

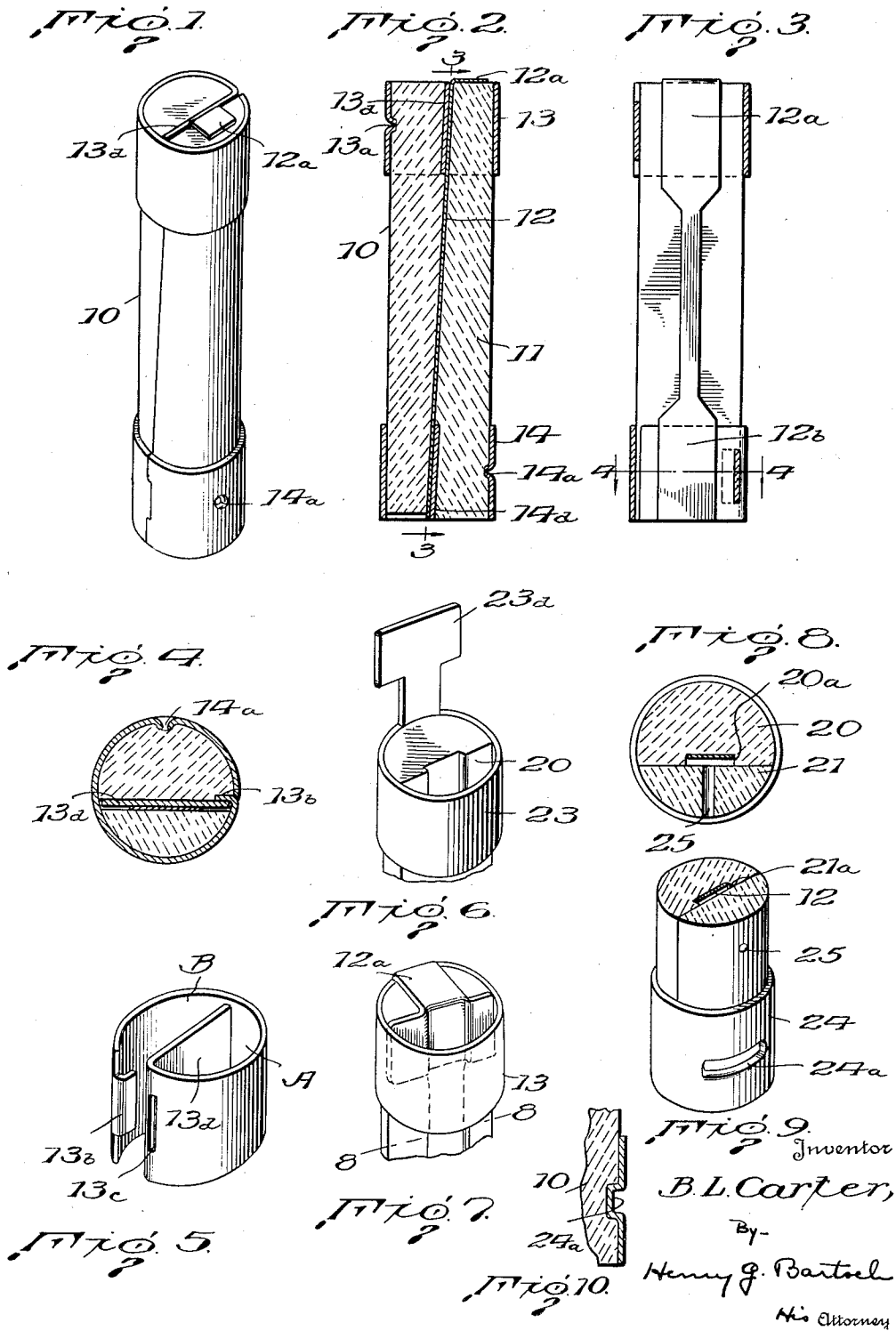
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FUSE

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FUSE

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7 Claims. (Cl. 200—131)

My invention relates to improvements in fuses and has to do, more particularly, with the provision of a novel renewable fuse of the cartridge type having a dielectric barrel capped at each end by fuse terminals adapted for reception in the spring clips of the conventional cartridge fuse receptacle.

Renewable cartridge fuses are at this time available upon the market. The most widely used construction consists of a tubular fibre barrel provided at each end with an externally threaded ferrule, one of which ferrules is closed except for a narrow slot through which an end of the replaceable fuse strip is inserted and bent over. A threaded cap receivable upon this ferrule clamps upon the bent-over end of the fuse strip, making contact therewith. The ferrule at the opposite end of the barrel is open to facilitate extension of the fuse strip therethrough. A slotted washer is strung upon the adjacent end of the inserted strip and is seated upon the rim of the open ferrule, whereupon this end of the fusible strip may be bent over and clamped down for electrical contact by a second cap threadedly associated with the washer-closed ferrule. The construction just described consists of four small parts which are expensive to manufacture and extremely difficult to assemble, particularly in the total darkness frequently encountered.

