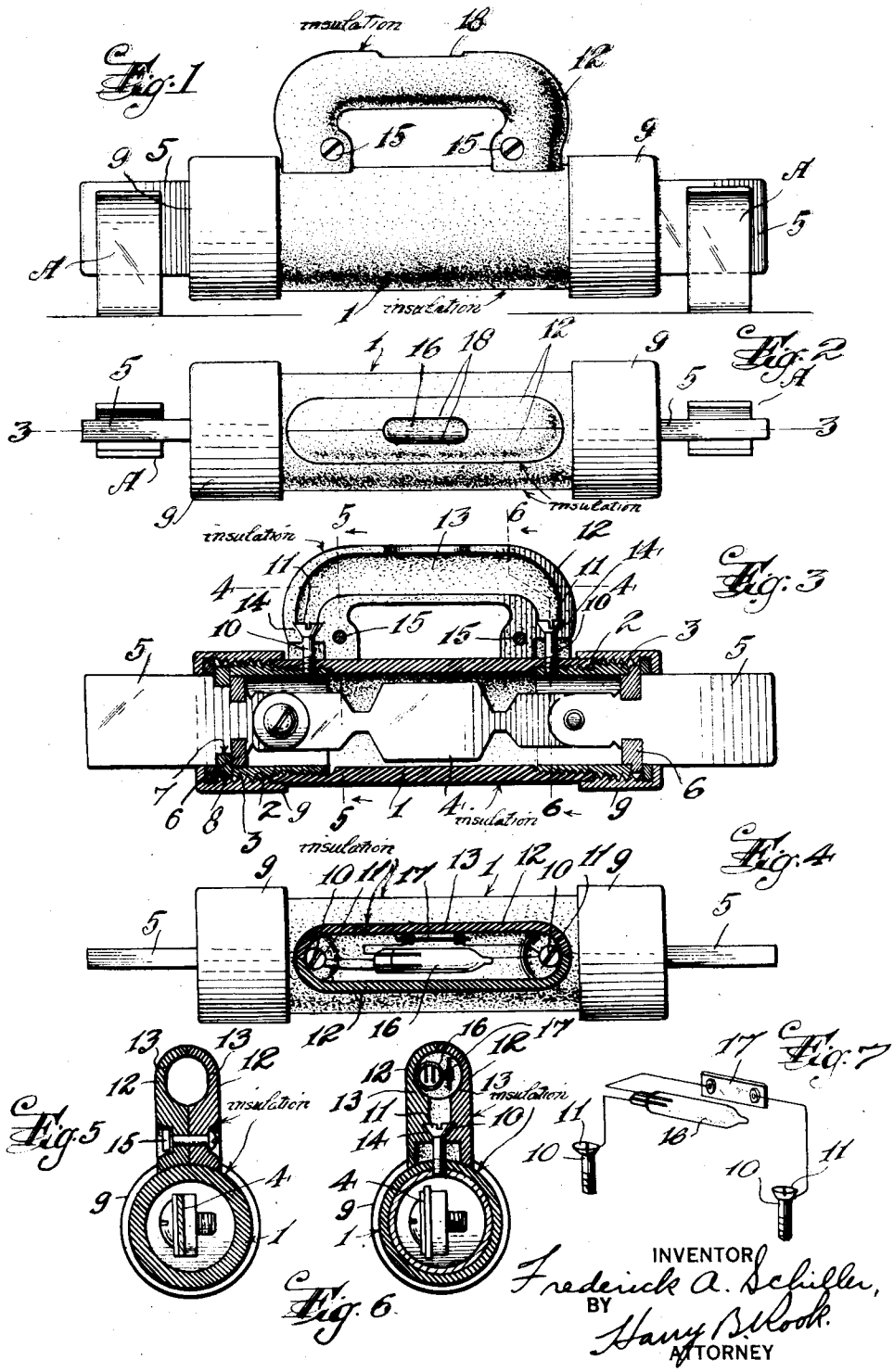
Oct. 10, 1939. F. A. SCHILLER 2,175,919

INDICATING FUSE

Filed Aug. 5, 1936 2 Sheets-Sheet 1



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INDICATING FUSE

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Fig. 8

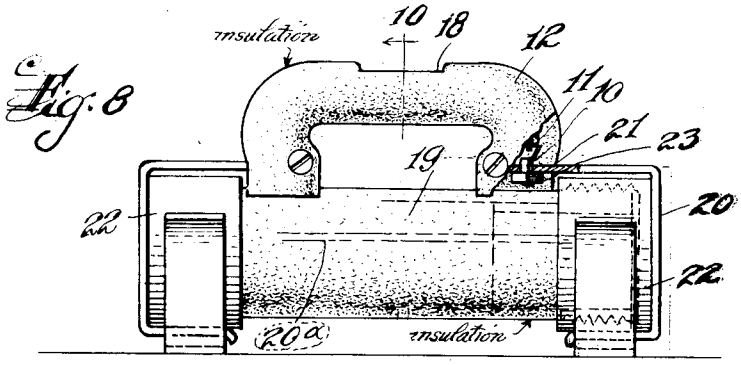


Fig. 9

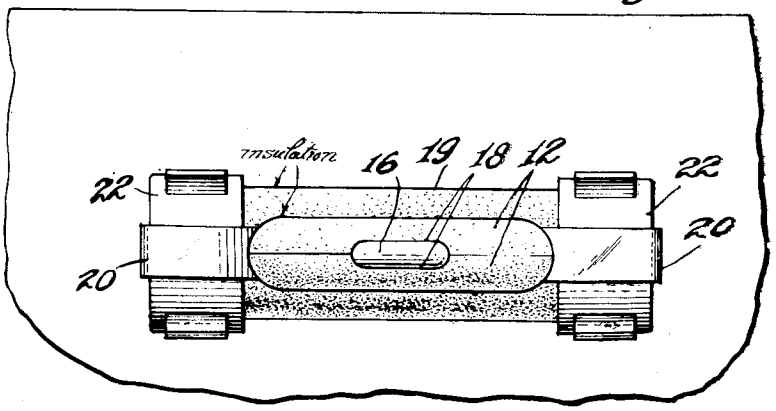


Fig. 11

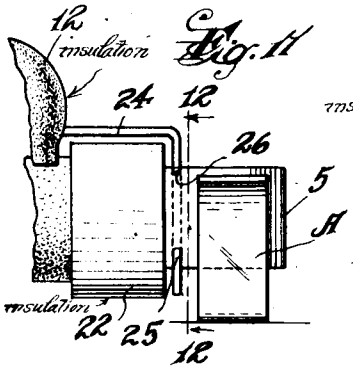


Fig. 10

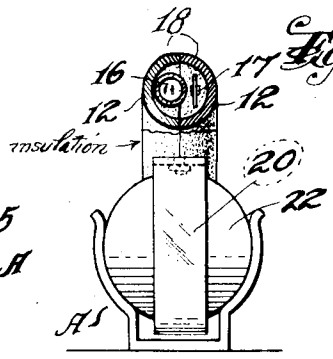
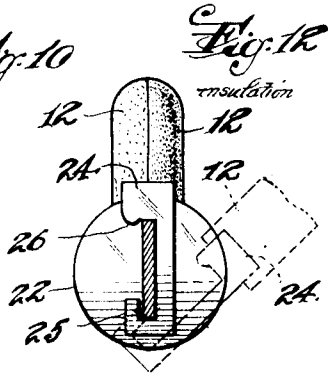


Fig. 12



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UNITED STATES PATENT OFFICE

2,175,919

INDICATING FUSE

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Application August 5, 1936, Serial No. 94,323

11 Claims. (Cl. 200—121)

This invention relates in general to electric fuses, and especially to fuses of the cartridge type, one object of the invention being to provide novel and improved means for indicating the integrity of the fusible element of the fuse, that is to indicate rupture of the fuse as the result of the passage of abnormal current therethrough.

Another object of the invention is to provide a fuse of this character which shall include a simple and inexpensive visible indicator which can be easily and quickly physically and electrically connected to the fuse.

