

L. W. DOWNES.  
ELECTRIC FUSE OR CUT-OUT.

APPLICATION FILED FEB. 2, 1903.

NO MODEL.

Fig. 1.

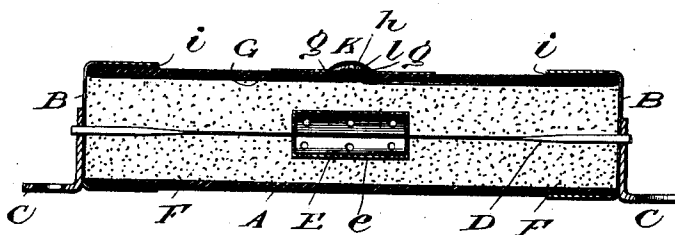


Fig. 2.

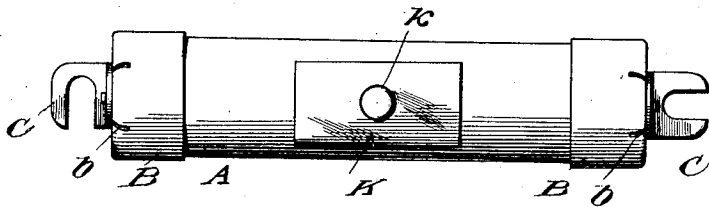


Fig. 3.

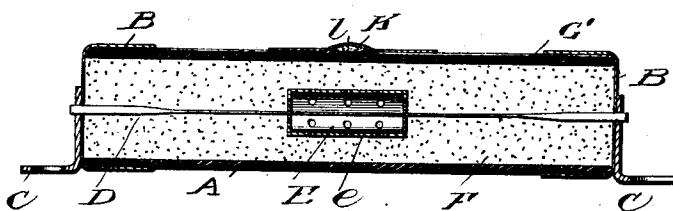
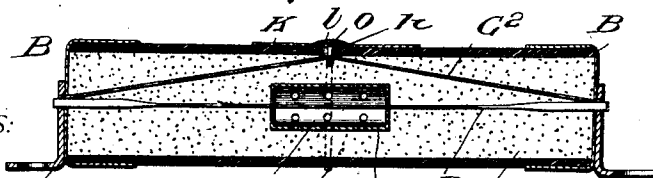


Fig. 4.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

LOUIS W. DOWNES, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE  
D & W FUSE COMPANY, OF PROVIDENCE, RHODE ISLAND, A CORPO-  
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## ELECTRIC FUSE OR CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 737,369, dated August 25, 1903.

Application filed February 2, 1903. Serial No. 141,581. (No model.)

*To all whom it may concern:*

Be it known that I, LOUIS W. DOWNES, a resident of Providence, Rhode Island, have invented a new and useful Improvement in  
5 Electric Fuses or Cut-Outs, which invention is fully set forth in the following specification.

My invention relates to inclosed electric fuses or cut-outs, and particularly to indicating-fuses, or such as are provided with means affording an exterior indication of the blown condition of the fuse. I was the first to employ for giving such indication the combination of an auxiliary fuse-wire, (or other form  
15 of auxiliary fuse adapted to be heated and to communicate its heat upon disruption of the main fuse-wire,) a material (such as sulfo-cyanid of mercury, a gummy mixture of ordinary gunpowder or equivalent) adapted to  
20 be heated by the auxiliary fuse, and a label applied to the exterior surface of the fuse-casing in association with said material, whereby upon disruption of the fuse the heating of the material will cause it to char,  
25 blacken, or discolor the adjacent portion of the label, thereby affording a readily-discernible indication that the fuse is blown. Broad claims to said invention have been made in my pending application, Serial No. 18,841,  
30 filed June 2, 1900.

My present invention relates to a specific form of said broad invention wherein the label extends over the material, the heating of the latter upon disruption of the fuse causing charring, blackening, or discoloration of that part of the label immediately over or adjacent to the material. In this manner a blackened or discolored spot is formed on the label, indicating the disrupted condition of  
40 the fuse. In the several embodiments shown in my application above referred to the label does not extend over the material, but has a hole therein in which said material is located. Extending the label over the material has the advantages, among others, of completely inclosing the latter, protecting it from deterioration through outside influences, and preventing it from becoming dislodged.

Patent No. 682,919, granted to me Septem-

ber 17, 1901, shows a fuse embodying the present invention in conjunction with other features of construction. The present invention is not, however, claimed therein.

Referring to the accompanying drawings, which show several embodiments of my invention, Figure 1 is a longitudinal sectional view, and Fig. 2 a plan view, of one embodiment of the invention. Fig. 3 is a longitudinal sectional view of another embodiment, and Fig. 4 is a similar view of still another  
60 embodiment.

A is a tubular casing, preferably of a fibrous material; B B, metallic caps secured over opposite ends of the casing and having slits or perforations *b*, through which vapors or gases  
65 evolved in the casing may escape to prevent explosion or blowing open of the fuse-casing; C C, terminal brackets secured to the caps; D, a main fuse-wire connected between terminal brackets C C and passing through the  
70 interior of the casing, and E an air-space about the fuse-wire at about the center thereof, said air-space being formed by a perforated paper drum *e* or other suitable means.

F is a filling of a suitable material, preferably in a finely-divided state, such as slaked lime, the principal function of which is to dissipate the heat from those portions of the wire which come directly in contact therewith, thus causing the rupture to take place  
80 at that part of the fuse which penetrates the air-space, and, furthermore, said material provides a multitude of minute paths or interstices for the escape of the vapor or gas evolved upon the fusing or blowing of the  
85 main fuse D.

