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1,702,354

H. R. COOK ET AL

CARTRIDGE FUSE

Original Filed Nov. 11, 1925

Fig. 1.

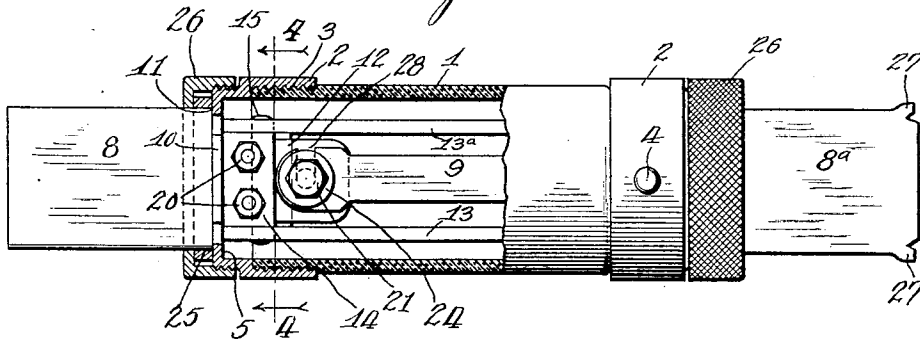


Fig. 2.

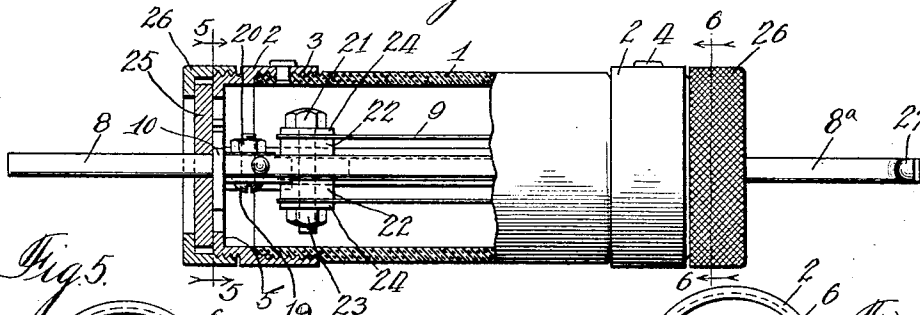


Fig. 3.

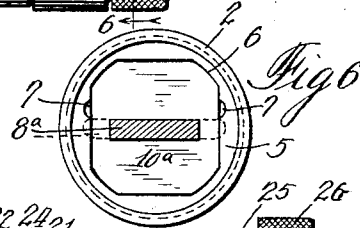
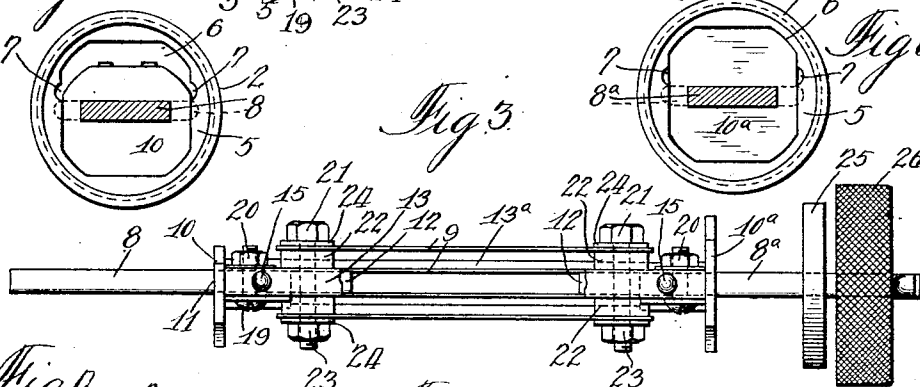


Fig. 5.

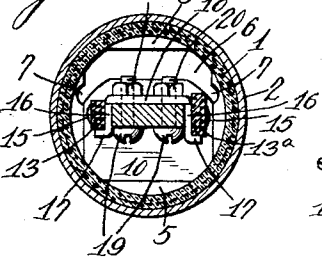
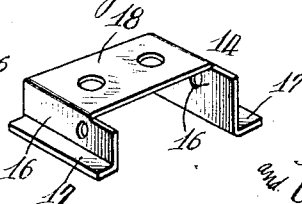


Fig. 6.



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CARTRIDGE FUSE.

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More particularly the invention relates to a renewable cartridge fuse of the knife blade type wherein the blades are incorporated in a terminal blade unit which is bodily removable from the casing, it being the general object of the invention to provide in such a fuse a new and improved terminal blade unit especially adapted for use where it is desirable to join the blades by a plurality of fusible elements so as to afford increased current carrying capacity.

Another object of the invention is to provide a terminal blade unit of an improved construction, wherein the terminal blades are secured in rigid alinement by means of a detachable insulating bridge section so constructed and related to the blades as to permit free access to the fusible links in renewing the latter.

In pursuance of the foregoing objects, we aim to provide a renewable cartridge fuse having a suitable casing, a terminal blade unit comprising a pair of contact blades joined by one or more fusible links and secured in rigid alinement by means of a detachable insulating bridge section, and means to secure said terminal blade unit detachably in said casing.

Further objects and advantages will become apparent as the description proceeds.

In the drawings,

Figure 1 is a longitudinal view of the preferred form of the invention, partly in central section.

Fig. 2 is a similar view taken in a plane at right angles to that of Fig. 1.