With the foregoing prior art construction in mind, my invention has, for its purpose, several well-defined objects. It is a primary object of my invention to provide a renewable cartridge fuse construction which, excluding the fusible strip, consists of but two detachable parts.

It is another object of my invention to provide a cartridge fuse construction which may be renewed without the use of any tools.

It is an object of my invention to provide a cartridge fuse construction which may be renewed in total darkness.

It is an object of my invention to provide a renewable cartridge fuse construction which insures perfect electrical contact of the replaceable fusible strip with the cartridge proper, preventing pitting of the cartridge contacts and assuring proper overload protection for the line in which the fuse is employed.

It is an object of my invention to provide a cartridge fuse construction, renewal of which may be effected with fusible strips having a wide range of length, thickness and flexibility.

It is an object of my invention to provide a renewable cartridge fuse construction which can be fabricated from inexpensive stock materials

by simple pressing and stamping operations, permitting sale of such fuses at a reasonable price.

Further objects, and objects relating to details and economies of construction and use will more definitely appear to those skilled in the art upon familiarization with the detailed description to follow. In one instance, I accomplish the objects of my invention by the means and methods set forth in the following specification. My invention is clearly defined in the appended claims. Structures constituting preferred embodiments of my invention are illustrated in the accompanying drawing forming a part of this specification.

Figure 1 is a perspective view of a renewable cartridge fuse constituting a preferred embodiment of my invention;

Fig. 2 is a longitudinal sectional view of the same fuse construction taken on a plane at right angles to the plane of the fusible strip forming a part thereof;

Fig. 3 is a longitudinal sectional view of the same construction taken on the line 3—3 of Fig. 2;

Fig. 4 is a transverse sectional view of the same fuse construction taken on the line 4—4 of Fig. 3;

Fig. 5 is a detail perspective view, on an enlarged scale, of one terminal collar of the foregoing construction, the collar element being shown in its blank form immediately prior to assembly with the butt end of a barrel segment of the previously illustrated construction;

Fig. 6 is a detail perspective view of a modified form of collar in which the fusible strip contacting terminal is constituted by a longitudinal extension of a seamless tubular collar blank;

Fig. 7 is a view similar to Fig. 6, illustrating the collar in complete assembly with the butt end of its associated barrel segment;

Fig. 8 is a transverse sectional view of an assembled fuse construction composed of two barrel segments of the type disclosed in Fig. 7 and illustrating the chambered form of the barrel segments which provide an expansion space for gases generated by fusing;

Fig. 9 is a view in perspective and section disclosing certain details of construction of the fuse illustrated in Figs. 7 and 8; and

Fig. 10 is a sectional view illustrating the mode by which the terminal collars are anchored to the butt end of the barrel construction disclosed in Fig. 9.

Similar reference numerals refer to similar parts throughout the several views.

In a broad sense, my invention may be said to find embodiment in a cartridge fuse construction

tion composed of two generally similar tapering segments which are complementary to each other when assembled and constitute a dielectric fusible-strip-receiving barrel. Proper assembly of the segments is preferably attained by a metal collar permanently secured to the butt end of each segment and provided with a socket portion which receives the complementary wedge end of the other tapered segment. Wing-like extensions of said collars lie along the planar faces of the segments and constitute terminals for electrical contact with the respective ends of fusible strip adapted for reception between the planar surfaces of the segments. The relative proportions of all the parts are such that assembling thereof induces a wedged contact of the terminals with the interposed fusible strip during final clamped engagement of the fusible strip. Where said strip-contacting terminals are not "inlaid" into flush disposition with respect to the planar faces of the segments, the intermediate attenuated portion of the fusible strip is exposed for venting and inspection, by reason of the slight spacing between the planar surfaces of the assembled segments. Obviously, however, the terminal strip contacts may be "inlaid" in the segments and a small channel may be provided in the planar surfaces so that the segments will be assembled in substantial contact. In such a construction, either an expansion chamber or a vent for the gases evolved in fusing should be provided to preclude swelling or bursting of the fuse barrel. Constructions embodying each of these concepts are illustrated in the accompanying drawing.

More specifically, and with reference to Figs. 1 through 5 of the drawing, my invention may be embodied in a cartridge fuse construction consisting of a bi-segmented barrel composed by a pair of substantially identical complementarily tapered segments 10 and 11 which are held in assembly upon a conventional fusible strip 12 by a pair of collar members 13 and 14 permanently secured to the butt ends of the segments 10 and 11.

