No. 755,796. PATENTED MAR. 29, 1904.

H. R. SARGENT.

FUSIBLE CUT-OUT.

APPLICATION FILED MAR. 14, 1900.

NO MODEL.

Fig. 1.

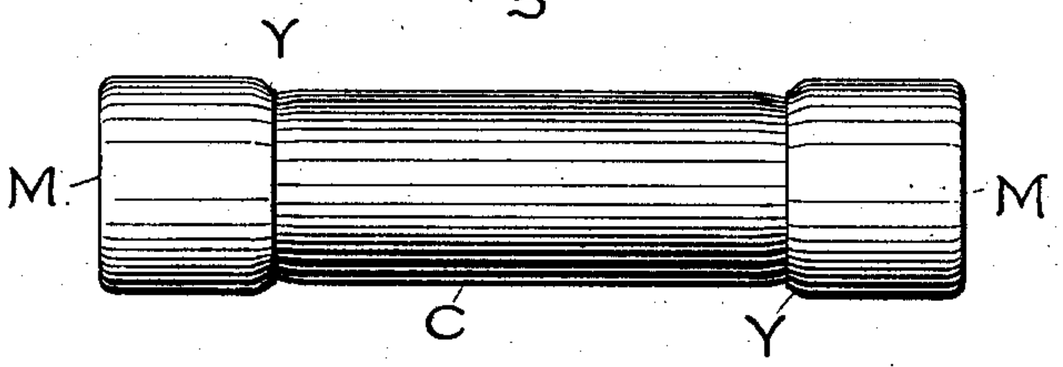


Fig. 2.

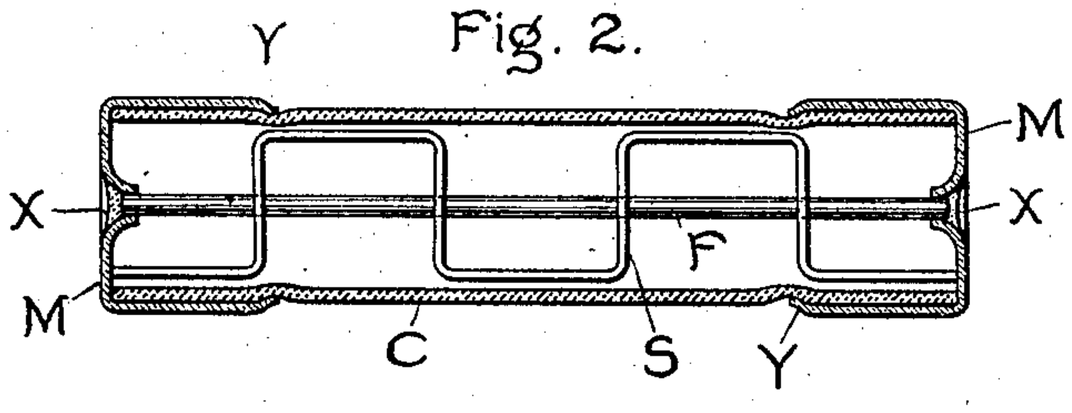
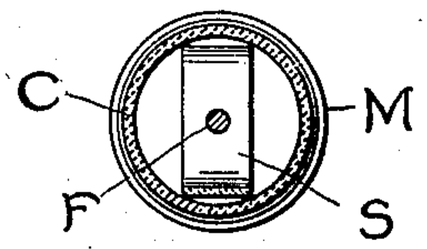


Fig. 3.



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No. 755,796. Patented March 29, 1904.

UNITED STATES PATENT OFFICE.

HOWARD R. SARGENT, OF SCHENECTADY, NEW YORK, ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

FUSIBLE CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 755,796, dated March 29, 1904.

Application filed March 14, 1900. Serial No. 8,647. (No model.)

To all whom it may concern:

Be it known that I, HOWARD R. SARGENT, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Fusible Cut-Outs, of which the following is a specification.

This invention relates to fusible cut-outs for electric circuits.

Figure 1 is a side elevation of a form of fuse constructed in accordance with my invention. Fig. 2 is a longitudinal section thereof, and Fig. 3 is an end section.

