

No. 873,793.

PATENTED DEC. 17, 1907.

C. N. SACHS.
SAFETY FUSE INDICATOR.
APPLICATION FILED MAR. 11, 1904.

Fig. 1.

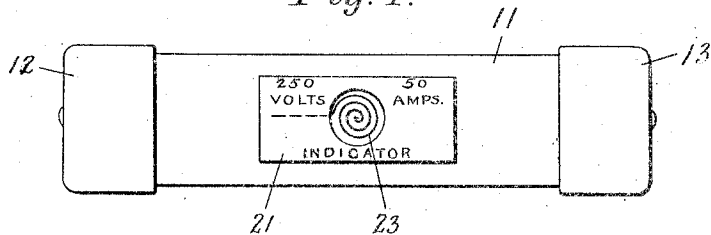


Fig. 2.

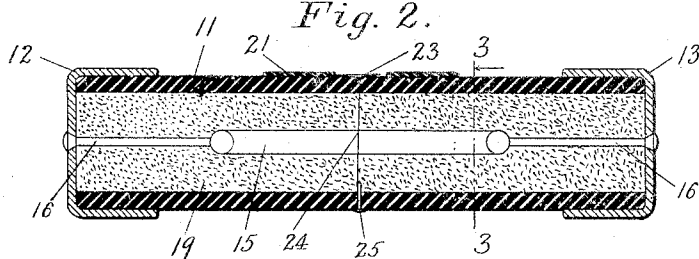


Fig. 3.

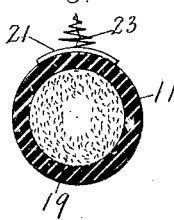


Fig. 4.

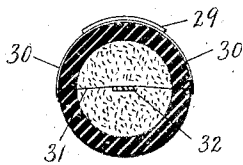


Fig. 5.

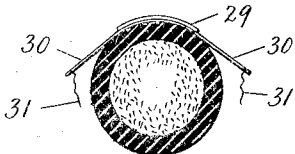


Fig. 6.

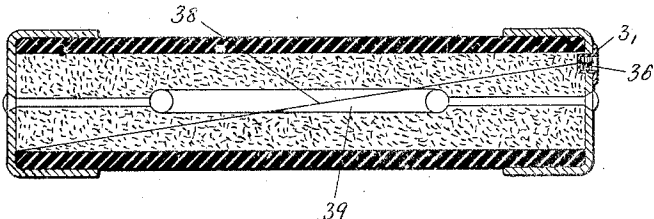
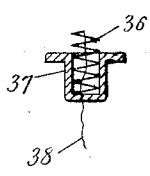


Fig. 7.



Witnesses:

Jas. K. Green
H. Mallner

Inventor:

C. N. Sachs,
By W. H. Jones, Atty

UNITED STATES PATENT OFFICE.

CAROLINE N. SACHS, OF HARTFORD, CONNECTICUT.

SAFETY-FUSE INDICATOR.

No. 873,793.

Specification of Letters Patent.

Patented Dec. 17, 1907.

Application filed March 11, 1904. Serial No. 197,652.

To all whom it may concern:

Be it known that I, CAROLINE N. SACHS, a citizen of the United States, and resident of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Safety-Fuse Indicators, of which the following is a full, clear, and exact specification.

This invention relates to improvements in indicating devices for safety fuses which are inclosed in tubes and casings, and known in the art as inclosed fuses, the object of the invention being to provide means for automatically indicating the condition of the electrical conductor or fuse strip, whether it is intact, or burned out, and to provide improved means for automatically changing the indication upon the burning out of the fuse. As such fuses are entirely concealed from view it has been the practice to combine with the main conductor inclosed in the casing, and surrounded by the material contained therein a fine shunt wire, connected in multiple with the main fuse strip, and placed either entirely upon the surface of the casing, or partly upon the inside of the casing, but with a portion thereof brought to the surface of the casing. In either case, it is intended that when the main fuse strip is ruptured by an excess of current the fine wire will also be ruptured as it is then the only remaining path for the current, and as this fine wire is visible upon the surface of the tube, or affects by ignition a visible device, it shows the condition of the interior fuse in this way. The objection to this form of indicator, however, is due to the fact that very frequently this shunt wire is improperly connected, so that it does not receive the current after the rupture of the main fuse, and therefore no indication is obtained. Such indicators also give forth more or less sparking or flashing, which it is desirable to eliminate.

