May 16, 1961 L. W. JACOBS 2,984,723

FUSE CLIP ASSEMBLY

Filed Nov. 20, 1959

Fig. 1.

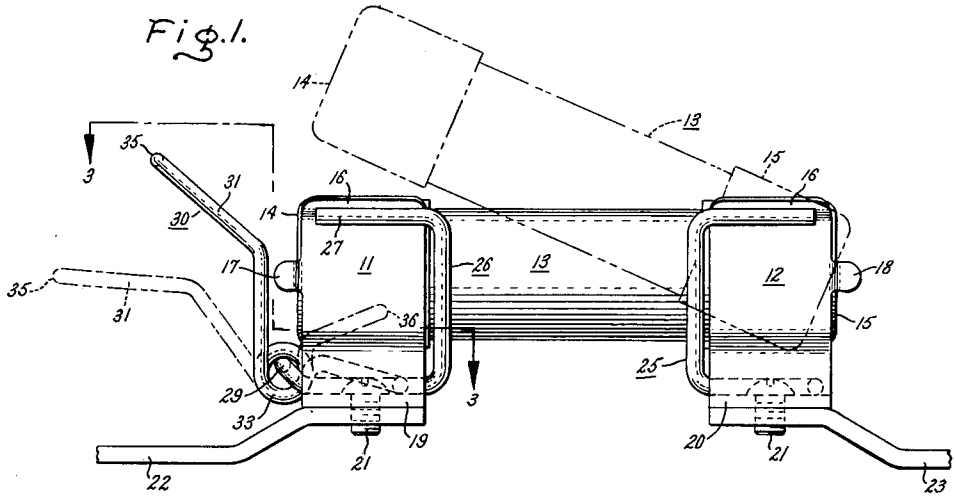


Fig. 2.

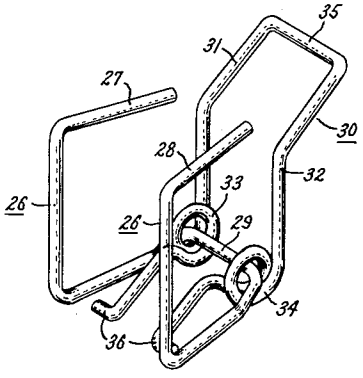
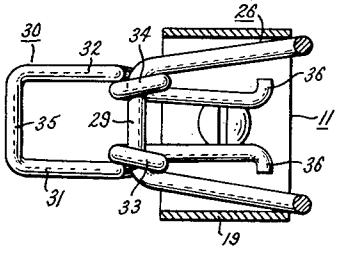


Fig. 3.



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7 Claims. (Cl. 200—113)

This invention relates to fuse clips and more particularly to reinforced fuse clips having manually operable means provided for ejecting a cartridge fuse therefrom.

The present invention employs two principal concepts, each of which singly has been generally familiar in the art. The first of these concepts involves the employment of auxiliary reinforcing means applied to a fuse clip to lend increased strength to it to avoid loss of resilience of the fuse clip in use and to insure positive contact pressure on a fuse ferrule inserted therein. The second concept involves the use of a lever-like fuse extractor in combination with the fuse clip to aid in removing a blown fuse therefrom for the substitution of a new fuse. In reinforced fuse clips it is particularly advantageous to have some provision for aiding the removal of fuses because of the increased frictional force exerted on the fuse ferrule, tending to impede such removal. Nevertheless, the employment of reinforcing means and fuse extracting arrangements have in the past been carried out independently of one another with independent and separable means for each purpose.

It is an object of this invention to provide a reinforced ejector fuse clip of a convenient and simple form in which the elements employed for the reinforcement of the clip and for the removal of the fuse from the clip cooperate with each other to reduce the total number of parts required.

It is a further object of this invention to provide a combination of a reinforcing member and fuse ejector which may be readily assembled on an existing fuse clip either at the time of its manufacture or at any time thereafter.

