

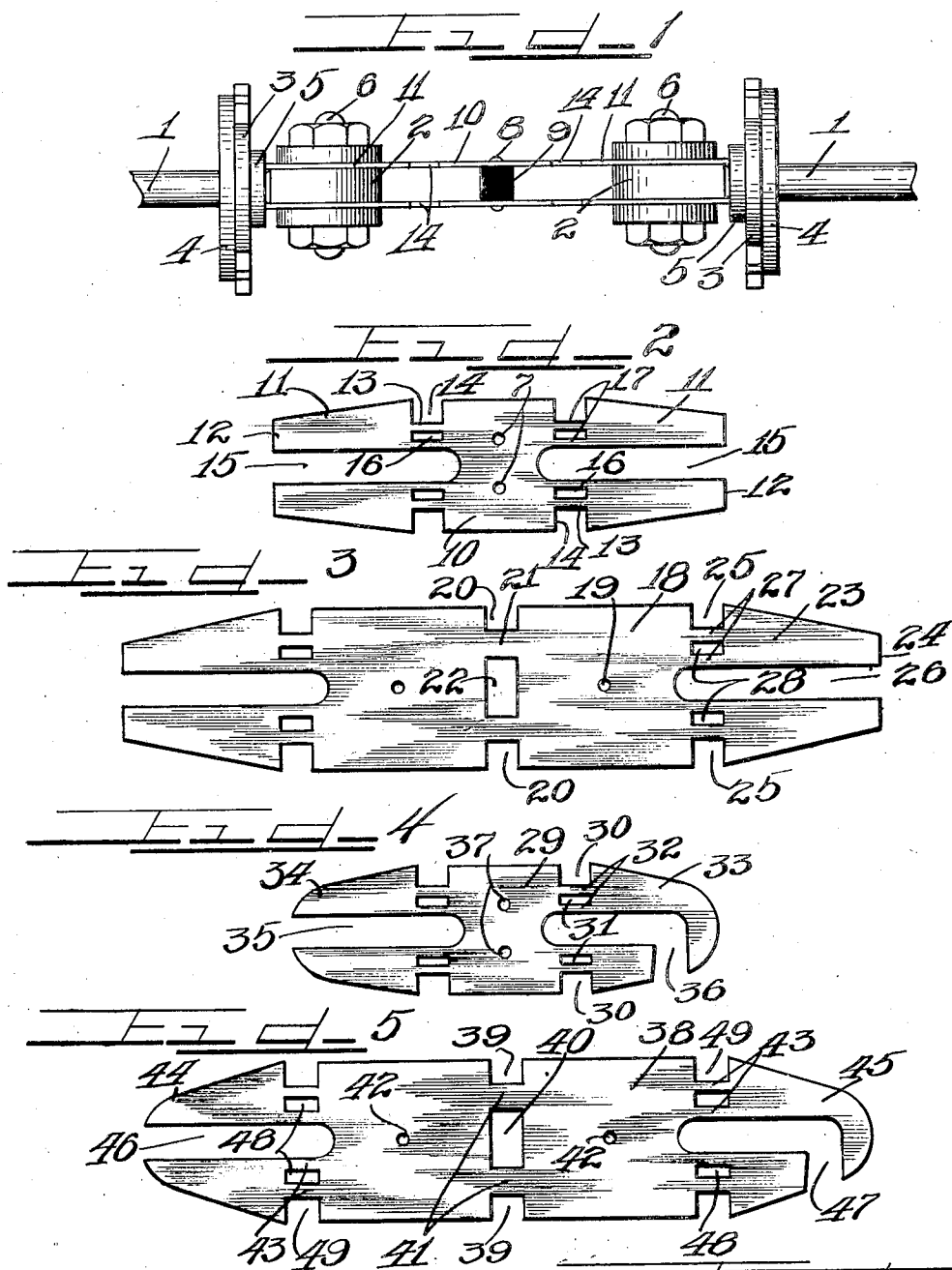
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RENEWABLE FUSE ELEMENT

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RENEWABLE FUSE ELEMENT

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The present invention pertains to an improved type of renewable or replaceable fuse element adapted for use in fuses of the knife-blade cartridge type, said fuse element adapted to be interposed in electric circuits to prevent destructive action of the current due to overloads or short circuits.

It is an object of this invention to provide an improved type of renewable or replaceable fuse element constructed of a strip of metal having two or more reduced sections and having end slots for mounting the fuse element, with said slots being of a length sufficient to project through the end sections of the element and through the reduced portions connecting the end sections with the body of the element to provide pairs of fusing strips on opposite sides of the mounting slots which strips when subjected to overloading or short circuiting, will blow thereby breaking up the end sections into a plurality of separated parts to facilitate convenient replacement of the fuse element.

