June 8, 1943. A. F. BAHLKE ET AL 2,321,271

FUSE HOLDERS

Filed May 13, 1942

Fig. 2.

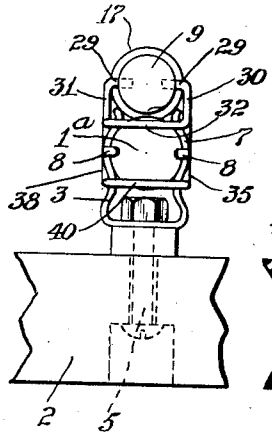


Fig. 1.

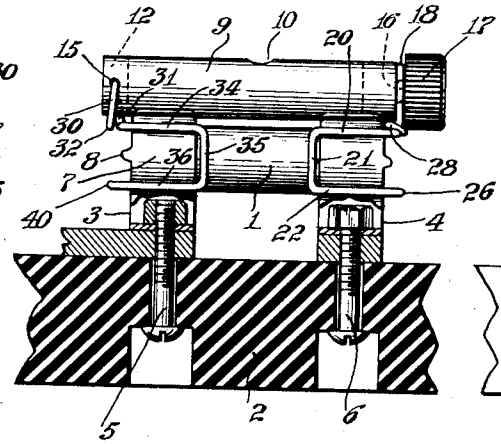


Fig. 3.

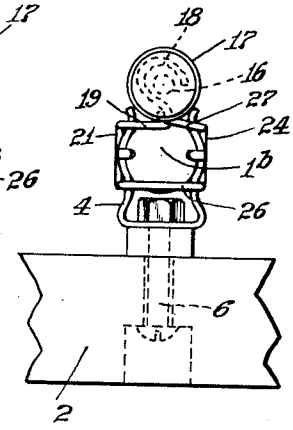


Fig. 4.

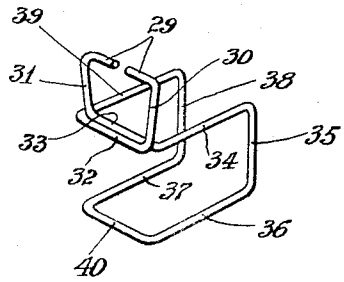


Fig. 5.

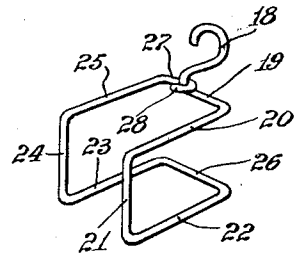


Fig. 7.

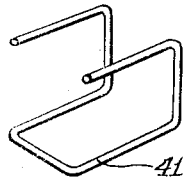


Fig. 6.

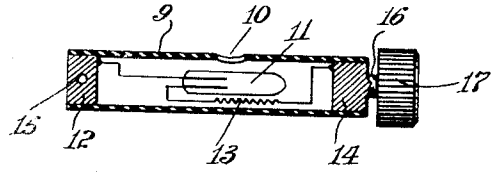
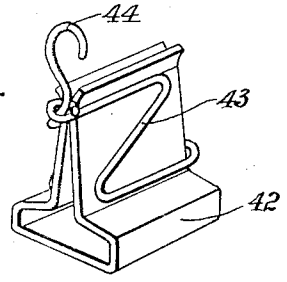


Fig. 8.



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FUSE HOLDER

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Application May 13, 1942, Serial No. 442,794

11 Claims. (Cl. 200—134)

This invention relates to new and useful improvements in fuse holders and more particularly to holders for fuses combined with visual indicators which can be readily combined with existing fuse panels.

In accordance with the present invention, the customary fuse holder is reinforced with a resilient clip which can be readily attached thereto and prevents the forcing out of the fuse when the structure is subjected to shocks.

The clips are, in accordance with one feature of the invention, so shaped that a visual indicator may be securely and quickly attached to the customary fuse holders and aids to hold in place a cartridge fuse when subjected to high impact shocks.

These and other features will more readily appear from the following detailed description of a preferred embodiment of the invention and the appended claims.