The main portion C of the casing, which may be of cylindrical or other suitable form, is composed of a hollow body of refractory insulating fiber or other suitable material and metal caps M, secured to the ends to close the latter. The manner of securing the caps to the body is shown at Y, the caps being rolled, spun, or knurled upon the fiber body, so that their edges press permanently thereupon to hold the caps securely in position against the pressure of the gases generated by the melting of the fuse. The word "contracted" is used in the claims to indicate, broadly, such a construction. A strip S of refractory insulating material, such as horn fiber or its equivalent, which is bent in a zigzag or other convenient form, is located within the hollow casing and is perforated for the reception of a fusible conductor F, which may be an ordinary lead fuse not specially prepared chemically or otherwise. The ends of the caps are perforated, and the edges around the perforations are bent inwardly, the ends of a fusible conductor F being supported upon these inwardly-bent edges. The ends of the fusible conductor F are permanently secured in the walls of the caps in an air-tight manner in any suitable way, as by solder X. With this construction the cut-out is air-tight to the extent that the fused conductor and arc will not be blown out of the casing, thus preventing the destruction of property by fire. However, it is not necessary that the casing be absolutely air-tight, as it is desirable that the generated gases be given an opportunity to escape slowly.

The metal caps M, which are the terminals of the fusible conductor, may be inserted in the circuit in any well-known manner, as in spring clips or supports, which form a part of the circuit.

This cut-out is adapted to overcome many difficulties hitherto encountered in cut-outs of this kind. The casing is practically air-tight to the extent that no portions of the fused conductor or arcs will be blown out of the casing to endanger property. The casing is made sufficiently strong, so that the gases generated by the fusing of the conductor will not burst through and carry arcs or portions of the fused conductor. The manner of fastening the caps upon the cylinder-casing also conduces to this effect in providing a strong substantially air-tight casing. The strip S supports the fusible conductor and prevents it from sagging when heated, so that it might engage the walls of the casing, thereby conducing to uniformity of rupture-point and preventing the casing from being charred or destroyed. This strip serves also as an interrupter which tends to prevent the continuance of arcs which might form when the conductor fuses. The structure of the strip also permits a large air-space for the generated gases, which with the strong casing renders an explosion improbable, and as little heat is absorbed by the strip the fusing-point of the conductor is substantially constant. The structure of the strip is also adapted to permit a free radiation of heat from the heated conductor both before and after the latter is fused. The strip occupies a very small portion of the free air-space in the casing, so that practically the whole interior of the hollow cylinder or shell constitutes a large air-space for the diffusion of the gases generated by the melting of the fuse, thus aiding to prevent an explosion and a consequent rupture of the casing. An important improvement embodied in this structure is that the metal caps do not become heated to a dangerous extent, as most of the heat generated is conveyed through the large interior air-space to the fiber walls, which have a large inner absorbing-surface and a large outer radiating-surface. A further advantage is that the conductor will not be held together in a molten state by enveloping oxi-

dation, since it is supported only at intervals, and hence the weight of its parts between the supporting-points will not permit it to be so held together.

This cut-out has been found to be very advantageous for use in low-potential circuits. The conductor is certain to fuse when a definite abnormal current flows through it, and the maintenance of an arc is prevented and the injurious effects of the primary arc are obviated without the necessity of resorting to chemical means. The substantially air-tight construction prevents fused parts of the conductor from being blown out of the casing, and it has been found that for fuses operating at low potential the gases generated are not of sufficient energy to rupture the casing at any point. A sharp distinction between the inclosed fuses hitherto in use and those constructed in accordance with this invention is that in the latter no means is provided for disposing of the gases generated by the melting of the fuse. The gases are permitted to remain in the casing, which is provided with a large air space or reservoir for the reception of the gases and with large cooling-surfaces and is, moreover, so strongly constructed, as described above, that it will not be ruptured by the pressure of the gases. So far as I know this is the first completely-inclosed fuse with which the ordinary fusible conductor could be used without the necessity of some chemical means for obviating the disastrous effects attendant upon the melting of the fuse.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A fusible cut-out, which comprises a substantially air-tight casing, adapted to resist the pressure of the gases generated by the melting of the fuse, substantially the entire interior of which casing is a large free air-space, and a bare fusible conductor extending therethrough and secured in the walls thereof, so that the casing is permanently closed and the fused conductor will not be blown out of the casing.

2. A fusible cut-out, which comprises a substantially air-tight casing adapted to resist the pressure of the gases generated by the melting of the fuse, substantially the entire interior of which casing is a large free air-space, and a bare fusible conductor extending therethrough, and secured in the walls thereof in such manner that it will not be blown out of the casing.

3. A fusible cut-out, which comprises a bare fusible conductor, and a permanently-closed casing therefor having a relatively large open interior air-space throughout its length and adapted to resist the forces released when the conductor fuses.

4. A fusible cut-out, which comprises a bare fusible conductor, and an air-tight casing therefor, the conductor, where it passes through the walls of the casing, being secured thereto so that it will not be blown out, the casing having a relatively large open interior air-space throughout its length, and being adapted to resist the forces released when the conductor fuses.

