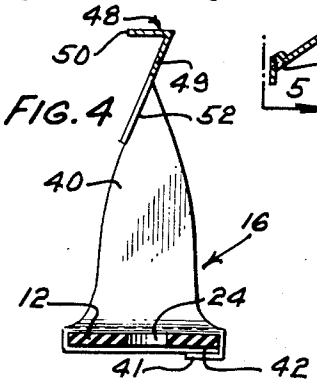
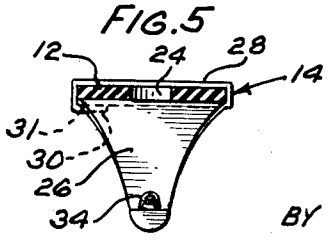


FIG. 5



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ELECTRICAL PROTECTIVE DEVICE

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5 Claims. (Cl. 200—113)

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This invention relates to an electrical protective device and more particularly to an alarm type fuse structure for use in connection with telephone equipment.

It is an object of this invention to provide an improved alarm fuse of simple construction having few parts and which entails a minimum expenditure of time and labor for the assembling thereof.

In one embodiment of the invention there is provided an insulating mounting strip on the opposite sides and ends of which are mounted an alarm spring and an indicator spring, each made from a single piece of sheet metal and having an end portion encircling the insulating strip to firmly secure it on the mounting strip. The indicator spring in its open position is adapted to extend perpendicularly from the insulating mounting strip and has its free end bent perpendicularly to the intermediate portion along a line obliquely across said spring to form a signal flag which is bent longitudinally intermediate its lateral edges to form converging surfaces which are readily seen from various angles, and the free ends of the springs are flexed toward the insulating strip and held in closed position by a fuse wire connected thereto.

Other objects and features of the invention will be apparent by reference to the following detailed description thereof and the accompanying drawings illustrating a preferred embodiment thereof in which,

Fig. 1 is a plan view of the fuse structure in closed or operative position;

Fig. 2 is a side elevational view of the fuse device showing it mounted in position on cooperating equipment;

Fig. 3 is a longitudinal sectional view of the fuse structure with the parts shown in fully expanded or released position before the springs have been flexed to their closed position;

Figs. 4 and 5 are detailed, sectional views along the lines 4—4 and 5—5, respectively, of Fig. 3;

Fig. 6 is a view in perspective of the indicator spring before it is assembled onto the mounting strip and showing a modified form of flag construction at one end thereof; and

Fig. 7 is a view in perspective of the alarm spring before it is assembled onto the mounting strip.

Referring to the drawings the fuse device 10 comprises a mounting strip 12 of insulating material on the opposite sides of which are mounted an alarm spring 14 and an indicating spring 16 connected together by the fuse wire 18. The

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mounting strip 12 has a laterally extending recess or notch 20 at one end and a longitudinally extending notch 22 at the other end and an aperture 24 disposed intermediate its ends along the longitudinal center line thereof. Formed from a single piece of spring sheet metal, such as nickel-silver or Phosphor-bronze, the alarm spring 14 has a flexible arm 26 and a laterally extending portion 28 which is wrapped around one end of the mounting strip 12 in telescoping relation therewith with the edge 30 thereof overlapping and clinched against the edge 31 of the spring 14 to secure the spring 14 on the supporting plate 12. The portion 28 of the spring 14 encircling the mounting strip 12 is provided with a slot 32 aligned with the recess 20 of the mounting strip and forms a terminal by means of which it may be electrically connected to a circuit. The free end of the arm 26 of a spring 14 is normally spaced from the mounting strip 12 (Fig. 3) and is provided with an aperture 34 for receiving one end of the fuse wire 18 therethrough.