While I have herein illustrated the improvements constituting my present invention in conjunction with the air-space construction of fuse set forth in my Patent No. 90 569,373, of October 13, 1896, it is to be understood that the invention is equally capable of use with other constructions of fuses.

Referring to Fig. 1, G is an auxiliary fuse-wire, preferably of German silver, (but any  
95 suitable metal or material may be used,) threaded through two small holes *g g* in the casing at about the middle thereof. A short

part or portion *h* of the wire is thus caused to lie against the outer surface of the casing A, the opposite ends of the wire being carried along the inner surface of the casing in contact with the filling F and out of the open ends thereof. The extremities of the auxiliary fuse-wire are finally bent over against the outer surface of the casing, as clearly shown at *i i*. The metallic caps B B press against and make electrical contact with extremities *i i*, thus forming between the terminals C C a second path for the current by way of the auxiliary fuse parallel to the main fuse. *l* is a small body of material in contact with the portion *h* of the auxiliary fuse-wire, adapted to be sufficiently heated thereby upon disruption of the fuse to afford the desired indication by discoloring, charring, or blackening and in some cases incidentally burning a hole in the label K, which is applied to the casing A, so as to extend over said material. The arrangement may be such as to develop sufficient heat to actually burn a hole through (at the same time discoloring or blackening) the label; but it is preferred to avoid all flame and to simply char, blacken, or discolor the label. The label or covering K, which may be of paper or other suitable material and of any desired size and shape, is pasted to or painted upon the surface of the casing. Any suitable material *l* may be used; but I preferably use a paste composition of about the consistency of thick paint, made of ordinary gunpowder dissolved in a water solution of gum-arabic, or fine gunpowder slightly moistened with an adhesive gum solution, which has been found to give the best results. The former material quickly dries and becomes hard and dense. The label is preferably applied in such position that a circle *k* printed thereon will embrace that part of the label which lies over the material *l* and is to be charred, blackened, or discolored upon disruption of the fuse. Upon blowing, fusing, or disruption of the fuse the auxiliary indicator fuse-wire is instantly heated and causes the gunpowder or other inflammable composition to be heated and to burn, but not with the ordinary rapidity of pure gunpowder, nor should the heat developed be sufficient to cause a spark or flame at the surface of the fuse, but simply chars the paper, turning it black or discoloring it within the circle *k*, thus affording the desired indication. Any suitable form and arrangement of auxiliary fuse may be employed for heating the material *l* upon disruption of the main fuse.

In the construction shown in Fig. 3 the auxiliary fuse-wire G' instead of being laced through the casing runs along the outer surface thereof, its ends extending under and making electrical contact with caps B B; otherwise the structure of Fig. 3 is the same as that of Figs. 1 and 2.

In Fig. 4 the auxiliary fuse-wire G<sup>2</sup> is entirely within the casing, a thread or cord *o* looped inward through an opening *h* in the casing and around the middle of the auxiliary fuse-wire serving to hold the latter against the inner surface of the casing across said opening, as set forth in my Patent No. 682,919. The material *l* fills opening *h* and makes contact with auxiliary fuse-wire G<sup>2</sup> where it crosses the inner end of said opening; otherwise the structure of Fig. 4 is the same as that of Figs. 1 and 2.

I claim—

1. In an electric fuse or cut-out, a casing, a main fuse inclosed thereby, an auxiliary fuse adapted to be disrupted upon disruption of the main fuse, a suitable material associated with the auxiliary fuse and adapted to be heated upon disruption thereof, and a label or covering applied to the casing and over said material and adapted to be discolored by heat therefrom upon disruption of the auxiliary fuse.

2. In an electric fuse or cut-out, a casing, a main fuse-wire inclosed by said casing, an auxiliary or indicating fuse-wire adapted to be disrupted upon disruption of the main fuse-wire, a suitable material associated with the auxiliary fuse-wire and adapted to be heated upon disruption thereof, and a label or covering applied to the casing and over said material and adapted to be discolored by heat therefrom upon disruption of the auxiliary fuse.

3. In an electric fuse or cut-out, a casing, a main fuse-wire inclosed by said casing, an auxiliary or indicating fuse-wire adapted to be disrupted upon disruption of the main fuse-wire, a suitable material in contact with a part of the auxiliary fuse-wire at the exterior surface of the casing and adapted to be heated upon disruption of said wire, and a label or covering applied to the exterior surface of the casing and extending over said material and adapted to be discolored by heat therefrom upon disruption of the auxiliary fuse-wire.

4. In an electric fuse or cut-out, a tubular casing, caps closing the ends of the casing, a main fuse-wire inclosed by said casing, an auxiliary or indicating fuse-wire extending along the exterior surface of the casing from one cap to the other, a small body of a suitable material applied to the exterior of the casing in contact with said auxiliary fuse-wire and adapted to be heated upon disruption of said wire, and a label applied to the surface of the casing and extending over said body of material and adapted to be discolored by heat therefrom upon disruption of the auxiliary fuse-wire.

5. In an electric fuse or cut-out, a casing, a main fuse inclosed by said casing, an auxiliary or indicating fuse adapted to be disrupted upon disruption of the main fuse, a

small body of a gunpowder composition associated with the auxiliary fuse and adapted upon disruption of the latter to be heated, and a label or covering applied to the casing  
5 and extending over said body of material and adapted to be discolored by heat therefrom upon disruption of the auxiliary fuse.

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

LOUIS W. DOWNES.

Witnesses:

EDWIN P. ALLEN,

ALEXANDER A. MCCAUGHIN.