A further object is to provide an integrity indicating unit for electrical fuses which shall comprise a case including separably connected complemental sections forming a chamber between them in which is mounted electrical indicating means, and means for connecting the indicating means with the terminals of the fuse which shall include a pair of parts separably clamped and held between the casing sections, whereby simplicity of structure, assembly of parts and connection of the indicating unit to a fuse, shall be achieved.

Another object is to provide a combination of fuse and integrity indicator of the character described wherein a common means is utilized for physically and electrically connecting the indicating means of the indicator to the terminals of the fusible element.

Other objects are to provide an indicator unit which shall comprise a casing formed of a plurality of complemental sections and having an electrical indicating means such as a glow lamp within the casing, and electrical conducting parts clamped between and interlocked with the casing sections for either directly connecting the indicator casing to a fuse or connecting the casing to clips or the like for releasable engagement with the terminals of a fuse, the said electrical conducting means also serving to connect the electrical indicating means to the fuse terminals, and to obtain other advantages and results as will be brought out by the following description.

Referring to the accompanying drawings in which corresponding and like parts are designated throughout the several views by the same reference characters,

Figure 1 is a side elevation of a combination cartridge fuse and integrity indicator embodying my invention.

Figure 2 is a top plan view thereof.

Figure 3 is a vertical longitudinal sectional view on the line 3—3 of Figure 2.

Figure 4 is a horizontal sectional view on the line 4—4 of Figure 3.

Figures 5 and 6 are transverse sectional views on the lines 5—5 and 6—6 of Figure 3.

Figure 7 is a wiring diagram showing the connection of the electrical indicating means to the electrical conducting members of the indicator unit.

Figure 8 is a side elevation of another type of cartridge fuse and an indicator unit embodying a modification of the invention releasably connected to the fuse.

Figure 9 is a top plan view of the structure shown in Figure 8.

Figure 10 is a transverse sectional view on the line 10—10 of Figure 8, the fuse being shown in end elevation.

Figure 11 is a fragmentary side elevation of one end of a cartridge fuse of the form shown in Figure 1, and a modification of the means for releasably connecting the indicator unit to the fuse, and

Figure 12 is a sectional view on the line 12—12 of Figure 11.

Specifically describing the invention, for the purposes of illustration I have shown the invention in connection with a known type of cartridge fuse, although the invention is susceptible of use with other types of fuses.

Referring to Figures 1 to 7 inclusive the reference character 1 designates a tubular housing of insulating material in each end of which is fitted a sleeve or bushing 2 of electricity conducting material having one end 3 projecting from the housing and connected to the terminals of a fusible element 4 arranged within the casing. As shown, the fusible element has connected to each end a blade 5 for engagement with a terminal clip on an insulating block of the usual nature, for example such as the clip A. Secured to each blade is a collar 6, and one blade has notches 7 cooperating with keepers 8 hinged to the corresponding bushing 3 for holding the fusible element and blades against longitudinal movement in the housing. Terminal caps 9 of known construction are threaded upon the outer ends of the sleeves 3. The fuse structure so far described is old in the art and no claim to novelty is made thereon.

Heretofore, the sleeves 2 have been held against removal from the housing 1 by pins or rivets passing through the housing and the inner portions of the sleeves, but in accordance with my invention I eliminate the necessity for such pins and utilize in place thereof conducting ele-

ments which also serve to electrically connect an electrical fuse integrity indicating means to the terminals of the fuse. Specifically I have shown a pair of screws 10 threaded through the housing 1 and each physically and electrically connected to one sleeve 2, the heads 11 of the screws projecting from the exterior of the housing 1. These conducting elements or screws 10 also serve to physically connect the casing of my integrity indicator to the fuse housing. As shown, said casing comprises two identical and complemental approximately U-shaped sections 12 of suitable insulating material each of which has a recess 13 in one side to complement the recess in the other section for forming a chamber when the sections are secured together in side by side relation. Each section also has a socket 14 in each arm thereof complemental to the corresponding socket of the other section to receive the headed portions 11 of the screws when the sections are secured together.

In securing the casing sections to the fuse housing, the sections are applied from opposite sides of the screws 10 so as to set the heads of the screws in the sockets 14 after which the sections are secured together as by bolts 15 which are insulated by the casing.