5. A fusible cut-out, which comprises a bare fusible conductor, and an air-tight casing having a relatively large, open, interior air-space through which the conductor extends, the casing being adapted to resist the forces released when the conductor fuses, and the ends of the conductor being secured in the walls of the casing so that they will not be blown out of the casing.

6. A fusible cut-out, which comprises the fusible conductor, and an air-tight casing having walls of insulating material and conducting metal, and having a relatively large open interior air-space throughout its length, through which the conductor extends, the casing being adapted to resist the forces released when the conductor fuses, and the ends of the conductor being secured so that they will not be blown out of the casing.

7. A fusible cut-out, which comprises the fusible conductor, a receptacle therefor, having a relatively large interior open space through which the conductor extends, metallic caps on the ends of the receptacle to close the same and secured in such manner that they will not be blown off when the conductor melts in the substantially air-tight casing thus formed, and a separate refractory strip which serves to support the conductor and prevent its engagement with the casing when the conductor expands.

8. A fusible cut-out, which comprises the fusible conductor, a receptacle therefor having a relatively large interior air-space, metallic caps on the ends of the receptacle to close the same and secured in such manner that they will not be blown off when the conductor melts in the substantially air-tight casing, and a separate strip of refractory material in the casing which serves to prevent the continuance of an arc.

9. A fusible cut-out, which comprises a fusible conductor, a receptacle therefor having a relatively large interior air-space throughout its length through which the conductor extends, metallic caps on the ends of the receptacle to close the same and secured in such manner that they will not be blown off when the conductor melts in the substantially air-tight casing, and a separate strip of refractory material which serves to support the conductor and prevent the continuance of arcs.

10. A fusible cut-out which comprises a hollow body or shell of fiber or its equivalent, metal caps for the ends of the hollow body, the edges of which are contracted about and shrunk into the shell to secure them in place, and a fusible conductor extending through the body.

11. A fusible cut-out which comprises a

casing having perforations the edges of which are bent, and a fusible conductor supported on said edges.

12. A fusible cut-out, which comprises a substantially air-tight casing having perforations the edges of which are bent, and a fusible conductor supported thereon in such manner that it cannot be blown out of the casing.

13. A fusible cut-out, which comprises a substantially air-tight casing having perforations the edges of which are bent, a fusible conductor supported upon said bent edges, and a suitable solder around the end of the conductor in the cavity formed by the bent edges.

14. A fusible cut-out, which comprises a casing of fiber or its equivalent, having metal ends secured thereto, the metal ends having perforations the edges of which are bent inwardly, a fusible conductor supported on the bent edges, and a suitable solder around the ends of the conductor in the exterior cavity formed by the bent edges.

15. A fusible cut-out, which comprises a hollow casing having a large free air-space, a fusible conductor extending therethrough, and a refractory support for the conductor which extends from end to end of the casing.

16. A fusible cut-out, which comprises a hollow cylinder having a large free air-space, a fusible conductor extending therethrough, caps which close the ends of the cylinder and are secured thereto so that they will not be blown off when the conductor fuses, and a separate refractory support for the conductor which permits the latter to be substantially entirely exposed in the air-space within the casing.

17. A fusible cut-out, which comprises a fiber casing having inclosing metal portions secured thereto, a zigzag strip in the casing, and a fusible conductor supported by the strip and connected with the metal portions.

18. A fusible cut-out, which comprises a hollow body having metal caps over its ends, a zigzag strip in the casing, a fusible conductor supported by the strip and having its ends rigidly secured to the caps.

19. A fusible cut-out, which comprises a hollow casing, a single strip extending the entire length of the casing, bearing against the wall of the casing, and having perforated angular portions, and a fusible conductor extending through the perforations.

20. A fusible cut-out which comprises an air-tight casing having a large free air-space, and consisting of a hollow cylinder of insulating material and metal end portions secured thereto so as not to be blown off when the conductor fuses, and a fusible conductor in said casing having its ends permanently secured to the metal portions.

21. A fusible cut-out, which comprises an air-tight casing of refractory insulating material with metal portions, a perforated zigzag strip of refractory insulating material adapted to prevent the continuance of arcs, and a fusible conductor extending through the perforations and having its ends permanently secured to the metal portions of the casing.

22. A fusible cut-out, which comprises a hollow body of heat-conducting material having metal end caps and a large interior air-space, and a fusible conductor having its ends permanently secured in the metal ends and supported in said casing in such manner that it is substantially entirely exposed to the air-space, so that the heat generated in the conductor will be conveyed through the air-space to the heat-conducting casing.

In witness whereof I have hereunto set my hand this 10th day of March, 1900.

HOWARD R. SARGENT.

Witnesses:

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