The indicator spring 16 is also made from one piece of spring sheet metal and has an end portion 38 bent perpendicularly to the intermediate portion 40 of the spring 16 and wrapped around the other end of the mounting strip 12 with the edge 41 thereof overlying and clamped against the edge 42 to firmly secure the spring onto the mounting strip. The encircling portion 38 is provided with recesses 44 which are aligned with the recess 22 in the mounting strip and forms a terminal member for electrically connecting the indicator spring 16 to a circuit. At its other end the intermediate portion 40 of the indicator spring 16 narrows toward the longitudinal center line and has the end portion 48 of the spring bent at right angles thereto along a line extending obliquely to the longitudinal center line. The end portion 48 of the spring 16 shown in Figs. 1 to 4 is bent to form a V-shaped channel member having an obliquely disposed wall 49 and a transverse end wall 50 and serves as a signal flag or target. If desired, the wall 50 of the flag 48 may be further bent to form a channel-shaped flag having a U-shaped cross section, as indicated in Fig. 6. Extending laterally from one edge of the obliquely disposed wall 49 of the flag 48 and adjacent the intermediate portion 40 of the spring 16 is a portion 52 located substantially along the center line of the spring 16 and forming a readily accessible bonding surface to which one end of the fuse wire 18 may be secured.

In its open position, as shown in Fig. 3, the intermediate portion 40 of the indicator spring

16 extends perpendicularly from the mounting strip 12 and positions the end or flag 48 in spaced relation to the strip 12 where it is clearly visible. In the closed position of the fuse structure as shown in Fig. 2 the indicator spring 16 is flexed to bring the end of the flag 48 into engagement with the mounting strip 12, the alarm spring is flexed toward the mounting strip 12, and the springs are held in this position by the fuse wire 18 soldered thereto. The fuse wire passes through the apertures 24 and 34 in the mounting strip and the alarm spring, respectively, and one end thereof, is soldered at 55 to the underneath side of the alarm spring and the other end engages the portion 52 of the spring 16 and is soldered thereto at 56.

The one-piece indicator spring and the one-piece alarm spring may be readily punched and formed into proper shape in progressive stages with progressive dies and assembled onto the mounting strip 12 to form a partly assembled fuse structure as shown in Fig. 3. The fuse wire 18 may then be threaded through the aperture 24 in the mounting piece and the aperture 34 in the alarm spring 14 and soldered to the arm 26 of the alarm spring at 55, after which the indicator spring 16 and the alarm spring 14 may be flexed to their closed position, as shown in Fig. 2, and the other end of the fuse wire 18 soldered as at 56 to the portion 52 of the indicator spring 16.

In Fig. 2 the alarm structure is shown in a typical installation with the terminal 28 of the alarm spring held in engagement with a main bus bar 60 by a fastening screw 61, and the terminal portion 38 of the indicator spring 16 is held in engagement with a post 62 by a fastening screw 63. The bus bar 60 and the post 62 are mounted on an insulating panel 66 which also supports a bus bar 68 positioned under the end of the arm 26 of alarm spring 14. The bus bar 60 is a main or battery bus bar which may be connected to a battery or other source of power, and the bus bar 68 is an auxiliary or alarm bus bar which is connected to an alarm means such as a belt or lamp. The post 62 is provided with a terminal 69 for connection to the circuit which is to be protected by the fuse device 10. It will be seen that with the fuse structure 10 in the closed position, as shown in Fig. 2, the flag 48 of the indicator spring is held in engagement with the mounting strip 12, and the alarm spring is held in spaced relation to the bus bar 68 and that electric current may flow from the bus bar 60 through the fuse 10 to the terminal post 62. In response to an overload surge of current the fuse wire 18 melts and releases the springs 14 and 16, the alarm spring 14 of which moves into engagement with the alarm bus bar 68 and the indicator spring 16 of which moves the flag 48 outwardly from the mounting strip 12 into a position where it may readily be observed. The signal flag 48 in its open position, as indicated in dotted lines in Fig. 2, because of its channel shape providing wall portions in angular relation to each other is clearly visible from various angles and readily permits the identification of the fuse which is opened.

It is to be understood that the above-described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. An alarm fuse comprising a mounting strip of insulating material, an alarm spring, means for securing one end of said alarm spring to one side and one end of said mounting strip to form a terminal member, said alarm spring having its other end spaced from said mounting strip and adapted to be flexed toward said strip to a closed position, an indicator spring having end portions bent perpendicularly in opposite directions to an intermediate shank portion thereof, means for securing one end of said indicator spring to the opposite side and the opposite end of said mounting strip to form a terminal member and to support the indicator spring with the shank portion thereof extending transversely to said mounting strip in an open position and with the free end thereof spaced from the mounting strip and forming a signal element, said indicator spring being capable of being flexed to a closed position with the end of the signal element in engagement with said mounting strip, and a fusible member connected to said alarm spring and said indicator springs for holding said springs flexed in closed position.