In order to eliminate the difficulty I provide an indicator controlled by an electrically inert but disruptible retainer composed of a fine wire, or silk or linen cord, or strip, which may be either of insulating or conducting material, and I pass this wire strip or cord, either longitudinally or transversely through the tube, so that some portion thereof is brought in contact with, or in close proximity to, the fuse strip. This cord is connected at either one or both of its ends to a small spring of suitable form, either on

the exterior of the tube or casing, or so that it may be seen or felt from the outside, but so arranged that, so long as the string, cord, or wire is intact, due to the continuous condition of the fuse strip, the spring or other device is held inert; but as soon as the strip has fused, the consequent heating and slight tendency to arc causes a burning and severing of the retainer strip, or cord, which results in a releasing of the spring or other device, and thus gives an indication externally that the fuse strip has been ruptured.

Figure 1 is a plan view of this improved fuse. Fig. 2 is a side view in section through the longitudinal center of the fuse showing the fuse intact. Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 2, showing the changed position of the indicating means after the fuse strip has been burned out. Figs. 4 and 5 are transverse sectional views showing a modified form of the indicating means. Fig. 6 is a sectional side view of a fuse with another modified form of the indicating means. Fig. 7 is an enlarged view of the indicating means and socket of Fig. 6 after the fusible strip or conductor has been burned out.

The general form of fuse here shown is that of a well-known type which is adapted to be placed in a suitable clip or holder to which the circuit wires are attached, and having means for connecting the wires with the terminals of the fuse strip.

The fuse shown in Figs. 1, 2 and 3 consists of an outer casing 11 containing a filling 19 of any suitable insulating material held in place by ferrules 12 and 13 on the ends of the casing 11. These ferrules form the external contacts of the fuse. The filling 19 incloses a fusible conductor or fuse strip, as it is commonly termed 15 which is soldered to terminals 16 which connect it with the ferrules 12 and 13. On the outside of the casing is a spiral indicator formed of spring wire or some other suitable material, one end of which is held in place under the label 21, while the other end is secured to a retainer 24 of thread or fusible wire which passes down through the casing 11 and the filling 19 to the opposite side of the casing where it is secured by any suitable means, as for instance the tack 25. The retainer 24 is in contact with or close to the fusible strip 15, so that when the strip is burned out the retainer 24 is also burned in two, thus releasing the inner end of the spiral indicator

23, and permitting it to rise to the position shown in Fig. 3.

In the modified form shown in Figs. 4 and 5 the indicator consists of a flat spring or strip of wire 30, the central portion of which is held in place under the label 29 while its two ends are retained closely against the casing 11 of the fuse by the retaining thread or wire 31. The latter joins the two ends of the indicator 30, being in contact with or close to the fusible strip 32, where it passes through the center of the core 19. On the burning out of the fusible strip, the retainer 31 is severed, thus permitting the outer ends of the indicator 30 to spring outward from the side of the casing 11 as shown in Fig. 5.

In the modified form shown in Fig. 6 a socket 37 is provided, which is fitted preferably into the ferrule 12. The socket contains a helical spring 36, the outer end of which is secured to one end of the retainer 38, which keeps it compressed within the socket. The retainer 38 passes across or in sufficiently close proximity to the fusible strip to be disrupted by the direct heat from the burning out of the fuse. The other end of the retainer is secured in any convenient way, being here shown as being fastened between the casing 11 and the ferrule 13. The direct heat of the burning out of the fusible strip 34 severs the retainer 38, thus releasing the outer end of the helical spring 36, and permitting it to project upwardly from the socket.

35 Whichever form of indicator is employed, its whereabouts upon the external surface of the fuse may be permanently indicated by means of the label, or otherwise. As shown in Fig. 1, the label is provided with an opening through which the indicator may be seen; and its condition instantly observed at all times. In many ways which will suggest themselves to those familiar with this art, the embodiments of this invention here-
40 in shown and described may be modified to suit the various conditions of service.