The collar members 13 and 14 may be of identical construction and be fabricated from a strip of thin sheet metal, one end of which, 13^b, is bent into the form of a tongue adapted to be received in a complementary slot 13^c. The other end of the strip is bent radially inwardly to form a contact portion 13^d which, in effect, divides the collar member into major and minor socket portions A and B. The major socket portion A receives the butt end of one of the segments and is permanently anchored thereto by means of an inwardly punched portion 13^a. Preferably, and as shown, the butt end of the secured segment 10 is recessed along its planar face to such an extent as to substantially accommodate the portion 13^d of the collar, with the result that the exposed surface of said contact portion 13^d is almost flush with said planar surface of the segment proper. The butt end of the segment 11 is similarly provided with its collar 14 of identical configuration, and the thin or wedge ends of the segments 10 and 11 are receivable within the minor sockets B of the collars 14 and 13, respectively. The size and configuration of the sockets B of the collars 13 and 14 is such that, when the segments 10 and 11 are assembled with the fusible strip 12 interposed between their complementary faces, the strip 12 will be tightly clamped in electrical connection with the terminal contacts 13^d and 14^d integral with the

collars. Preferably, though not essentially, one of the segments 10 is slightly shorter than its complementary segment 11, to facilitate insertion of the wedge ends in their respective sockets B. Where, as illustrated in Figs. 1 through 5, the complementary surfaces of the segments are substantially plane, the interposition of the strip 12 effects a slight spacing therebetween, by reason of which spacing facile venting of the strip is inherently afforded. Moreover, such spacing permits ready inspection of the interposed fusible strip 12 for continuity without disassembly of the fuse parts and, in many instances, without removal of such a fuse from its conventional fuse block or receptacle.

The method of replacing a "blown" fuse strip in a device of the foregoing construction should be readily understood. The cartridge may be "opened" simply by grasping an end of the device in each hand and pulling apart the two component elements of the cartridge. This separative action almost invariably results in the dropping out of the ruptured fuse strip 12 in its two pieces. The user then selects a replacement strip 12 of the proper capacity and, after bending over one end 12^a of the strip, lays it upon the planar face of one of the segments (11, here). The other segment 10 is then superposed upon the segment 11, in slightly displaced relation thereto so as to clear the socket B of the collar 14, and the two segments are then longitudinally telescoped into interengagement, as shown in Figs. 1 and 2. The bending over of the portion 12^a of the fusible strip suffices to prevent displacement thereof with respect to the segment 11, and the telescoping assembly of the segments is effective to bring the enlarged ends 12^a, 12^b of the strip into wedged contact with the terminals 13^d, 14^d of the cartridge. When the parts are assembled as shown in Fig. 2, the wedged relationship of the terminals 13^d and 14^d with the ends 12^a and 12^b of the strip is so complete as to preclude the existence of any high resistance connection between these parts. As a result, overheating of the fuse construction is impossible, and the accuracy of the strip 12 as an overload device is maintained.

In Figs. 6 through 10 I have disclosed a modified cartridge fuse construction constituting another embodiment of my inventive concept. Complementary tapered segments 20 and 21, generally similar to those 10 and 11 of the previously described construction, are employed. However, the planar faces of these segments 20 and 21 are provided with shallow longitudinal channels 20^a, 21^a of a depth sufficient to accommodate a conventional fusible strip 12 disposed therein and permit the planar faces of the segments, when complementarily assembled, to lie in close contact. A distinct vent opening 25 is provided for permitting relief of gases developed due to fusing of the strip 12 when overloaded. The construction illustrated in Figs. 6 through 10 is also distinguished from that previously described in that the identical collar elements 23 and 24 are formed from inherently tubular stock, the fuse-strip-contacting terminal 23^d illustrated being exemplary of the contact means of each collar element. Preferably, the contact terminals are "inlaid" into the planar surface of the segment by cutting out a portion of the latter adjacent its butt end, and such cut-out portion permits a "dishing" of the terminal, as shown in Fig. 7, to snugly receive the enlarged end 12^a of the fuse. Such a construction affords contact of the major

portion of the planar faces of the two segments, providing a closed barrel ventable through the opening 25. Secure assembly of the collar elements with the butt ends of the segments is afforded by the embossment (24^a here) into a previously formed recess in the segment.

The mode of assembly for the construction illustrated in Figs. 6 through 10 is similar to that involved in the cartridge fuse construction illustrated in Figs. 1 through 5 and need not be specifically described.

It will be seen that I have provided an extremely simple and inexpensive cartridge fuse construction which may be renewed with a fusible strip of the conventional type available on the market. Not only may my construction be fabricated from inexpensive stock material by simple pressing and stamping operations, but the renewal of my fuse may be accomplished without the use of any tools whatever and, if necessary, in total darkness. The complementary barrel segments 10 and 11 may be inexpensively manufactured from dielectric compositions by a simple molding operation. The very act of assembly of the two parts upon a new fusible strip assures a tight electrical connection therewith. Hence, overheating and improper break-down of the strip, as well as a pitting of the contact surfaces, is precluded. Where no provision, such as channeling, is made for the accommodation of the fusible strip, venting thereof upon break-down is inherent and fracture of the strip may be discerned without removal of the cartridge from the conventional fuse block or receptacle.

