E. O. SCHWEITZER.

FUSE DEVICE.

APPLICATION FILED FEB. 20, 1914.

**1,215,999.** Patented Feb. 13, 1917.

Fig. 1.

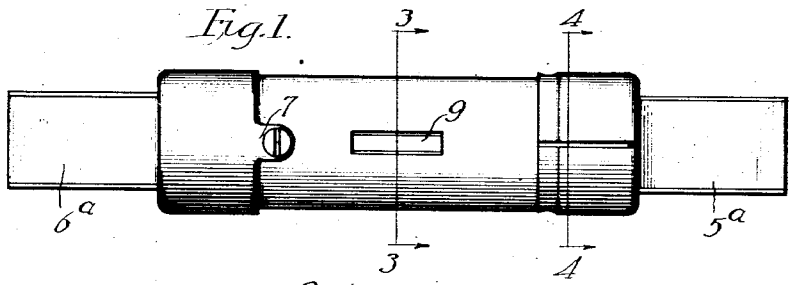



Fig. 2.

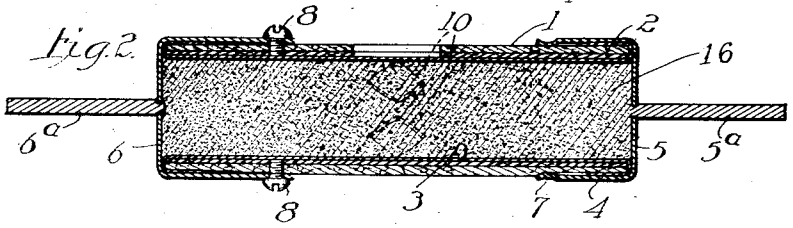



Fig. 3.

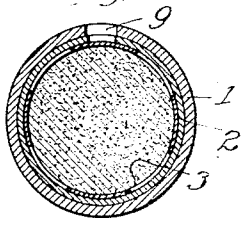



Fig. 4.

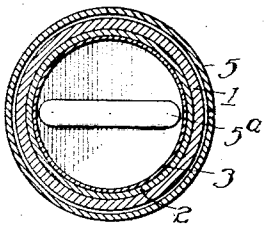



Fig. 8.

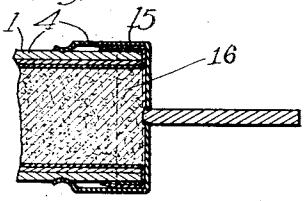



Fig. 5.




Fig. 6.

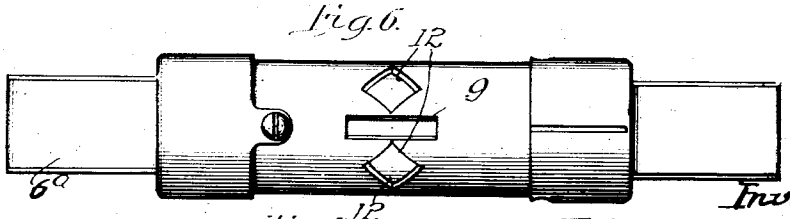
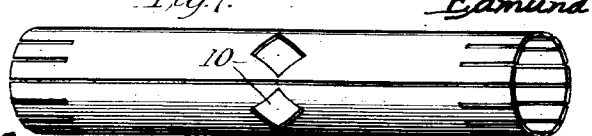



Fig. 7.

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# UNITED STATES PATENT OFFICE.

EDMUND O. SCHWEITZER, OF CHICAGO, ILLINOIS.

## FUSE DEVICE.

1,215,999. Specification of Letters Patent. Patented Feb. 13, 1917.

Application filed February 20, 1914. Serial No. 819,941.

*To all whom it may concern:*

Be it known that I, EDMUND O. SCHWEITZER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Fuse Devices, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to fuse devices, and especially to what are technically termed inclosed or cartridge fuses.

Prominent objects of the invention are to provide a simple, practical and inexpensive type of fuse device; to simplify and cheapen the construction; to secure a high degree of efficiency; to arrange for the ready and automatic indication of the condition of the fuse, whether it is operated or not; to arrange for easy and ready refilling; and to secure the foregoing and other desirable ends in a simple and expeditious manner.