It is also an object of this invention to provide a fuse element having apertured reduced sections intermediate the body portion and the end sections with said reduced sections being separated into a plurality of fusing strips by mounting slots of the fuse element.

It is a further object of this invention to provide a renewable fuse element having the end sections and reduced apertured portions adjacent thereto divided by mounting slots of the fuse element to afford an arrangement whereby the end sections, when a fuse is blown, will be separated into a plurality of pieces to facilitate replacement of the blown fuse element by a new element.

It is furthermore an object of this invention to provide a replaceable fuse element adapted for use in cartridge fuses of the knife-blade type with said element being so constructed that the mounting slots provided in the ends thereof are of a length sufficient to project through reduced portions of the fuse element adjacent the inner ends of the end sections.

It is also an object of this invention to provide a renewable fuse element with reduced fusing strips provided on opposite sides of

the mounting slots and to the outside of the inner ends of said slots.

It is an important object of this invention to provide an improved type of renewable fuse element having the mounting slots thereof so positioned to provide reduced fusing strips on opposite sides thereof to form end sections of a plurality of parts joined to the body portion of the element by the reduced fuse strips.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

This invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a fragmentary side elevation of a knife-blade terminal unit of a knife-blade type cartridge fuse having mounted therein replaceable fuse elements embodying the principles of this invention.

Figure 2 is a plan view of an improved renewable fuse element embodying the principles of this invention and having the mounting slots projecting through the end sections, through intermediate sections, and into the body portion of the fuse element.

Figure 3 is a modified form of fuse element adapted for use in cartridge fuses of the knife-blade type having a reduced portion in the body section of the element.

Figure 4 is a plan view of another modified form of renewable fuse element having rounded end sections and reduced intermediate sections divided by the mounting slots of the fuse element.

Figure 5 is another modified form of a high capacity renewable fuse element for use in cartridge fuses of the knife-blade type.

As shown on the drawings:

The reference numeral 1 indicates a pair of knife-blade terminals of a cartridge fuse with said knife-blade terminals having the inner ends thereof reduced in size to form tongues or projections 2. Mounted on each of the knife-blade terminals 1 is a notched disc 3 and an outer metal disc 4. Secured on each knife-blade terminal 1 adjacent the

inner surface of the notched disc 3 is a stop plate or block 5. Each of the knife-blade tongues 2 is provided with an aperture for the reception of a retaining bolt 6 or other suitable means for securing a single or a multiple type renewable fuse strip or element in place between the knife-blade terminal units of the cartridge fuse. Figure 1 illustrates the use of a double or multiple type replaceable or renewable fuse unit, the two fuse elements of which are provided with suitable apertures 7 provided in the middle portion of the fuse element for the reception of connecting pins or rivets 8 around which spacing sleeves or collars 9 are engaged to hold the renewable fuse element separated and in substantially parallel relation with respect to one another.

The improved renewable fuse element is adapted for use in the combination illustrated in Figure 1 and comprises a strip of fusible metal embracing an intermediate or main body portion or section 10 and tapered end or terminal sections 11 the ends of which are squared to provide straight end edges 12, to permit the same when engaged on knife-blade terminal units to abut against the stop plates or blocks 5 to hold the renewable fuse element in proper aligned position. Integrally connecting the end or terminal sections 11 with the body section 10 are reduced intermediate or connecting sections 13 formed by opposite pairs of marginal notches 14. Provided in each end of the renewable fuse element is a longitudinally positioned mounting slot 15 the outer end of which opens through the straight edge 12 while the inner portion of each of said slots projects longitudinally through the middle portion of the respective tapered end sections 11 and continues through the reduced intermediate portions 13 and extends part way into the body section 10. It will thus be noted that each of the mounting slots 15 divides one end of the renewable fuse element into two end section parts and also divides the reduced intermediate sections 13 into two parts, each of which is provided with a longitudinally positioned opening or slot 16 to form a plurality of parallel fusing strips 17 on each side of the mounting slots 15 to connect one of the end section parts to the body portion 10 of the fuse element. It will be noted that each of the mounting slots 15 divides one of the tapered end sections into a plurality of parts and furthermore serves to divide each one of the reduced connecting sections 13 into a plurality of reduced sections each of which is divided by an opening 16 to provide a plurality of reduced fusing strips 17 which, when the fuse element is subjected to overloads or short circuits, will readily blow, permitting the end section parts or halves to be separated from the body portion 10 of the fuse element to be conveniently removed from opposite sides of the mounting

screw bolts 6 to permit a new fuse element to be mounted in position.

