

B. S. LUTHER.
INCLOSED ELECTRIC FUSE.
APPLICATION FILED APR. 18, 1910.

968,174.

Patented Aug. 23, 1910.

2 SHEETS—SHEET 1.

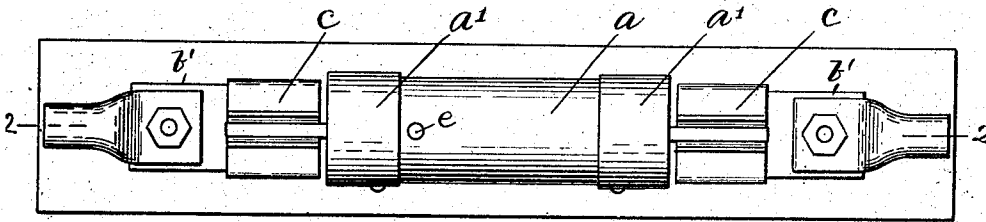


Fig. 1.

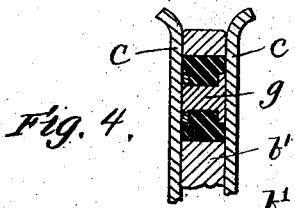


Fig. 4.

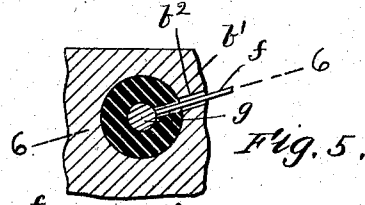


Fig. 5.

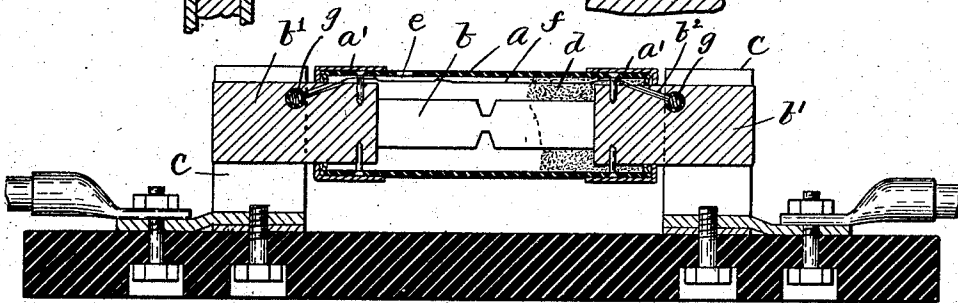


Fig. 2.

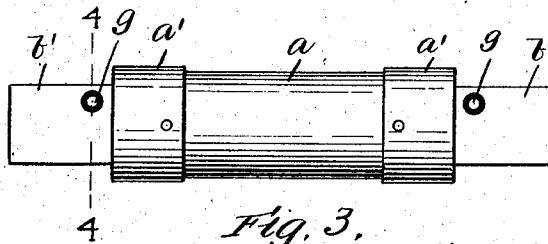


Fig. 3.



Fig. 6.

Witnesses:

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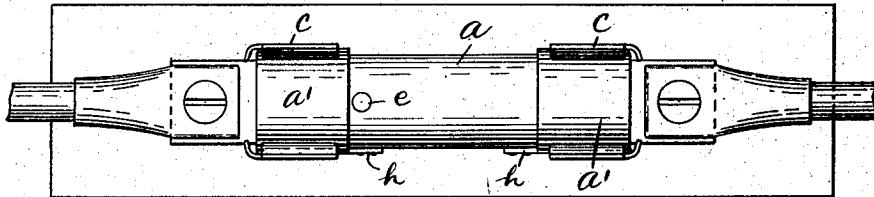


Fig. 7.

