H. A. YATES.

SAFETY FUSE.

APPLICATION FILED JULY 11, 1911.

1,028,173.

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Fig. 1.

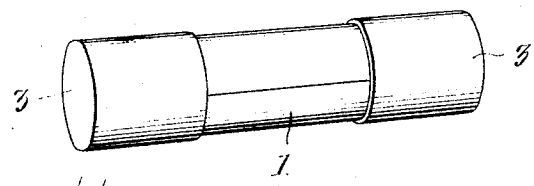


Fig. 2.

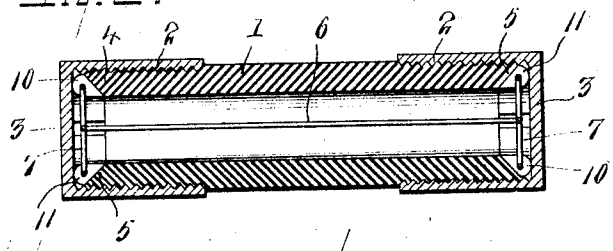


Fig. 3.

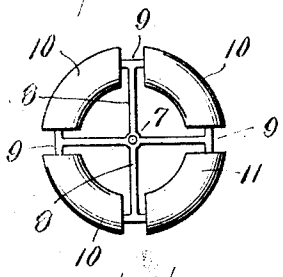


Fig. 4.

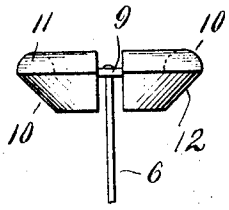


Fig. 5.

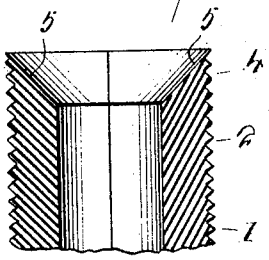


Fig. 6.

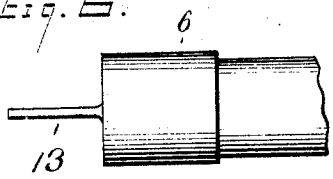
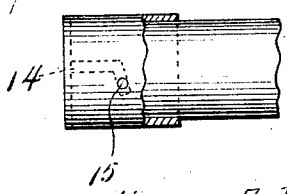


Fig. 7.



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UNITED STATES PATENT OFFICE.

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SAFETY-FUSE.

1,028,173. Specification of Letters Patent. Patented June 4, 1912.

Application filed July 11, 1911. Serial No. 637,881. REISSUED

To all whom it may concern:

Be it known that I, HARRY A. YATES, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Safety-Fuses, of which the following is a specification.

The present invention relates to certain novel and useful improvements in thermal cut-outs for electric circuits, and has particular application to a type of safety fuse, wherein the fusible conductor is melted under a heavy overload, or when a short circuit occurs, thereby forming an open circuit.

In carrying out my invention, it is my purpose to provide a safety fuse for electric circuits which will embrace the desired features of simplicity, efficiency, and economy in cost of manufacture and installation.

Furthermore, I aim to provide a safety fuse wherein, when operated through an overload or short circuit, the fusible element will be ruptured, and broken up into sections, which will fall or drop back into the shell or cylinder of the fuse body, thereby breaking the circuit and at the same time preventing the formation of an arc.

Still another object of the invention is to provide a form of safety fuse, in which the parts are so constructed and arranged that when the fusible conductor has been melted and broken up into sections, the circuit can not be reëstablished by a person inserting a piece of conducting wire in the shell or cylinder, and connecting the terminals at the caps. It is frequently the practice for an operator to reëstablish the circuit, after the safety fuse has been ruptured, in the manner above mentioned, with the result that the electrical equipment is oftentimes seriously damaged by short circuits and extremely heavy overloads. With the use of my invention, however, the possibility of the workman so reëstablishing the circuit is obviated, and consequent injury to the equipment prevented.

With the above-recited objects and others of a similar nature in view, the invention consists in the construction, combination and arrangement of parts, set forth in and falling within the scope of the appended claims.

In the accompanying drawing:—Figure 1 is a perspective view of my improved safety fuse, the terminals of the caps being omitted. Fig. 2 is a vertical longitudinal sectional view of the same. Fig. 3 is a top plan view of one of the fusible ring heads. Fig. 4 is a view in side elevation of the same. Fig. 5 is a detail sectional view taken longitudinally through a portion of the cylinder or shell. Fig. 6 is a detail view in elevation of the end of one form of fuse casing and showing a terminal carried by the cap. Fig. 7 is a detail view, partly in section, of a modified manner of attaching the cap to the cylinder or shell.

Referring now to the accompanying drawing in detail, the numeral 1 designates the cylinder or shell of the device, which, in the present instance is formed of two assembled semi-cylindrical sections, which are composed of a suitable non-conducting material. The ends of this shell, as shown in Figs. 2 and 5, are exteriorly threaded as at 2 for the reception of the interiorly threaded conducting caps 3 which are designed to be connected to the usual terminals in any suitable manner. The end portions 4 of the shell are beveled inwardly as at 5 for the purpose hereinafter described.