Before the casing sections are secured to the fuse housing, an electrical indicating means is connected to the screws 10. This indicating means is shown in the form of a glow lamp 16, known in the art, and a resistor 17 which are electrically connected in series with each other, one terminal of the glow lamp being connected to one screw 10 and one terminal of the resistor being connected to the other screw 10 as clearly shown in Figures 3, 4 and 7. Then when the two sections are applied to the fuse housing, the lamp 16, resistor 17 and the wiring connections are enclosed within the chambers 13 of the indicator casing. Preferably the two sections 12 of the indicator casing have complemental notches 18 in their edges to form a sight opening through which the lamp 16 may be viewed. The lamp 16 and resistance 17 are electrically in series with each other but in shunt with the fusible element 4.

In operation, when the fuse is connected in circuit and under normal conditions, the current flows freely through the fusible element and the lamp 16 is unlighted; but when the fuse becomes ruptured as by the passage of abnormal current therethrough, the current will flow through the sleeves 2, screws 10, resistor 17 and lamp 16 to cause the lamp to glow, which may be viewed through the sight openings 18.

The invention also contemplates the quick detachable or releasable connection of the indicator unit to a fuse. The identical indicator casing including the conducting members or screws 10 may be utilized for this purpose. For one form of fuse such as indicated at 19 in Figures 8 to 10 inclusive, a U-shaped conducting spring clip 20 has one arm secured to each conducting screw 10 by a nut 21, the clips being resilient and of such size and shape that they may be slipped over and physically and electrically connected to the ends of the fuse terminals 22 to which are electrically connected the fuse element 20a disposed within the fuse housing. Preferably the casing sections 12 of the indicator will be notched at 23 to provide a clearance for the nuts 21 and clips 20 so as to permit the indicator casing to rest on the fuse housing as shown in Figure 8; and these notches also prevent pivotal movement of the clips 20 on the screws 10 and hold the clips in longitudinal alinement with the indicator casing.

Another form of the invention is shown in Figures 11 and 12 where the indicator casing has a clip 24 at each end for quick detachable or releasable connection to a blade type cartridge fuse like that shown in Figure 1. Here one arm of each clip 24 is hooked at 25 to engage under one edge of the corresponding blade 5 of the fuse, and the hook may be somewhat resilient to cooperate with a lug 26 on the arm which may snap over the other edge of the blade and hold the clip in position. The indicator unit may be applied to the fuse as shown in Figure 12, the hook 25 being first slipped under the blade as shown by dot and dash lines after which the whole unit is pulled upwardly and swung inwardly of the fuse housing until the indicator casing rests upon the fuse housing.

The indicator casing also serves as a handle for applying and removing the fuse to and from the terminal clips, the approximate U-shape of the casing providing adequate clearance for the fingers between the casing and the fuse housing, in all forms of the invention.

The identical form of the casing sections make the sections interchangeable so as to maintain cost of manufacture and assembly at the minimum, and the clamping of the screws between the casing sections makes possible the use of the screws for easily and quickly securing the casing directly to a fuse, and also for attaching the fuse engaging clips 20 and 24 to the casing for quick detachably and releasably mounting the indicator on the fuse housing. The screws thus serve the dual function of electrical conductors between the indicating means and the fuse terminals and of physical fasteners for securing the indicator casing on the fuse.

Other modifications and changes in the details of structure of the indicator unit will occur to those skilled in the art as within the spirit and scope of the invention.

Having thus described my invention, what I claim is:

1. An integrity indicating unit for fuses comprising a casing including complemental sections each having a recess to complement the recess in the other section for forming a chamber between the sections when they are secured together, means for separably securing the sections together, electrical indicating means within said chamber, and means for connecting said indicating means in shunt with the terminals of a fuse including a pair of parts separably clamped and held between said casing sections.

2. An integrity indicating unit for fuses comprising a casing including complemental sections each having a recess to complement the recess in the other section for forming a chamber between the sections when they are secured together, means for separably securing the sections together, electrical indicating means within said chamber, and means for connecting said indicating means in shunt with the terminals of a fuse including a pair of screws having their heads clamped and held between said casing sections and their shanks projecting from said casing.