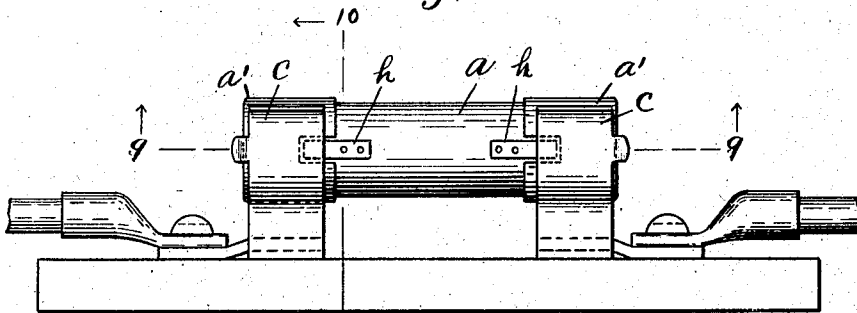


Fig. 8.

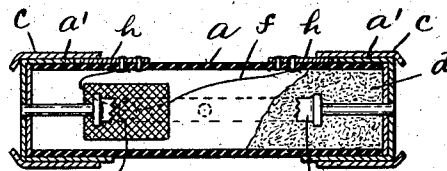


Fig. 9, b.

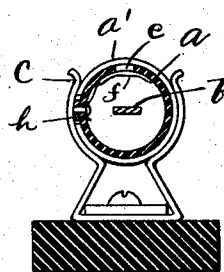


Fig. 10.

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UNITED STATES PATENT OFFICE.

BENJAMIN S. LUTHER, OF NEWBURYPORT, MASSACHUSETTS, ASSIGNOR TO THE CHASE-SHAWMUT COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

INCLOSED ELECTRIC FUSE.

968,174

Specification of Letters Patent. Patented Aug. 23, 1910.

Application filed April 18, 1910. Serial No. 556,184.

To all whom it may concern:

Be it known that I, BENJAMIN S. LUTHER, of Newburyport, in the county of Essex and State of Massachusetts, have invented an Improvement in Inclosed Electric Fuses, of which the following is a specification.

This invention relates to inclosed electric-fuses, and particularly to those having indicators of the explosive type for indicating when the fuse blows. In electric-fuses of this description a wire is usually connected with the indicator, which is attached at its ends to the conducting-terminals of the fuse, at points within the fuse-case. An inclosed indicator-wire, having its points of attachment within the case, cannot be tested easily, and, for this reason, is usually not tested. Furthermore, in the process of manufacture there is liability of the inclosed indicator wire breaking or becoming detached, and thereby rendered inoperative, but, as said wire is entirely concealed within the fuse-case, such accidental injury is not known previous to the blowing of the fuse.

The object of this invention is to provide an inclosed electric-fuse having an indicator with an indicator-wire, whereby the objections above noted are overcome, and consists in providing the indicator-wire with conducting-terminals of its own, which are independent of the conducting-terminals of the fuse, and which are adapted to be arranged outside of the fuse-case, and to be disposed relative to the conducting-terminals of the fuse, so that when the conducting-terminals of the fuse are placed in mechanical and electrical engagement with the usual supporting-clips on the base, the conducting-terminals of the indicator-wire are likewise placed in mechanical and electrical engagement with the said clips, thereby electrically connecting the indicator-wire in parallel with the fuse-strip. An indicator-wire having conducting-terminals of its own, adapted to be arranged outside of the fuse-case, may be easily applied and also tested independently of the fuse-strip, and, furthermore, less wire is required than in the instance above recited.

Figure 1 is a plan view of an electric-fuse embodying this invention, arranged on a base with the supporting-clips, Fig. 2 is a longitudinal vertical section of the electric-fuse shown in Fig. 1, taken on the dotted line 2—2, Fig. 3 is a side elevation of the

electric-fuse shown in Fig. 1, Fig. 4, is an enlarged sectional detail taken on the dotted line 4—4 Fig. 3. Fig. 5, is an enlarged sectional detail of one of the independent conducting terminals. Fig. 6, is an enlarged sectional detail taken on the dotted line 6—6 Fig. 5. Fig. 7 is a plan view of an electric-fuse having an indicator-wire with independent conducting terminals of a modified form, Fig. 8 is a side elevation of the electric-fuse shown in Fig. 7. Fig. 9 is a longitudinal vertical section of the electric-fuse shown in Fig. 8, taken on the dotted line 9—9. Fig. 10 is a transverse section of the electric-fuse shown in Fig. 8, taken on the dotted line 10—10.