2. An alarm fuse comprising an insulating strip, a sheet metal alarm spring, means for securing one end of said alarm spring to one side of said insulating strip to form a terminal member, said alarm spring having its other end spaced from said insulating strip and adapted to be flexed toward said strip to a closed position, a sheet metal indicator spring having end portions bent transversely to an intermediate shank portion thereof, means for securing one end of said indicator spring to the opposite side of said insulating strip to form a terminal member and to support the indicator spring with the shank portion thereof extending transversely to said insulating strip in an open position and with the free end thereof forming a signal flag, said signal flag having a first wall portion extending perpendicularly from said shank portion along a line disposed obliquely to the longitudinal center line of said indicator spring and provided with a bonding surface adjacent said shank portion and substantially along the center line of said indicator spring, said signal flag having a second wall portion extending perpendicularly to said shank portion and transversely from said first wall portion, said indicator spring being capable of being flexed to a closed position with the end of the flag in engagement with said insulating strip, and a fuse wire bonded to said alarm spring and to said bonding surface of said indicator spring for holding said springs flexed in closed position.

3. An alarm fuse comprising a flat mounting strip of insulating material, a single piece alarm spring having one end forming a terminal secured to the mounting strip and having its other end spaced from said mounting strip and capable of being flexed toward said strip to a predetermined closed position, a single piece indicator spring having end portions bent in opposite directions perpendicular to the intermediate portion thereof to form a terminal portion and a signal flag thereon, said terminal portion being secured to the mounting strip to support the indicator spring in its open position with the intermediate portion thereof transverse to the insulating strip, said signal flag being bent along a line oblique to the longitudinal center line of said spring to position a portion of said flag obliquely to said longitudinal center line, said flag being bent intermediate its edges along a line perpendicular

to said intermediate portion of the spring to provide portions thereof at an angle to said obliquely disposed portion, said indicator spring being flexed from its open position to a predetermined position with the end of the flag in engagement with said mounting strip, and a fuse element connected to and holding said springs in closed position.

4. An alarm fuse comprising an insulating strip, a single piece alarm spring having one end thereof forming a terminal encircling the insulating strip to attach said spring thereto and having its other end normally spaced from said insulating strip and movable under tension toward said strip to a closed position, a single piece indicator spring having end portions bent in opposite directions transversely to an intermediate shank portion thereof and having one end forming a terminal encircling said insulating strip to secure said indicating spring thereon with the shank portion disposed transversely to said strip in an open position, the other end of said indicator strip forming a signal flag, said indicator spring being capable of being flexed to a closed position with the end of the flag in engagement with the insulating strip, and a fuse wire connected to said alarm and indicator springs for holding said springs under tension in closed position.

5. An alarm fuse comprising an insulating strip having an aperture therein, a one-piece sheet metal alarm spring having one end forming a terminal secured to the insulating strip for supporting said alarm spring on one side of said strip and having its other end spaced from said insulating strip and capable of being flexed toward said strip to a predetermined closed position, a one-piece sheet metal indicator spring having end portions thereof bent in opposite directions perpendicular to the intermediate portion to form a terminal and a signal flag on opposite ends

thereon, said terminal being secured to the insulating strip to support the indicator spring on the other side of said strip and in an open position with the flag in spaced relation to the insulating strip, said flag being connected to said intermediate portion of the spring along a line oblique to the longitudinal center line of the spring to position a portion of said flag obliquely relative to said center line and to provide a laterally accessible bonding surface disposed substantially along said center line of said indicator spring, said flag being channel-shaped in cross section along an axis perpendicular to said intermediate portion in open position, said indicator spring being flexed from its open position to a predetermined closed position with the end of the flag engaging said insulator strip, and a fuse wire extending through the aperture in said strip and having one end thereof connected to said alarm spring and its other end bonded to said bonding surface of said indicating spring substantially along the center line of said spring for holding said springs under tension in closed position.

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