By way of a brief summary of a preferred embodiment of this invention, a fuse clip of a generally conventional U-shaped form is provided having a base portion adapted to be mounted on a mounting surface and a pair of contact arms bowed to accept a cylindrical fuse ferrule therebetween. The upper end of the bowed arms are flared outwardly somewhat to ease the insertion of a fuse ferrule. Backing up the sheet metal fuse clips is a reinforcing member preferably of spring material and generally of a U-shape conforming to the shape of the fuse clip. The end portions of the reinforcing member terminate in spaced fingers situated within the concave outer surfaces of the flared outer portions of the reinforcing member. The fuse ejector is provided in the form of a lever shaped of spring wire stock looped about the bottommost portion of the reinforcing member and rotatable thereabout. The combination of the reinforcing member and fuse ejector thus constitutes, in a preferred embodiment, an efficient assembly comprising but two easily fashioned parts readily assembled on an existing fuse clip.

Further objects of this invention as well as additional details and advantages will be more clearly perceived with reference to the following more detailed description taken together with the accompanying drawings wherein:

Fig. 1 is a side view of a pair of fuse clip assemblies, one of which is constructed in accordance with this invention, and showing a cartridge fuse inserted therein;

Fig. 2 is a perspective view of the reinforcing member and the fuse ejector shown in Fig. 1; and

Fig. 3 is a plan view partly in section taken on the line 3—3 of Fig. 1.

Fig. 1 shows a pair of fuse clips **11** and **12** having a cartridge fuse **13** inserted therein. The fuse has cylindrical ferrules **14** and **15** at each end which are inserted within the fuse clips. The fuse clips are therefore formed generally in the shape of a U with two arms bowed outwardly to conform to the outer configuration of the ferrules. The outer ends of the two arms of each fuse clip are, however, curved in a reverse direction at **16** to give them an outward flare, thereby to ease the insertion of the fuse ferrule. Each fuse clip has at one side bent over lugs **17** and **18** to prevent the insertion of larger fuses than should be inserted and to prevent properly rated fuses from slipping out the ends of the fuse clips. The fuse clips are attached at their base portions **19** and **20** by threaded members **21**, or otherwise as desired, to electrically conductive terminals **22** and **23** which provide mounting means and terminal means for connection of the fuse in a circuit to be protected.

Reinforcement for the fuse clip **11** is provided by a one-piece reinforcing member **26** of spring wire generally in the shape of a U as best seen in Fig. 2. This reinforcing member conforms in shape to the fuse clip in order not to interfere with the insertion of removal of fuses and terminates in a pair of spaced-apart fingers **22** and **23** which embrace the concave outer surfaces of the outwardly flared portions **16** at the top of the fuse clip. Since the reinforcing member is of spring material with a predetermined "set" to it, it exerts a strong bias to back up the fuse clip and to provide increased contact pressure on the fuse ferrule. Although the ends of the spaced-apart arms of the reinforcing member are thus situated on the outside, as it were, of the fuse clip, the bight or cross portion **29** of this U-shaped member is bent backwardly between the spaced-apart arms of the fuse clip. Fuse clip **12** is also provided with a reinforcing member **25** generally similar in shape to the reinforcing member **26**, but this element by itself is not the subject matter of the present invention.

In the preferred embodiment shown the one-piece ejector lever **30** is also formed of wire spring material and is bent double to form two co-extensive portions **31** and **32**. These two portions are loosely looped at **33** and **34** about opposite ends of the bight portion **29** of the reinforcing member **26** to pivot thereon. One end of the lever forms a convenient handle **35** for manipulation of the lever while the other end with its outwardly bent lugs **36** is positioned to bear against and exert force upon fuse ferrule **14** to eject it from the clip. By forming the fuse ejecting lever of two co-extensive portions as shown, the relative relationships of the parts are maintained and the lever is prevented from slipping around and off the ends of the reinforcing member **26**. The combination of a reinforcing member and a fuse ejector as shown in Fig. 2 may obviously be assembled easily on a fuse clip of the type shown in Fig. 1 at any time, even after the fuse clip has been mounted permanently in a piece of electrical equipment. Once on the fuse clip it provides extra contact pressure to establish good contact fidelity between the clip and a fuse ferrule inserted therein. To remove the fuse from its clip all that is required is to exert a downward force on the fuse handle **35** as shown in Fig. 1, whereupon the opposite end of the fuse ejecting lever will force the fuse ferrule up and out of the clip. The fuse **13** and the fuse ejecting lever **30** will then occupy the positions shown in broken lines in Fig. 1. Since the fuse ejecting lever is in the nature of a

torsion spring, its resilience allows the lever to flex somewhat, permitting the application of maximum ejecting forces for the short distance traveled while avoiding the possibility that the lever might fracture in use.