In the accompanying drawings Figure 1 is an elevation of a fuse embodying my present invention;

Fig. 2 is a longitudinal section of the same;

Figs. 3 and 4 are cross sections taken on lines 3—3 and 4—4 respectively in Fig. 1;

Fig. 5 is a view of an interior portion of the device;

Fig. 6 is a view similar to Fig. 1 of a modified form;

Fig. 7 is a view of an interior portion of said device; and

Fig. 8 is a longitudinal section of an end view of the same.

Referring first to the device shown in Figs. 1 to 4 inclusive, I show a hollow casing 1, which might be any one of a variety of shapes, but which is preferably tubular. This casing 1, is preferably of insulating material, such for example as fiber. Within the hollow member 1 is another hollow member 2, preferably of the same shape as the member 1, and of a size to fit snugly within the same, so as in effect to form a lining therefor. This member 2 is preferably of fireproof material, such for example as asbestos. Inside of the member or lining 2 is a fuse member 3 which is also preferably hollow and of a shape and size to fit closely within the member 2. The fuse member 3 is shown separately in Fig. 5. As shown in this figure the end portions of said fuse 3 are fringed or slit as at 4, and when the fuse is arranged within the hollow or tubular casings said fringed or slit portions 4 are turned or bent back so that they come on the outer side of the end portions of the member 1. Metal caps or ferrules 5 and 6 are fitted over the ends of the member 1, thereby closing the open ends of said member and also making contact with the turned back ends 4—4 of the fuse 3. The cap or ferrule 5 is preferably provided with an annular indented portion 7 adapted to fit in a similar groove in the outside of the casing 1 so that said ferrule shall have a reasonably tight snap fit. The other cap or ferrule 6 is preferably provided with lugs 7 (Fig. 1), through which screws 8 are extended to secure said ferrule 6 detachably to the casing 1. The caps or ferrules 5 and 6 are preferably provided with contact end portions $5^a$ and $6^a$.

The casing 1 and lining 2 are preferably provided with an elongated slot 9, through which the fuse 3 may be seen. In this way it may be told simply by looking through the slot 9 whether or not the fuse has blown, thus forming a very simple and satisfactory indicator arrangement.

The fuse 3 is preferably provided with apertures or recesses 10 (Fig. 2) which form a weakened part to the fuse, so that it will blow at such part, preferably the middle of the fuse.

The modified arrangement shown in Figs. 6, 7 and 8 has the casing 1 provided with cut-away portions or recesses 12—12 serving as vents. In this arrangement the fuse also is preferably provided with cut-away portions as 10—10. In this arrangement also I preferably make the hollow fuse 3 longitudinally split as shown in Fig. 7, so that said fuse may be conveniently formed from a flat sheet of material formed into proper hollow or curved form, as for example by rolling it into cylindrical form in case the fuse is a cylindrical tube.

In this modification also as best shown in Fig. 8 I preferably provide a metal collar 15 arranged outside of the end portion of the casing 1, which collar lies under or within the fringed portion 4 of the fuse 3 whereby metal bearing or contact surfaces are provided on both sides of the ends of said fuse.

The interior of the fuse 3 is preferably filled with non-combustible and non-conducting granular filling material 16. This of course being on the inside of the fuse does not prevent the indicating arrangement of the fuse from acting satisfactorily.

The device can also be refilled, as will be obvious. It has this advantage however, that the fusible elements cannot be interchangeable in the various sizes of fuse devices. This is so arranged because the refilling is usually done by inexperienced people. Attention is therefore called to the fact that in the fuse device disclosed herein the size or diameter of the fuse is such that no smaller or larger fuse element than the right size can be inserted in the fiber casing or tube. Furthermore, the thickness of the fuse element cannot be changed because the outer casing or tube and ferrule have definite sizes; and the length and width are perfectly definite for each size of casing or tube. So far as I am aware this advantage is not secured by any fuse now on the market, regardless of whether it is of the refillable type or not.