3. An integrity indicating unit for fuses comprising a casing including a pair of identical approximately U-shaped complemental sections each having a recess in one side to complement the recess in the other section for forming a chamber when the sections are secured together in side-by-side relation, means for separably se-

curing the sections together, electrical indicating means in said chamber, a means for connecting said indicating means in shunt with the terminals of a fuse including a pair of parts one separably clamped and held between the complemental pair of end portions of the arms of said casing sections at each end of the casing.

4. An integrity indicating unit for fuses comprising a casing including a pair of identical approximately U-shaped complemental sections each having a recess in one side to complement the recess in the other section for forming a chamber when the sections are secured together in side-by-side relation, means for separably securing the sections together, electrical indicating means in said chamber, a means for connecting said indicating means in shunt with the terminals of a fuse including a pair of screws each having its head clamped and held between the complemental end portions of the arms of said casing sections at one end of the casing and with its shank projecting beyond the extremity of the corresponding arm of the casing.

5. A fuse comprising a housing of insulating material having conducting terminals and a fusible element within the casing electrically connected to said terminals, an integrity indicator comprising a casing including complemental sections each having a recess to complement the recess in the other section for forming a chamber between said sections when they are connected together, electrical indicating means within said chamber, and means connecting said indicating means in shunt with said fusible element including a pair of parts separably clamped and held between said casing sections and each electrically connected to one of said terminals.

6. A fuse comprising a housing of insulating material having conducting terminals and a fusible element within the casing electrically connected to said terminals, an integrity indicator comprising a casing including complemental sections each having a recess to complement the recess in the other section for forming a chamber between said sections when they are connected together, electrical indicating means within said chamber, and means connecting said indicating means in shunt with said fusible element including a pair of screws each having its head clamped and held between said casing sections and with its shank having a screw-threaded connection with one of said terminals.

7. An integrity indicating unit for fuses comprising a casing including complemental sections each having a recess to complement the recess in the other section for forming a chamber between the sections when they are secured together, means for separably securing the sections together, electrical indicating means within said chamber, and means for connecting said indicating means in shunt with the terminals of a fuse including a pair of parts separably clamped and held between said casing sections and a clip secured to each of said parts for releasable, physical and electrical connection to one terminal of such fuse.

8. A fuse comprising a housing of insulating material having conducting terminals and a fusible element within the casing electrically connected to said terminals, projections on the exterior of the housing electrically connected respectively to said terminals, and an integrity indicator comprising a casing including complemental sections embracing said projections between them for securing the casing on said housing, and electrical indicating means within said casing electrically connected to said projections.

9. A fuse comprising a housing of insulating material having conducting terminals and a fusible element within the casing electrically connected to said terminals, projections on the exterior of the casing electrically connected respectively to said terminals, and an integrity indicator comprising a casing including separably connected complemental sections having complemental recesses to receive and interlock with said projections when said sections are applied to said projections from opposite sides thereof and secured together for fastening said casing to said housing, and electrical indicating means within said casing electrically connected to said projections.

10. A fuse comprising a tubular housing of insulating material, a sleeve fitted into each end of said housing and having an end projecting from said housing, a terminal element physically and electrically connected to said end of each sleeve, a fusible element within said casing electrically connected to said terminal elements, an electricity conducting member passing through said housing and secured in and electrically connected to each of said sleeves with a portion projecting from the housing, and an indicator including a casing comprising separably connected complemental sections embracing said projecting portions of said conducting members between them and interlocking therewith for securing the casing on the housing, and electrical indicating means within said casing electrically connected to said electricity conducting elements.

11. An integrity indicating unit for fuses comprising a casing including a pair of identical approximately U-shaped complemental sections each having a recess in one side to complement the recess in the other section for forming a chamber when the sections are secured together in side-by-side relation, means for separably securing the sections together, an electricity conducting element separably clamped and held between the complemental pair of end portions of the arms of said casing section and projecting from the corresponding end of the casing, and electrical indicating means within said chamber and electrically connected to said conducting elements.

FREDERICK A. SCHILLER.