Although I have illustrated but one preferred embodiment to illustrate this invention certain variations in form will doubtless occur to those skilled in the art to which this invention pertains. For example, although the fuse clips shown are of a type adapted to receive cylindrical fuse ferrules, they might also be adapted to receive blade type fuse terminals as well. I therefore intend to cover by the following claims all such variations as fall within the true spirit and scope of this invention.

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

1. A fuse clip assembly comprising: a U-shaped clip of sheet metal for engaging and frictionally retaining a fuse element inserted therein; a reinforcing spring member having a pair of spaced arms embracing said clip and a bight portion joining said arms; and an ejector lever pivoted on said bight portion for ejecting a fuse element inserted in said clip.

2. A fuse clip assembly comprising: a U-shaped clip of sheet metal having a base portion and a pair of contact arms for engaging and frictionally retaining a fuse element therebetween; a reinforcing spring member conforming to the shape of said clip comprising a bight portion adjacent the base portion of said clip and a pair of resilient arms embracing and reinforcing the contact arms of said clip; and an ejector lever pivoted on said bight portion for ejecting a fuse element inserted within said clip.

3. A fuse clip assembly comprising: a U-shaped clip of sheet metal having a base portion and a pair of contact arms for engaging and frictionally retaining a fuse element therebetween; a one-piece reinforcing wire spring element generally in the shape of a U with a bight portion adjacent the base portion of said clip and a pair of resilient arms embracing and reinforcing the contact arms of said clip; and a one-piece ejector lever of wire spring material looped about the bight portion of said reinforcing element to pivot thereon and having at one end a handle and at the other end a force exerting portion for bearing against and ejecting a fuse element inserted within said clip.

4. A fuse clip assembly comprising: a U-shaped clip of sheet metal having a base portion and a pair of contact arms for engaging and frictionally retaining a fuse element therebetween; a one-piece reinforcing wire spring element generally in the shape of a U with a bight portion adjacent the base portion of said clip and a pair of resilient arms embracing and reinforcing the contact arms

of said clip; and a one-piece ejector lever of wire spring material bent double to form two co-extensive parts, said parts being looped about the bight portion of said reinforcing member at opposite ends thereof to pivot thereon, one end of said lever forming a manually operable handle, and the other end of said lever being positioned to bear against and eject a fuse element inserted within said clip.

5. A reinforcing fuse ejector assembly for application to a fuse clip which has a base portion and a pair of contact arms for engaging and frictionally retaining a fuse element inserted therein comprising: a reinforcing spring member having a pair of spaced arms for embracing said clip and a bight portion joining said arms; and an ejector lever pivoted on said bight portion for ejecting a fuse element inserted within said clip.

6. A reinforcing fuse ejector assembly for application to a fuse clip which has a base portion and a pair of contact arms for engaging and frictionally retaining a fuse element inserted therein comprising: a one-piece reinforcing wire spring element generally in the shape of a U with a bight portion for mounting adjacent the base portion of said clip and a pair of resilient arms for embracing and reinforcing the contact arms of said clip; and a one-piece ejector lever of wire spring material looped about the bight portion of said reinforcing element to pivot thereon and having at one end a manually operable handle and at the other end a force exerting portion for bearing against and ejecting a fuse element inserted within said clip.

7. A reinforcing fuse ejector assembly for application to a fuse clip which has a base portion and a pair of contact arms for engaging and frictionally retaining a fuse element inserted therein comprising: a one-piece reinforcing wire spring element generally in the shape of a U with a bight portion for mounting adjacent the base portion of said clip and a pair of resilient arms for embracing and reinforcing the contact arms of said clip; and a one-piece ejector lever of wire spring material bent double to form two co-extensive parts, said parts being looped about the bight portion of said reinforcing member at opposite ends thereof to pivot thereon, one end of said lever forming a manually operable handle, and the other end being positioned to bear against and eject a fuse element inserted within said clip.

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