The novel arrangement of providing the mounting slots of the fuse element so that they extend longitudinally through the tapered end sections and through the reduced intermediate sections provides a plurality of pairs or sets of fuse strips between each of the end sections and the body section so that when the fuse element is subjected to overloads or to short circuits the fuse strips will melt or blow, thereby permitting the middle or body section 10 to drop away and separate from the end sections the parts of each of which are separated, thereby permitting the same to be removed from opposite sides of the particular mounting screw or bolt which holds the same connected with the terminal blade of the unit.

Figure 3 illustrates a modified form of renewable or replaceable fuse element of a higher capacity than the one illustrated in Figure 2 and embraces a fusible metal body portion or section 18 provided with a pair of apertures 19 provided for use in connecting two or more fuse elements in parallel assembled relation to provide a multiple fuse unit. The body section 18 is provided with side notches 20 in the longitudinal margins thereof to provide a reduced middle section 21 having an opening 22 therein to provide a pair of parallel fusing strips connecting the two halves of the body portion or section 18. Provided on each end of the body section 18 is a tapered end section 23 the outer reduced end of which is provided with a straight edge 24 to permit the same, when engaged on the knife-blade terminal unit to abut against a stop plate or block to hold the renewable fuse element in proper aligned position. Integrally connecting the enlarged inner end of each tapered end section 23 with the body section 18 is a reduced connecting portion formed by opposite notches 25. Provided in each of the end sections 23 is a longitudinally disposed mounting slot 26 which extends from the outer end of the end section inwardly through the reduced section and into a portion of the body section 18, thereby dividing each end section into two parts or halves each of which is connected by a plurality of reduced fuse strips 27 formed by providing an opening or slot 28 in each of the reduced connecting portions joining the inner ends of the end section parts with the body portion 18 of the fuse element. The fusing strips 21 joining the two portions of the body section 18 are of greater cross-section than the fusing strips 27 which connect the end section parts with the ends of the body section. This arrangement permits the smaller fusing or melting strips 27 to fuse on short circuits, while on overloads, both the small fusing strips 27 and the larger fusing strips 21 will blow, thereby permitting a plurality

of sections to drop out from between the end sections each of which has the halves or portions thereof separated to facilitate convenient removal from opposite sides of the mounting screw bolts holding the end sections in place.

Figure 4 illustrates another modified form of renewable fuse element comprising a main body section 29 formed of fusible metal. The body section 29 is formed by a plurality of pairs of oppositely positioned notches 30 which form reduced connecting sections each of which is provided with a slot or opening 31 dividing the reduced connecting sections into a plurality of fusing strips 32. The outer ends of the fuse element are formed to provide tapered end or mounting sections 33 and 34. The tapered end section 34 is provided with a longitudinally positioned mounting slot 35 which projects from the outer end of the end section inwardly and extends through one of the reduced portions formed by the notches 30 into the body section 29 of the fuse element. The tapered end or mounting section 33 is provided with an L-shaped or angled slot 36 the outer end of which opens through one of the side edges or margins of the end section, while the long arm of said slot projects centrally through the end section 33 and through the reduced portion joining the end section 33 with the body 29 with the inner end of said slot 36 terminating in the body section 29.

It will thus be noted that the fuse element of the type illustrated in Figure 4 has the tapered end sections at the ends with the mounting slots 35 and 36 having the inner ends thereof of sufficient length to not only project through the end sections but through the reduced portions and into the body section 29, thereby providing a plurality of pairs of parallel fusing strips 32 on opposite sides of the mounting slots so that when the fuse element is subjected to overload or short circuits, the fusing strips 32 will blow thereby permitting the middle or body section 29 to drop out of contact with the end sections both of which are divided into a plurality of parts caused by the fusing of the strips 32 so that the end section parts may be removed from opposite sides of the mounting bolts which serve to hold the fuse element in position. When fuse elements of the type illustrated in Figure 4 are to be used in multiple as illustrated in Figure 1, the body portion is provided with a plurality of apertures 37 for the reception of connecting pins or rivets.