In the drawing

Fig. 1 is a side elevation partly in cross-section of the fuse indicator;

Fig. 2 is one end view;

Fig. 3 is a view of the opposite end;

Figs. 4 and 5 are perspectives of the wire clips by means of which the indicator is mounted on the fuse holders;

Fig. 6 is a longitudinal cross-section of the indicator;

Fig. 7 is a perspective view of a clip used in structures without indicators; and

Fig. 8 is a holder and clip for knife blade type of fuses.

Referring first to Figs. 1–6, a fuse cartridge 1 is mounted on a panel of insulating material 2 by means of two flat phosphor-bronze open ended clips or holders 3 and 4. The holders 3 and 4 are fastened to the panel 2 by means of screws 5 and 6, constituting the two terminals of the circuit, and are bent into a U-shape within which the metal ferrules 1*a*, 1*b* at the ends of the fuse cartridge are gripped. The legs of the holders are curved out as indicated at 7 to conform to the radius of the fuse ferrules 1*a*, 1*b* and have turned-in tabs 8 to prevent the longitudinal movement of the fuse. The foregoing describes the customary fuse panel.

The indicator consists of a casing sleeve 9 of insulating material having a central window or opening 10. The casing 9 is longer than the fuse 1 and the space between 3 and 4 and encloses a small electric lamp, e. g., a neon discharge tube 11 provided with the customary two electrodes. One of the electrodes of the lamp 11 is connected with a metal plug 12 in one end of the sleeve 9 and the other electrode is connected over a resistor 13 with a metal plug 14 in the other end of the sleeve. The sleeve has two diametrically opposed perforations and aligned perforations in plug 12, as indicated at 15, through which contact may be established with the plug. The plug 14 has a screwthreaded stud 16 projecting from it and a knob 17 of insulating material is screwed on the stud.

There are two attaching clips by means of which the indicator 9 may be resiliently and detachably mounted on the fuse holders 3 and 4. One of these clips is shown in Fig. 4 and is arranged pivotally to hold the end 15 of the indicator, and the other clip is shown in Fig. 5 and is adapted to lock the end 14 of the indicator. The two clips, Figs. 4 and 5, are shaped out of resilient wire so as to embrace the fuse holders 3 and 4 and securely hold together their legs thus locking the fuse 1 in the fuse holders 3 and 4 even when subjected to high impact shocks.

The two clips are shaped out of resilient wire or formed out of metal stamping that will regain its shape after distortion to embrace with their transverse arms the resilient legs of the fuse holders 3 and 4 and tend to press together the legs to strengthen the grip on the fuse 1 and prevent its being forced out as a consequence of impact shock.

Referring first to Fig. 5, the wire clip for holding the end 14 of the indicator 9 is arranged to be mounted on fuse holder 4. One end of the wire is bent into an S 18 which hooks over the screwthreaded stud 16. The tip of the S 18 is out of line with the body thereof whereby the end hooking over 16 and clamped between knob 17 and casing 9 functions as a spring lock washer. The body of the wire is formed into an elbow 19 and is then bent into two parallel branches, one consisting of 20, 21, 22 and the other of 23, 24, 25. The two branches are interconnected by horizontal arm 26. The horizontal legs 20, 22, 23 and 25 of the two branches lie in grooves of the holder 4. The end of the wire is bent at right-angles to form an arm 27 and is hooked over the juncture between 18 and 19 as indicated at 28.

It will be seen that the two parallel branches of the clip are yieldingly linked with one another at 28 so that the fuse 1 can be pushed in the holder 4 and again pulled out without removing the wire clip, the branches 19, 27 and the hook

18 leaving free the passage to holder 4. The vertical branches 21, 24 and 35, 38 of the two clips will, when the clips are pushed in place, snap over the edges of the holders 3 and 4 and thus prevent the removal of the clips without compressing the legs of the holders.

The clip for the other end of the indicator 9 (Fig. 4) has its ends 29 pointed towards one another. They fit into the holes 15 of the sleeve 9 and make contact with the metal plug 12. The wire is then brought down in parallel vertical legs 30, 31 and bent in adjacent horizontal branches 32, 33. From this point the clip is shaped the same as the first mentioned clip forming two parallel branches 34, 35, 36 and 37, 38, 39 which are interconnected at 40 and embrace the holder 3 in the same manner as described in connection with holder 4. The two branches of this clip are also positioned in grooves of the holder 3 but they are free to expand and contract so as to allow the insertion and removal of fuses.

