Jan. 30, 1923. 1,443,865

J. C. BOGLE.
RENEWABLE ELECTRIC FUSE.
FILED JUNE 1, 1920.

Fig. 2.

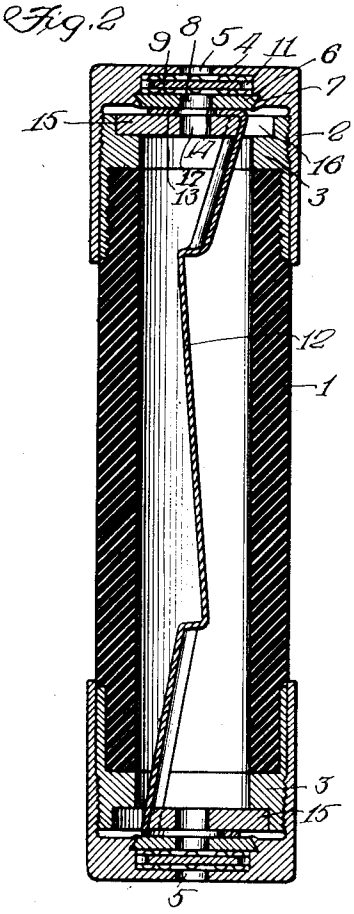


Fig. 1.

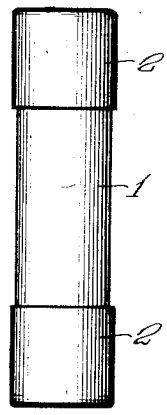


Fig. 3.

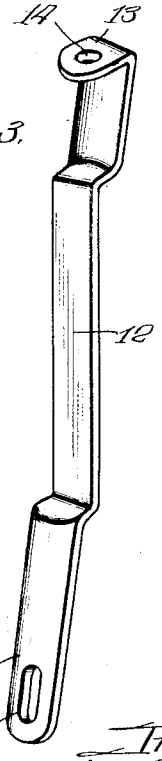


Fig. 4.

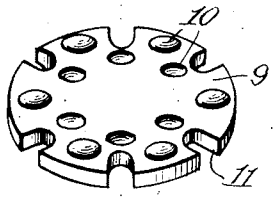
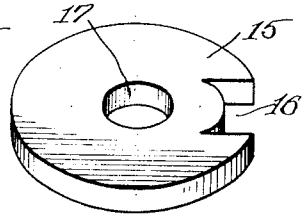


Fig. 5.



Inventor:
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By
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Attys.

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UNITED STATES PATENT OFFICE.

JOHN C. BOGLE, OF OAK PARK, ILLINOIS, ASSIGNOR TO COOK ELECTRIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

RENEWABLE ELECTRIC FUSE.

Application filed June 1, 1920. Serial No. 385,427.

To all whom it may concern:

Be it known that I, JOHN C. BOGLE, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented new and useful Improvements in Renewable Electric Fuses, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to renewable electric fuses and it has special relation to fuses of this general type which permit of the venting therefrom of the pressure and products of combustion that result from the blowing of the fusible element enclosed in the fuse.

An object of my invention is to provide a fuse of the above indicated character wherein the venting of the pressure and the products of combustion is accomplished by means of a restricted and tortuous passageway that precludes the flame, generally accompanying the blowing of a fusible element, from following the vent exteriorly of the fuse.

Another object of my invention is to provide a renewable electric fuse wherein proper venting and adequate protection against fire hazard is secured, as well as the elimination of the tendency of certain permanent parts of the fuse to be sealed and welded to the renewable parts by the molten and vaporized portion of the fusible element when it is blown.

Another object of my invention is to provide a renewable electric fuse having the foregoing characteristics which comprises a unitary structure in the form of the end cap serving as an electric terminal for the fuse which embodies a tortuous path whereby restricted venting of the fuse is accomplished without any fire hazard.

For a better understanding of the nature, the scope and the characteristic features of my invention reference may be had to the following description and the accompanying drawing, in which:

Fig. 1 is a view in elevation showing a renewable electric fuse embodying a form of my invention;

Fig. 2 is an enlarged view, in sectional elevation, of an electric fuse constructed in accordance with my invention;

Fig. 3 is a view in perspective of a fusible link that I may employ in my electric fuse;

Fig. 4 is a view in perspective of a baffle plate which may be comprised in the detachable end cap that my present fuse is supplied with; and

Fig. 5 is a view in perspective of a washer that serves as a means for firmly holding the fusible link or element of my fuse in fixed position.