Furthermore, the fuse, in conjunction with the filling material inside the fuse, serves to choke out the arc and as the casing takes the place of an external filling the construction is simpler and more readily manufactured. It is also of advantage in connection with the apertures 9 in the outer casing, as it is readily observed through the same, to determine whether the fuse is intact or whether it has been blown.

It will be understood that changes and modifications may be made without departing from the spirit of the invention.

What I claim is:

1. A fuse device comprising an exterior fuse-holding casing made of insulating material and non-destructible by the operation of the fuse, a fuse fitting within said casing and lining the interior wall thereof, and filling material on the inner side of said fuse.

2. A fuse device comprising an outside casing provided with apertures and a hollow fuse arranged within said casing and lining the inner wall thereof, said fuse also having apertures, the apertures of said casing being out of register with the apertures in the fuse.

3. A fuse device comprising a tubular insulating casing, a tubular fuse confined therein, said fuse having its ends longitudinally slotted and bent back over the ends of said insulating casing, and metal caps fitted over the ends of said insulating casing and the slotted ends of said fuse.

4. A fuse device comprising a tubular exterior casing made of insulating material having an aperture between its ends and a fuse of substantially the same size as the interior of said casing, said fuse fitting closely within said casing and lining the inner wall thereof.

5. The combination of an exterior hollow casing consisting of a tubular portion made of insulating material and metallic cap members fitted to and closing the ends of said tubular portion, and a tubular fuse arranged within said tubular portion of said casing and lining the interior wall thereof, said fuse extending between and contacting at its ends with said metallic terminal caps, and said intermediate tubular portion being nondestructible by the explosion of the fuse.

6. The combination with an exterior casing of a hollow fuse arranged within said casing and lining a wall portion thereof, said casing having apertures in said wall portion through which said fuse may be seen.

7. A fuse device comprising in combination, an exterior casing having an aperture, a fuse arranged against the inner wall of said casing opposite the aperture therein, and filling material on the other side of said fuse.

8. A fuse device comprising a tubular structure made of insulating material and provided with an aperture between its ends, metallic terminals at the ends of said tubular structure, and a tubular fuse lining the interior wall surface of said tubular structure and connected with the metallic terminals thereon.

9. A fuse device comprising a tubular structure made of insulating material and provided with an aperture between its ends, metallic terminals at the ends of said tubular structure, and a tubular fuse lining the interior wall surface of said tubular structure and connected with the metallic terminals thereon, and filling material within said tubular fuse.

10. A fuse device comprising a tubular structure made of insulating material and provided with an aperture between its ends, metallic terminals at the ends of said tubular structure, and a tubular fuse lining the interior wall surface of said tubular structure and connected with the metallic terminals thereon, said fuse being provided with apertures arranged out of register with the aperture in said tubular structure.

11. The combination of a cylindric exterior casing made of insulating material and having an aperture between its ends, metallic terminals located at and closing the opposite ends of said casing, a hollow cylindric fuse of substantially the size of the interior of said cylindric casing, said fuse being located within and lining the interior walls of said cylindric casing and being connected with said terminals.

12. The combination of a cylindric exterior casing made of insulating material and having an aperture between its ends, metallic

terminals located at and closing the opposite ends of said casing, a hollow cylindric fuse of substantially the size of the interior of said cylindric casing, said fuse being located within and lining the interior walls of said cylindric casing and being connected with said terminals, said connection between said fuse and terminals being formed by the ends of said fuse bent back over the outer surface of the ends of said casing between the same and said metal terminals, which latter are formed as caps extending longitudinally over end portions of said casing.

13. A fuse device comprising a cylindric casing made of insulating material, provided with a plurality of apertures between its ends, a hollow cylindric fuse lining the inner wall of said casing, said fuse being provided between its ends with apertures but having fuse material registering with one of said apertures in said casing, whereby said fuse material may be seen through said aperture before the fuse blows, end portions of said fuse being bent back over end portions of said cylindric casing, and metallic terminal caps fitted over the turned back ends of said fuse and covering the same, and also closing the ends of said casing and fuse.

In witness whereof, I hereunto subscribe my name this 17th day of February, A. D., 1914.

EDMUND O. SCHWEITZER.

Witnesses:
A. L. JONES,
H. A. JONES.