The fusible conducting element of my invention, in the present instance comprises a strip 6 of fuse wire or ribbon having formed integral therewith at each end a spider 7 made up of the radiating arms 8, and the short cross arms 9 at the ends thereof, these cross arms connecting the fusible segments 10, so that when the latter are assembeld as is shown in Fig. 3, they form a complete conducting head or ring. As will be seen by reference to Figs. 2 and 4, each of the ring segments is formed of a curved crown portion 11, and a downwardly and inwardly extending or beveled lower portion 12, which is adapted to correspond with and rest upon the downwardly and inwardly beveled end wall of the shell. As will be seen, I employ two of these fusible heads or rings, one for each end of the shell or cylinder, and I further form the fuse wires 6, the head spider and the segments of the head or

ring as an integral structure. These fusible parts may be made of any suitable conducting material, possessing the proper degree of fusiblity, such as lead alloy or the like.

In Fig. 6, I have shown the cap at the end of the shell as provided with a flat blade contact terminal 13.

In Fig. 7, instead of screwing or threading the caps onto the ends of the shell, I form an angular or bayonet slot 14 at each end of the shell, while the cap is provided with the locking pin 15, as is shown in Fig. 7.

From the above description, taken in connection with the accompanying drawing, the construction and manner of employing my invention will be readily apparent. The fuse is installed in the usual manner, and under the influence of an exceedingly heavy overload, or short circuit the current, flowing through the fusible conducting element will rupture and melt the same, at the cross arms 9 of the spider 7, as the cross sectional area of all the members of the spider at this point is not quite equal to the cross sectional area of the wire or ribbon 6, and consequently the combined current carrying capacity of all of the arms of the spider is less than the current carrying capacity of the main wire or ribbon. The consequence is that the fusing will take place at the cross arms of the spider connecting the segments of the head or ring, so that the latter will be separated and such segments will fall away or apart from each other thereby completely opening the circuit. At the same time the fusing of the remainder of the spider and the ends of the wire 6 will occur.

By beveling the end of the cylinder in the manner shown, I prevent a person inserting a wire within the shell and completing the circuit by bringing the ends of the wire over the ends of the shell and fastening the same in contact with the caps, for should this be attempted the ends of the wire would strike the screw threads and prevent the cap being secured in position.

It will be noted that I have provided an exceedingly simple yet positive and effective form of safety fuse which comprises in the present instance substantially but three parts, the fusible elements, the caps and the shell, so that the device may be manufactured and marketed at a relatively low cost. Furthermore, when the fuse has been ruptured, it is not necessary to entirely discard the cylinder or casing, as the latter may again be used by the simple addition of a new fusible element, which, may be readily placed in position owing to the sectional construction of the shell or casing.

While I have herein shown and described one particular embodiment of my invention, by way of illustration, I wish it to be understood that I do not confine myself to all the precise details of construction herein set forth, as modification and variation may be made without departing from the spirit of the invention or exceeding the scope of the appended claims.

I claim:—

1. A safety fuse comprising a casing and a fusible element contained therein, said element having a main fusible portion, fusible head members, and fusible connections between the head members and the main fusible portion, the combined current carrying capacity of said connections being less than the current carrying capacity of the main fusible portion.

2. A safety fuse comprising a casing, and a fusible element contained therein, the latter comprising fusible head members each formed of connected sections, and a fusible member connecting the head members.

3. A safety fuse comprising a casing, and a fusible element therein, said element comprising a plurality of head members each head member being formed of separated sections, a fusible spider connecting the sections of each head, and a fusible strip connecting the spiders.

4. A safety fuse comprising a casing, a fusible ring located adjacent to each end of the casing, and a fusible connection extending between the rings, said ring being adapted to be ruptured upon the operation of the fuse, substantially as described.

5. A safety fuse comprising a casing, a fusible ring formed of a series of segments, a fusible spider connecting the segments, and a fusible strip connected to the spider.

6. A safety fuse comprising a casing, having inwardly beveled ends, a fusible ring at each end of the casing and having a beveled surface corresponding to the adjacent beveled end of the casing, a fusible connection extending between the rings, and conducting caps at the ends of the casing.

7. A safety fuse comprising a casing formed of sections of insulating material, a fusible member adjacent to each end of the casing, a fusible strip, fusible connections between the strips and each member, said connections being adapted to be ruptured by the current in the operation of the fuse, and caps of conducting material at the ends of the casing.

8. A safety fuse comprising a casing formed of sections of insulating material, a plurality of fusible rings located spaced apart within the casing, each ring being formed of segmental members, a fusible spider frame connecting the segmental members, a fusible strip connecting the spiders, and conducting caps for the ends of the casing.

9. A safety fuse comprising a casing, a fusible strip therein, a fusible spider formed