a represents the body of the fuse-case of cylindrical or other form, composed of insulating material; *a'*, *a'*, the cylindrical metallic caps arranged on the opposite ends of said body; *b* a fuse-strip contained in the case, and attached at its ends to conducting-terminals *b'*, *b'*, which latter are made as flat plates or blades extending through holes in the end-caps *a'*, *a'*, and adapted to mechanically engage supporting clips *c*, *c*, which are arranged on a base. Any usual or suitable finely divided refractory filling *d* is contained in the case, which is packed around the fuse-strip and the inner ends of the conducting-terminals. Such a fuse is of well-known construction, and is here shown merely for the purpose of illustrating my invention. At a point on the inside of the wall of the fuse-case, remote from the arc-forming point of the fuse-strip, an indicator *e* is arranged over a hole in the case. This indicator is of the explosive type and is designed to eject a plug from the hole in the case, or to perform some other act to indicate that the fuse has blown. Such an indicator is shown in Letters Patent #801,467, dated Oct. 10, 1905.

f represents the indicator-wire which is attached to the indicator *e*, and is made to extend therefrom in opposite ways and to extend throughout the length of the fuse-case and through the end-caps, so that its opposite ends terminate outside the fuse-case. The indicator-wire is arranged adjacent the fuse-strip and operates as a fuse to cause the indicator to explode when the fuse blows. The ends of the indicator-wire, instead of being attached directly to the conducting-terminals of the fuse, at points in-

side the fuse-case, are here shown as having conducting-terminals of its own, which are made separate from or independent of the conducting-terminals of the fuse, and which
 5 are arranged outside of the fuse-case, so as to be accessible for the purpose of testing the indicator-wire independently of the fuse.

As shown in Figs. 1 to 6, *g, g*, represent the separate or independent conducting-
 10 terminals, which are attached to the opposite ends of the indicator-wire. They are made as small plugs, adapted to be arranged in holes in the conducting-terminals *b', b'*, with their exposed faces flush with the sides
 15 of said terminals *b', b'*. They are insulated from the conducting-terminals *b', b'*, so as to be entirely separate therefrom. They are arranged on the conducting-terminals *b', b'*, more particularly for convenience, so that
 20 when the fuse is placed in the supporting-clips and the conducting-terminals *b', b'*, engage said clips, said separate conducting-terminals *g, g*, will also engage said clips and electrical connection thereby be estab-
 25 lished. As here shown, the conducting-terminals *b', b'*, are formed with passages *b²* for the ends of the indicator-wire, and, referring to Fig. 6, the ends of the indicator-wire are extended through these passages
 30 and through the insulation contained in the holes in the conducting-terminals *b'*, so as to directly engage the plugs *g*. Said plugs, for simplicity of construction, may be made as headed studs, adapted to be set in holes,
 35 having washers placed on the ends thereof opposite the heads which are held in place by upsetting said ends.

Referring to Figs. 7 to 10, the separate and independent conducting-terminals for
 40 the indicator-wire are shown as small plates *h*, arranged on the outside of the case, and extending into recesses formed in the end-caps, and the ends of the indicator-wire are connected to said plates by rivets extending
 45 through the wall of the case and connected to the plates. In this embodiment of my invention the results obtained by the construction shown in the aforesaid embodiment of my invention are obtained. The fuse shown
 50 in Figs. 7 to 10 is designed to engage the supporting-clips by its metallic end-caps, and the separate conducting-terminals *h*, being arranged in recesses in said caps, are properly disposed to engage said clips, as shown
 55 in Fig. 8. Like the form shown in Fig. 2, separate and independent conducting-terminals are here provided for the indicator-wire, which are arranged outside the fuse-case, and exposed so that the indicator-wire
 60 may be tested separately from the fuse. From the foregoing it is apparent that my invention is susceptible of other modifications.

I claim:

65 1. In an inclosed electric-fuse, a fuse-strip

attached to a pair of conducting-terminals, arranged at the opposite ends of the fuse-case, an indicator, and an indicator-wire arranged in connection with said indicator and adjacent the fuse-strip, and a separate
 70 pair of conducting-terminals attached to the ends of said indicator-wire, substantially as described.