The casing 9 may be swung around the pivot formed by the clip ends 29 which are outside of the space between holders 3 and 4 and thus allow free access to the fuse.

The device may be readily applied to existing fuse panels by slipping the clips over the fuse holders either vertically or horizontally, pivoting the casing 9 on ends 29, swinging the casing into horizontal position in which it is parallel with the fuse 1, placing the hook 18 over stud 16 and clamping it in position by screwing-down knob 17. The clip shown in Fig. 4 will on account of the overlapping relationship of legs 32, 33 exert a pressure on the indicator casing 9 so as to force stud 16 into the hook 18 once the latter is snapped over the former. The fuse 1 is now additionally locked in position and its removal from the holders 3 and 4 is blocked by the casing 9. Both the indicator and the fuse are so firmly anchored as to prevent their displacement under high impact shocks. As the legs of holder 3 are forced apart by the impact, the points 29 of the clip will be forced together more tightly to grasp indicator 9.

By controlling the spacing of the open ends of 29 (Fig. 4), one may control the extent to which arms 34 and 39 will spread. This makes it possible to lock fuse 1 in fuse holder 3 without the aid of indicator 9.

Likewise, the spread of arms 20 and 25 (Fig. 5) is controlled by the clearance allowed at juncture 28, which connects arms 19 and 27. This control makes it possible to lock fuse 1 in fuse holder 4 without the aid of indicator 9.

If it is desired to dispense with the use of the indicator, then the holders 3 and 4 may be equipped with wire clips like 41 shown in Fig. 7.

When the fuse 1 burns-out and interrupts the low resistance path which such fuses conventionally provide, then the lamp 11 will light by current flowing from holder 3 over the wire clip, plug 12, the lamp 11, resistance 13, plug 14, stud 16, the second wire clip and holder 4. When the lighted lamp is observed through the window 10 the knob 17 is loosened and the stud 16 is removed from under hook 18. The casing 9 may now be freely swung around the pivot 29 to allow the replacement of the burnt-out fuse by a new fuse. After the fuse retaining indicator is installed on the fuse holders, which can be accomplished without the use of any tools, there are no loose parts to drop off, or come off in the hands of the person changing blown fuses.

The invention is applicable to fuse panels equipped with cartridge fuses of many types and may be also otherwise modified as will be obvious to those skilled in the art. For instance, Fig. 8 illustrates the application of the invention to holders of knife blade type of fuses. Holder 42 is gripped in clip 43 corresponding to the clip shown in Fig. 5 and equipped with a hook 44 performing the same function as hook 18.

What we claim is:

1. In a fuse indicator, a pair of circuit terminals, a fuse frictionally held in connection with the terminals but removable therefrom, an electric lamp, a casing enclosing said lamp and blocking the removal of the fuse from the terminals, a pivotal mounting for said casing on one of said terminals around which the casing may be swung to allow free removal of the fuse, a lock on the other terminal for holding said casing in the fuse blocking position, and an electrical connection for said lamp to said terminals including said lock and pivotal mounting.

2. In a fuse indicator, a pair of circuit terminals, a fuse frictionally held in connection with the terminals but removable therefrom, an electric lamp, a casing enclosing said lamp and blocking the removal of the fuse from the terminals, a removable pivotal mounting for said casing frictionally held on one of said terminals and about which the casing may be swung to allow free removal of the fuse, a lock frictionally held on the other terminal for holding said casing parallel with the fuse and blocking its removal, and an electrical connection for said lamp to said terminals including said lock and pivotal mounting.

3. In a fuse indicator, a pair of circuit terminals, a fuse frictionally held in connection with the terminals but removable therefrom, an electric lamp, an oblong casing enclosing said lamp and blocking the removal of the fuse from the terminals, said casing being of greater length than the distance between the terminals, a pivotal mounting for said casing on one of said terminals consisting of spring wire frictionally held on the terminal and having pivot points projecting in perforations at one end of the casing, a lock on the other terminal for holding said casing, said lock consisting of spring wire frictionally held on the other terminal and having a resilient looped portion arranged to engage the other end of the casing, and an electrical connection for said lamp to said terminals including said lock and pivotal mounting.