Referring to Figs. 1 and 2, my fuse comprises an insulating casing 1, usually made of fibre and in the form of a tubular member. The casing 1 is provided at each of its ends with an end cap 2 which is made of conducting material and serves as a terminal member for my electric fuse.

The end caps 2, it will be noted by reference to Fig. 2, are interiorly threaded in order that they may be screwed to exteriorly threaded ferrules 3 with which the casing 1 is provided at both of its ends. The ferrules 3 are preferably made of metal, such as brass and are secured to the casing 1.

Each end cap 2 is provided at an end portion 7 with an outer end wall 4 in which a central opening 5 is formed. A second end wall 6, which is formed in the shape of an annular disc that is swaged into the end portion 7, is disposed adjacent to the end wall 4 but spaced therefrom, as shown. The end wall 6 is likewise provided with a central opening 8. Interposed between the end walls 4 and 6 is a baffle plate 9 that is illustrated in Fig. 4. The baffle plate 9 is generally of circular form having spaced and circularly arranged nodules 10 formed on both of its faces as shown particularly in Fig. 2. Spaced notches 11 are cut in the periphery of the baffle plate 9.

In assembling my detachable cap member so as to form a unitary structure which embodies, in itself, a tortuous passageway for venting the fuse, I provide a countersunk portion in the end wall 4 of the cap member 2 wherein the baffle plate 9 is disposed. It will be observed that the nodules 10 formed on the upper face of the baffle plate 9 provide means for spacing the baffle plate from the end wall 4. At the same time the baffle plate 9 obstructs direct communication through the opening 5 which is formed in the end wall 4. I then position the circular disc portion 6 adjacent to the underside of the baffle plate 9. The nodules 10 formed on the underside of the baffle plate 9 serve to space the inner end wall 6 from the baffle plate.

By properly swaging the metal comprised in the end portion 7 of the end cap 2 the disc 6 will be permanently secured in position and serve as the inner end wall for my end cap. It will be noted that a tortuous and restricted passageway is formed in the unitary end cap which comprises the opening 8, the notches 11 cut in the baffle plate 9 and the opening 5. Communication between the openings 5 and 8 is therefore established through a series of tortuous passageways which extend adjacent to both sides of the baffle plate 9 and through the notches 11 cut in the periphery of the baffle plate.

A fusible element 12, shown in Fig. 3, is contained within the casing 1 and is provided with a bent-over end portion 13 in which an opening 14 is formed. The bent-over end portion 13 is engaged by a washer 15, of Fig. 5, the fusible element 12 being received in a notch 16 cut in the periphery of the circular disc-shaped washer 15. The washer 15 is also provided with an opening 17 which registers with the opening 14 formed in the bent-over end 13 of the fusible element.

In assembling my renewable fuse, the washer 15 engages on its upper face the bent-over end 13 of the fusible link 12 in such a manner that the openings 14 and 17 register with each other. The washer 15 with the associated fusible link 12 is then positioned within the casing 1 so that the washer 15 will engage a countersunk portion formed in the ferrule 3. The detachable end cap 2 is then screwed upon the ferrule 3 so as to firmly hold the bent-over end 13 of the fusible link 12 intermediate between the inner end wall 6 and the washer 15.

It will be observed that the interior of the casing 1 is vented through the opening 17, formed in the washer 15, through the opening 14, formed in the bent-over end 13 of the fusible link, and through the tortuous passageway formed in the end cap 2.

In placing the other end cap 2 in position, a second washer 15 is properly adjusted in the countersunk portion formed in the lower ferrule 3. The straight end 19 of the fusible link 12 will extend through the notch 16 cut in the lower end washer 15. The straight end 19 of the fusible link 12 is provided with a longitudinal slot 20 so that when the end 19 is bent over to engage the exposed face of the washer 15 at the lower end of the fusible link an unobstructed passageway may be had through the opening 17 formed in the lower washer. If the bent-over end 19 of the fusible link 12 were provided with an opening similar to the circular opening 14 formed in the upper bent-over end 13 it would require considerable adjusting to have the openings register with each other so that unobstructed passage may be had therethrough.

A lower end cap 2, similar in all respects to the upper end cap 2, is then screwed upon the lower ferrule 3. Venting of the fuse is thus secured through the lower end of the casing 1 as well as through the upper end.

By reason of the tortuous passageways that I form in the two end caps 2 it is substantially impossible for flames to follow through the end caps at the blowing of the fusible element. In this fashion, the renewable fuse of my present invention is free from fire hazard, inasmuch as flames will not follow through the restricted and tortuous paths formed in the unitary structures comprising the end caps 2.