2. In an inclosed electric-fuse, the combination of a fuse-strip attached to a pair of
 75 conducting-terminals arranged at the opposite ends of a fuse-case, an indicator, an indicator-wire arranged in connection with said indicator and adjacent the fuse-strip, a separate pair of conducting-terminals at-
 80 tached to the ends of said indicator-wire, the conducting-terminals of one pair being insulated from the conducting-terminals of the other pair and disposed relatively to each other to engage the same supporting-
 85 clips, substantially as described.

3. In an inclosed electric-fuse, the combination of a fuse-strip attached to a pair of
 conducting-terminals arranged at the opposite ends of the fuse-case, an indicator, an
 90 indicator-wire arranged in connection with said indicator and adjacent the fuse-strip, and a separate pair of conducting-terminals attached to the ends of said indicator-wire, which are supported by but insulated from
 95 the aforesaid conducting-terminals, substantially as described.

4. In an inclosed electric-fuse, the combination of a fuse-strip attached to a pair of
 conducting-terminals arranged at the opposite
 100 ends of the fuse-case, an indicator within said case, an indicator-wire arranged in connection with said indicator, having its ends extended outside of the ends of the case, and a separate pair of conducting-
 105 terminals arranged outside the case, which are attached to the ends of said indicator-wire, and are insulated from the aforesaid conducting-terminals, substantially as described.
 110

5. In an inclosed electric-fuse, the combination of a fuse-strip attached to a pair of
 conducting-terminals arranged at the opposite
 115 ends of the fuse-case, an indicator within said case, an indicator-wire arranged in connection with said indicator, having its ends extended outside of the ends of the case, and a separate pair of conducting-
 terminals arranged outside the case, attached
 120 to the ends of said indicator-wire and supported by, but insulated from, the aforesaid conducting-terminals, substantially as described.

6. In an inclosed electric-fuse, the combination of a fuse-strip attached to a pair of
 125 conducting-terminals arranged at opposite ends of the fuse-case, an indicator, an indicator-wire arranged in connection with said indicator, having its ends extended beyond the ends of the case, a separate pair of con-
 130

ducting-terminals attached to the ends of said indicator-wire which are arranged in holes in the aforesaid conducting-terminals and are insulated therefrom, the exposed faces of said separate conducting-terminals being flush with the sides of the fuse-terminals, substantially as described.

7. In an inclosed electric-fuse, the combination of a fuse-strip attached to a pair of conducting-terminals arranged at opposite ends of the fuse-case, an indicator, an indicator-wire arranged in connection with said indicator, having its ends extended through passages in said conducting-terminals to points beyond the ends of the case, a separate pair of conducting-terminals attached to the ends of said indicator-wire which are set in holes in the aforesaid conducting-terminals, flush with the sides thereof, and insulated therefrom, substantially as described.

8. In an inclosed electric-fuse, the combination of a fuse-base, supporting-clips thereon, an inclosed electric-fuse having a fuse-strip connected with a pair of conducting-terminals adapted to engage said clips, an indicator, an indicator-wire arranged in connection with said indicator, a separate pair of conducting-terminals attached to the ends of said indicator-wire, also adapted to engage said clips, and insulating-means for separating the conducting-terminals of one

pair from the other, substantially as described.

9. In an inclosed electric-fuse, the combination of a fuse-base, supporting-clips thereon, an inclosed electric-fuse having a fuse-strip connected with a pair of conducting-terminals adapted to engage said clips, an indicator, an indicator-wire arranged in connection with said indicator, a separate pair of conducting-terminals attached to the ends of said indicator-wire also adapted to engage said clips, substantially as described.

10. In an inclosed electric-fuse, the combination of a fuse-base, supporting-clips thereon, an inclosed electric-fuse having a fuse-strip connected with a pair of conducting-terminals adapted to engage said clips, an indicator, an indicator-wire arranged in connection with said indicator, a separate pair of conducting-terminals attached to the ends of said indicator-wire also adapted to engage in a manner to insure electrical contact with a portion of the clips on said base, substantially as described.

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

BENJAMIN S. LUTHER.

Witnesses:

B. J. NOYES,
H. B. DAVIS.