The retainer may be of any suitable material, and may be either a conductor or a non-conductor of electricity; and if a conductor it may carry a portion of the current but is preferably arranged to be electrically inert in the sense that it conducts no portion of the current directly from one external contact to the other external contact. In any case, however, the retainer, or some portion thereof, should be disruptible upon rupture of the fuse strip 15, and preferably by the direct heat of that rupture, in which latter case the retainer or some portion thereof should be placed in suitable proximity to that portion of the fusible strip, preferably the center of its length, which will be first ruptured by an excess of current, so that the heat generated by the rupture of the fusible
65 strip shall directly disrupt the retainer.

The term "electrically inert as between the external contacts of the fuse" is herein employed to distinguish this invention from those in which the indicator normally forms a part of the main fuse, or forms a shunt circuit around the entire main fuse, and in which such indicators are ruptured by current carried directly from one external contact to the other external contact.

I claim as my invention:—

1. The combination in an inclosed fuse, of conductor fusible by the current, a member inclosed within the fuse structure and electrically inert as between the external contacts of the fuse, but disruptible upon the rupture of the fusible conductor, and movable means in connection with the said member for indicating whether or not it is disrupted.

2. The combination in an inclosed fuse, of a conductor fusible by the current, an external indicator, a retainer inclosed within the fuse structure and electrically inert as between the external contacts, but directly disruptible by the heat of rupture of the conductor for holding the indicator in its position indicative of the normal condition of the fuse.

3. The combination in an inclosed fuse, of a conductor fusible by the current, an external indicator therefor, and a retainer inclosed within the fuse structure and electrically inert as between the external contacts, but arranged within the disrupting influence of the conductor for holding the indicator in its position indicative of the normal condition of the fuse.

4. The combination in an inclosed fuse, of a fusible conductor, an external indicator and a retainer inclosed within the fuse structure and electrically disconnected from the fuse, but subjected to disruption by the heat of rupture of the fuse, for holding the indicator in its position indicative of the normal condition of the fuse.

5. The combination in an inclosed fuse, of a fusible conductor, an indicator electrically disconnected from the fuse, and a retainer inclosed within the fuse structure and disruptible by and placed within the burning out influences of the fuse and connected with the indicator for holding it in the position indicative of the intact condition of the fuse.

6. The combination in an inclosed fuse, of a fusible conductor, an indicator electrically disconnected from the fuse and indicating by changes in its position whether the fuse is intact or burned out, and a retainer separate from, but disruptible by, and placed within the fuse structure and within the burning out influences of the fuse for holding the indicator in the position indicative of the intact condition of the fuse.

7. The combination in an inclosed fuse, of a fusible conductor, an indicator and a re-

5 tainer situated within the fuse structure and subjected to disruption upon the disruption of the fuse, but electrically inert as between the external contacts of the fuse, for holding the indicator in its position indicative of the normal condition of the fuse.

10 8. The combination in an inclosed fuse, of a fusible conductor, an indicator and a retainer situated within the fuse structure and subjected to disruption upon the disruption of the fuse, but electrically inert as between the external contacts of the fuse, for holding the indicator in the position indicative of the intact condition of the fuse, a portion of the
15 retainer being located in proximity to the central portion of the fuse.

20 9. The combination, in a safety fuse, of an inclosing casing, a fusible conductor situated within the casing, a resilient indicator, an electrically inert retainer situated within the casing, separate from the fuse, but directly disruptible by the burning out of the fuse and connected with the indicator to hold it out of its normal position of repose.

25 10. A mechanical indicator for safety fuses, comprising an inclosing casing, a resilient indicator, an electrically inert re-

tainer within the casing, but separate from the fuse strip thereof, for holding the indicator in compression, and passing in proximity to the fuse strip, the retainer being directly disruptible by the burning out of the fuse strip.

30 11. A mechanical indicator for inclosed fuses comprising a resilient indicator, a retainer, disruptible by the burning out of the fuse strip, for holding the indicator against its resilient tendency, and a label for attaching the indicator to the casing of the fuse structure.

40 12. A mechanical indicator for inclosed fuses comprising a resilient indicator, a retainer, disruptible by the burning out of the fuse strip, for holding the indicator against its resilient tendency, and a label for showing the location of the indicator, and for securing it in that position.

45 In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CAROLINE N. SACHS.

Witnesses:

CAROLINE M. BRECKLE,
WM. H. HONISS.