4. In combination, a fuse, two circuit terminals each having a holder for said fuse, a resilient clip for each holder and having parallel branches gripping the holder, an indicator comprising a casing and an electric lamp therein, a pivotal mounting for one end of said casing formed by one clip, a lock for the other end of said sleeve formed by the other clip, and an electrical connection between the lamp and the two clips.

5. In combination, a fuse, two circuit terminals each having a resilient holder for said fuse, a spring clip for each holder and having parallel branches gripping the holder, an indicator comprising a casing and an electric lamp therein, a pivoted mounting for one end of said casing formed by one clip outside of the space between the two terminals, a lock for the other end of said sleeve formed by the other clip outside of the space between the two terminals, and an electrical connection between the lamp and the two clips.

6. In combination, two circuit terminals, a

cylindrical fuse, two U-shaped spring holders, one for each terminal, gripping between their legs said fuse, a resilient clip of wire for each holder and having parallel branches tending to press together the legs of the holder, one end of the wire of which one of the clips is formed being hooked, the two ends of the wire of which the second clip is formed being aligned and pointed towards one another, a sleeve of insulating material having diametrically opposed perforations near one end into which the ends of the second clip project to form a pivot, a first contact in the last mentioned end of said sleeve engaged by the clip ends projecting through said perforations, a second contact in the opposite end of said sleeve and having a projecting stud held by the hooked end of the first clip, an electric lamp in said sleeve, and an electrical connection between the lamp and the two contacts including a resistor.

7. In combination, two circuit terminals, a cylindrical fuse having contacts at its ends, a U-shaped spring holder for each terminal gripping between its legs a contact, a resilient clip of wire for each holder and having parallel branches partially surrounding and tending to press together the legs of the holder, one end of the wire of which one of the clips is formed being hooked and the other end twisted about said one end below the hook, the two ends of the wire of which the second clip is formed being aligned and pointed towards one another, a sleeve of insulating material of greater length than said fuse and having a window near its center and diametrically opposed perforations near one end into which the ends of the second clip project to permit the swinging of said sleeve about the pivot points formed by the wire ends, a first metal plug in the last mentioned end of said sleeve engaged by the clip ends projecting through said perforations, a second metal plug in the opposite end of said sleeve, a screw-threaded stud projecting from the last mentioned plug and partly encircled by the hooked end of the first clip to hold the sleeve parallel with the fuse and so close thereto as to block its removal from the holders, a screw-threaded knob engaging said stud, an electric lamp in said sleeve, and an electrical connection between the lamp and the two metal plugs including a resistor.

8. In combination, a fuse cartridge, a pair of circuit terminals each including a holder having open ended resilient legs between which the fuse is held removable through the open ends, a detachable spring clip for each holder pressing the sides of the legs together while leaving the ends open to prevent the fuse from being forced out by impact shock and yet permitting the removal of the fuse and its replacement without disturbing the clips, and a visual indicator detachably mounted on the clips.

9. In combination, a fuse cartridge, a pair of circuit terminals each including a holder having open ended resilient legs between which the fuse is held removable through the open ends, a detachable spring clip for each holder each clip having arms transverse to the legs and pressing their sides together while leaving the ends open, projections on the arms to prevent removal of the clips without compressing the legs of the holders, and a visual indicator detachably mounted on the clips.

10. In combination, a fuse cartridge, a pair of circuit terminals each including a holder having resilient open ended legs between which the fuse is held removable through the open ends, a detachable spring clip for each holder pressing the sides of the legs together while leaving the ends open to prevent the fuse from being forced out by impact shock and yet permitting the removal of the fuse and its replacement without disturbing the clips, one of said clips having two aligned pivoting points projecting outside of the plane of the holder and tending to approach one another as the holder legs are spread apart, a visual indicator gripped between said pivoting points, and means for fastening said indicator to the other clip.

11. In combination, a fuse cartridge, a pair of circuit terminals each including a holder having resilient legs between which the fuse is removably held, a detachable spring clip for each holder pressing the legs together to prevent the fuse from being forced out by impact shock, a visual indicator including an oblong casing, a pivotal mounting for one end of the casing on one clip, a hook projecting from the other clip and a stud projecting from the other end of said casing in cooperative relation with said hook, said one clip tending to move the casing to press the stud into engagement with the hook.

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