Figure 5 illustrates a modified form of renewable fuse element of the high-capacity type embracing a body portion 38 at its middle portion with marginal notches 39 and a middle opening 40 transversely aligned to provide a plurality of intermediate fusing strips 41 joining the two halves of the body section 38. When the fuse element illus-

trated in Figure 5 is to be used in multiple, apertures 42 are provided in the body section. Formed on opposite ends of the body portion 38 and integrally connected therewith by means of a plurality of sets of parallel fusing strips 43 are tapered end sections 44 and 45 formed with rounded ends. The end section 44 is provided with a longitudinally positioned mounting slot 46 which projects inwardly through the entire length of the end section 44 and through the reduced portion uniting the end section 44 with the body section 38 and terminates in the body section. In a similar manner the tapered end section 45 is provided with an angular or L-shaped mounting slot 47, the outer end of which opens through one of the side edges of the end section 45, while the long arm of said mounting slot projects longitudinally through the end section and through the reduced portion of the element which connects the end section 45 with the body portion 38. It will be noted that the end sections 44 and 45 are connected with the body section 38 by means of a plurality of pairs of fusing strips 43 which are separated by openings or apertures 48 so that the fusing strips 43 are of less cross-section than the fusing strips 41 joining the two halves of the body section 38. Marginal notches 49 positioned to the outside of the fusing strips 43 separate the outer ends of the body portion 38 from the enlarged inner ends of the tapered end sections 44 and 45 respectively.

It will be noted that a plurality of different types or styles of renewable fuse elements have been illustrated and described in which the various elements comprise body sections and tapered end sections which are connected by apertured reduced portions each of which comprises a plurality of pairs of parallel fusing strips with said pairs of fusing strips being positioned on opposite sides of the mounting slots provided in the tapered end sections due to the fact that said mounting slots are of sufficient length to not only project through the end sections but through the reduced connecting sections and into the body section of the fuse element. The various fuse elements are constructed with the fusing strips positioned in parallel relation and parallel to the longitudinal edges of the body portion of the element so that when the elements are subjected to overloads or short circuits, a positive breaking of the circuit is insured due to the blowing of the primary or the primary and secondary fusing strips to permit the body section of the fuse element to drop out to insure a gap between the end sections of the fuse elements which are secured to the terminal heads of units of the cartridge fuses in which the various fuse elements may be mounted. With the fusing of the fuse strips to permit the body sections to drop out, attention is called to the fact that

the tapered end or mounting sections are divided into a plurality of parts so that after a fuse has blown, the end section parts may be removed from opposite sides of the mounting screws or bolts.

The various fuse elements illustrated and described may be used singly or in multiple as illustrated in Figure 1 and are so constructed that the elements may be adapted for use in cartridge fuses of the knife-blade type. While tapered, square-ended, and round-ended end sections are illustrated and described in connection with the various types of renewable fuse elements, it will, of course, be understood that any other desired or required type or shape of end sections may be provided on the improved renewable fuse element so long as the end sections have the mounting slots thereof projecting not only through the length thereof but with said mounting slots extending through reduced connecting sections which unite the end sections with the body section of the fuse element.

It will, of course, be understood that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and it is, therefore, not the purpose to limit the patent granted hereon otherwise than is necessitated by the scope of the appended claims.

I claim as my invention:

1. A renewable fuse element comprising a fusible strip of metal embracing a body section and end sections connected by reduced portions, said element having mounting slots extending through the end sections and the reduced portions and continuing into the body section.

2. A renewable fuse element comprising a body section, end sections, and apertured connecting sections joining the end sections with the body section, said element having slots extending through the end sections and continuing through said connecting sections into the body section.

3. A fuse element comprising a body section and integral end sections, with said end sections having slots extending therethrough and continuing into the body section.

4. A fuse element comprising a body section, end sections, and reduced apertured sections connecting the end sections with the body section, said element having slots in the body section extending outwardly through the reduced apertured sections and through the end sections.

5. A fuse element comprising a fusible metal strip having notches and apertures therein on opposite sides of mounting slots.

6. A fuse element including groups of fusible strips separated by mounting slots provided in the element.

7. A fuse element comprising a body section, end sections, and fusing sections connecting the end sections with the body section, said end sections having mounting slots therein extending into the fusing sections.

8. A fuse element comprising a body section, end sections, and reduced fusing sections connecting the end sections with said body section, said element having mounting slots therein common to all of said sections.

9. A fuse element comprising a body section, end sections, and reduced fusing sections connecting the end sections with said body section, said element having slots therein extending outwardly in opposite directions from the body section through said fusing sections and said end sections.

10. A fuse element comprising a body section, end sections, and apertured fusing sections connecting the end sections with the body section, said body section having slots therein extending into the fusing sections.

In testimony whereof I have hereunto subscribed my name at Chicago, Cook County, Illinois.

JOHN B. GLOWACKI.