I am aware that numerous changes in size, configuration and structural detail may be availed of without departing from the broad concepts of the invention herein disclosed. I, therefore, claim my invention broadly, as indicated by the appended claims.

What I claim is:

1. A renewable cartridge fuse, comprising: a pair of wedge-shaped dielectric segment members similarly externally tapered and complementarily associable side-by-side to constitute a separable barrel, a socket member carried by the butt portion of each segment member and within which socket member the thin end of the complementary wedge-shaped segment member is detachably wedgedly receivable, and electrical contact means set into an end portion of each segment member, to constitute a portion of the barrel cleavage surface and positively engage a conventional fusible strip interposed between said segment members when wedgedly socket-assembled.

2. A renewable cartridge fuse, comprising: a cylindrical barrel of dielectric material comprised by two substantially identical complementarily tapered segment members, electrical contact means built into the complementary faces of each of said segment members adjacent their respective butt ends defining a pair of spaced terminals adapted to be bridged electrically by a conventional fusible strip interposable between said complementary segment members, and an electrically conductive collar secured about the butt end of each segment member in connection with its adjacent contact means and including a socket portion within which the complementary thin end of the other segment member is detachably wedgedly receivable to effect positive wedged engagement of said contact means with the adjacent portions of a conventional fusible strip interposed between said segment members.

3. A renewable cartridge fuse, comprising: a

two-piece barrel of dielectric material comprised by a pair of longitudinally tapered complementary segment members, a pair of electrically-conductive tubular collars each provided with an integral partition defining a major socket permanently secured about the butt end of one segment member and a minor socket adapted to wedgedly detachably receive the complementary thin end of the other segment member, said partition elements being inset into the planar face of the segment to which it is permanently secured and constituting a slightly-raised terminal for positive wedging engagement with the ends of a conventional fusible strip interposed between said segment members.

4. A renewable cartridge fuse, comprising: a two-piece barrel of dielectric material comprised by a pair of longitudinally tapered complementary segment members, a pair of electrically-conductive collars each constituted by a strip curled into tubular form one end of which strip is extended inwardly to constitute a partition within the strip-formed tube and the other end of which strip is tongued into a slot formed in the tubular portion adjacent its line of juncture with said partition, each partitioned collar defining a major socket permanently secured about the butt end of one segment member and a minor socket adapted to receive detachably the complementary thin end of the other segment member and effect positive wedged engagement of the partition members with the ends of a conventional fusible strip interposed between said segment members.

5. A renewable cartridge fuse, comprising: a two-piece barrel of dielectric material comprised by a pair of longitudinally tapered complementary segment members, a pair of electrically-conductive collars each provided with a tongue turned longitudinally inwardly over the butt portion of a segment member secured within said collar and therewith defining a socket for detachable wedged reception of the complementary thin portion of the other segment member, each said tongue element being inset into the complementary face of the butt portion of its segment member and constituting a terminal for positive engagement with the adjacent end of a conventional fusible strip interposed between said socket-assembled segment members.

6. A renewable cartridge fuse, comprising a pair of wedge-shaped dielectric segment members of slightly different overall length but similar longitudinal taper, said members being complementarily associable side-by-side to constitute a separable barrel, electrical contact means on the complementary faces of each of said segment members, said contact means of each segment member being disposed adjacent its butt end to define, with that of the other segment member, spaced terminals adapted to be bridged electrically by a conventional fusible strip interposable between said complementary segment members, and a socket member carried by the butt portion of each segment member in electrical connection with its contact means and within which socket member the complementary thin end of the other segment member is detachably wedgedly receivable to effect positive engagement of said contact means with the adjacent portions of the conventional fusible strip interposed between said segment members.

7. A renewable cartridge fuse, comprising: a pair of recessed wedge-shaped segment members of dielectric material similarly longitudinally

5 tapered and complementarily associable side-by-side to constitute a hollow separable barrel, electrical contact means on the complementary faces of each of said segment members, said contact means of each segment member being disposed adjacent its butt end to define, with that of the other segment member, spaced terminals adapted for electrical bridging by a conventional fusible strip interposable between said complementary segment members, and a socket member carried

by the butt portion of each segment member in electrical connection with its contact means and within which socket member the complementary thin end of the other segment member is detachably wedgedly receivable to effect positive engagement of said contact means with the adjacent portions of the conventional fusible strip interposed between said segment members. 5

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