At the same time, by reason of the few parts comprised in my present fuse, there is very little tendency of the renewable parts of my fusible element to become sealed to the permanent parts. Again, the tendency to become sealed is overcome by providing a channel through which the products of the arc can easily pass and which can contain these products without sealing together those surfaces which must move with reference to one another when the cap is removed.

In case vaporized metal were carried between two surfaces which move relatively to each other when the cap is removed, the condensing of all or a part of this vapor would seal these surfaces together.

I have experimented with a number of different metals in order to ascertain the metal which is most suitable for making the baffle plates 9. I have found that non-corrosive alloys of nickel and copper are particularly adapted for this purpose, since such alloys have very little tendency to deteriorate when being subjected to the hot flames and gases which follow immediately on the blowing of a fusible element. Moreover, baffle plates 9 formed of these alloys do not become oxidized.

While I have shown and described but one embodiment of my invention, it is to be understood that many modifications may be made therein without departing from the scope of the appended claims and I desire to have only such limitations imposed upon my invention as are necessitated by the prior art or set forth in the appended claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In an electric fuse, the combination with an enclosing casing and a terminal therefor in which a tortuous passageway is formed to permit venting of the fuse, of a fusible link extending through said casing and engaging said terminal, said fusible link having openings formed in its end portion whereby communication may be established between the interior of said casing and the tortuous passageway formed in the said terminal.

2. In an electric fuse, the combination with an enclosing casing, and an end cap therefor in which a tortuous passageway is formed to permit venting of the fuse, of a fusible link extending through said casing and having a bent-over end that engages said end cap, the bent-over end of said fusible link having an opening formed therein in order that communication may be established therethrough between the interior of said casing and the tortuous passageway formed in said end cap.

3. In an electric fuse, the combination with an enclosing casing and an end cap therefor in which a tortuous passageway is formed to permit venting of the fuse, of a fusible link extending through said casing and having a bent-over end portion in which an opening is formed, and a washer adapted to engage the wall of said casing and the bent-over portion of said fusible link, said washer having an opening formed therein whereby communication may be established between the interior of said casing through said washer, said bent-over end of the fusible link and the tortuous passageway formed in said end cap.

4. An electric fuse comprising a casing, a fusible link extending therethrough and having a bent-over end portion in which an opening is formed, and a cap terminal for the casing having a wall portion provided with a tortuous restricted passageway, said passageway of the cap terminal registering with the opening in said fusible link in order to furnish communication between the interior of said casing and the outer air.

5. An electric fuse comprising a casing, a fusible link contained therein and having a bent-over end portion in which an opening is formed, a washer having an opening, and a cap terminal for said casing provided with a wall portion in which a tortuous passageway is formed whereby communication is afforded from the interior of said casing to the outer air.

6. An end cap of unitary structure for an electric fuse comprising a cup-shape member having its end wall countersunk and perforated, a baffle plate contained in said countersunk portion and provided with upstanding projections on both faces and a plurality of spaced peripheral notches, and a perforated disk positioned in said counter-sunk portion of the end cap and in contact with said baffle plate.

7. An end cap of unitary structure for an electric fuse comprising a cup-shape member having its end wall countersunk and perforated, a baffle plate received in said counter-sunk portion, a perforated disk positioned in said counter-sunk portion, and means for spacing said baffle plate from said disk and the adjacent end wall of said cap member whereby a tortuous passageway may be formed interiorly of the end cap and having the perforations in said end cap and said disk serving as its termini.

8. In a container for electrical apparatus, a vented closure member comprising a perforated and counter-sunk portion, a perforated disk positioned in said counter-sunk portion, and a baffle plate retained in said portion by and beneath said disk.

9. In a container for electrical apparatus, a vented closure member comprising a perforated and counter-sunk portion, a perforated disk positioned in said counter-sunk portion, a baffle plate retained in said portion by and beneath said disk, and means formed on said member at the periphery of said counter-sunk portion for fixing said disk in position.

10. A terminal of unitary structure for an electric fuse shell comprising a cup-shape member having a perforated and countersunk wall, a perforated disk fixed in said counter-sunk wall, a baffle plate beneath said disk, and means for spacing said plate from said counter-sunk wall and from said disk.

In witness whereof, I have hereunto subscribed my name.

JOHN C. BOGLE.

Witnesses:
GEO. W. HANSEN,
LAURA M. SCHNEIDER.