Fig. 3 is an elevational view of the terminal blade unit, with a portion of the insulating bridge broken away.

Fig. 4 is a section taken approximately along line 4—4 of Fig. 1.

Fig. 5 is a section in the plane of line 5—5 of Fig. 2 with the end cap removed.

Fig. 6 is a section in the plane of line 6—6 of Fig. 2 with the end cap removed.

Fig. 7 is a perspective view of one of the clips of the bridge section.

For purposes of disclosure, we have illustrated in the drawings and will hereinafter describe in detail the preferred embodiment of the invention, with the understanding that we do not intend to limit the invention to the particular construction and arrangement shown, it being contemplated that various

changes may be made by those skilled in the art without departing from the spirit and scope of the appended claims.

In the form herein illustrated the invention embodies a casing comprising an insulating tube 1 of fibre or other suitable material, having metallic heads or bushings 2 suitably secured at the opposite ends thereof as by means of the screw threads 3 and rivets 4. The heads have outer end walls or webs 5 forming alined non-circular apertures 6 therein, these apertures being herein shown as equal in size and shape and as having four straight edged sides at right angles to each other. Two of the webs have opposed notches 7 therein offset from the central portion of the webs as shown in Figs. 4, 5 and 6.

The terminal blade unit in the preferred form illustrated comprises a pair of knife blade terminals 8 and 8^a, joined by one or more fusible elements 9 and having plates 10 and 10^a fixed transversely thereon, the blades being secured rigidly in spaced relation by means of an insulating bridge section to be presently described. The knife blades are provided with opposed shoulders 11 formed on the edges thereof, the inner portions 12 of the blades being narrower than the outer or terminal portions. The plates 10 and 10^a which are apertured to permit insertion of the inner portions 12 of the blades, are secured against the shoulders by any suitable means. These shoulders extend beyond the edges of the plates and abut the outer side of the webs 5 of the heads when positioned axially of the casing (see Figs. 5 and 6 wherein the position of the terminal portions of the blades is shown in dotted outline), to prevent inward movement of the blade therein, as shown for the left hand end in Fig. 1, the plates 10 and 10^a then being positioned within the apertures 6 and in the planes of or flush with the webs 5. The plate 10^a is adapted to fit snugly in and to close the aperture of one head as shown in Fig. 6, to hold the blade 8^a central thereof and against rotary movement in the casing. The plate 10 fits snugly against three of the straight sides of the aperture of the other head to partly close said aperture and to prevent rotary movement of the blade 8 in that head when the blade is central thereof, said plate being narrower on one side of the blade to permit lateral movement of the

blade in the aperture to a position eccentric of the casing wherein the shoulders 11 register with the notches 7 in the webs to permit withdrawal of the terminal blade unit longitudinally through the casing.

The insulating bridge section herein illustrated comprises two laterally spaced insulating members or bars 13 and 13^a secured rigidly together and adjacent the edges of the blades by means of two U-shaped channel like metallic clips 14 positioned between the insulating members at their opposite ends and secured thereto by means of rivets 15. These clips, as shown in Fig. 7, have the upright portions 16 extended longitudinally and turned outwardly at the top edges to provide ledges or flanges 17 against which the insulating members abut to prevent a pivotal movement of the clip about the rivets and to obtain a rigid structure. The intermediate portions 18 are flat and of a length to permit the inner portions 12 of the terminal blades to fit snugly within the U. Suitable fastening devices may be provided to secure the clips to the terminal blades, such devices being herein shown as comprising bolts 19 passing through apertures in the clips and blades, and nuts 20, the apertures preferably being so positioned that when the fastening devices are tightened the ends of the bridge section abut the plates 10 and 10^a.

The fusible links 9 may be connected directly to the terminal blades and independently of the bridge section, as for example, by means of bolts 21 passing through apertures in the blades and links, the adjacent links being spaced apart by the terminal blades, or washers 22. Nuts 23 engaging the bolts 21 serve to clamp the links and blades together, washers 24 being positioned between the outer links and the bolt heads and nuts.

As herein illustrated, the terminal blade unit is held centrally in the casing and against longitudinal movement by means comprising the shoulders 11, the webs 5, a pair of washers 25 and two screw-threaded end caps 26 which engage correspondingly screw-threaded portions of the heads 2. These washers have slots therethrough adapted to admit the terminal portions of the knife blades so that the washers may be slid on the blades and up against the webs 5 and plates 10 and 10^a. As shown in Figs. 1 and 2 for the left hand end of the fuse, when the end caps 26 are screwed tightly on the heads 2, the shoulders of the blades abut the webs 5, and the washers 25 contact the plates and heads to hold the blades central in the casing and against longitudinal and transverse movement, the plates 10 and 10^a then fitting snugly in the apertures of the heads to prevent rotary movement of the blades in the casing. The washer 25 and end cap 26 for one end of the fuse are preferably retained permanently on one terminal blade

as by means of projecting portions 27 thereon, these permitting rotary movement of the cap relative to the casing.

To replace a fuse link in a fuse of the preferred construction such as shown in the drawings, the end caps 26 are first unscrewed from the heads 2 and the left end cap and washer removed from the blade 8. The right end cap and washer are retained on the blade 8^a by means of the projecting portions 27 of the blade. The blade 8 may then be moved transversely of the casing until the shoulders 11 on the blade register with the notches 7 after which the entire terminal blade unit may be withdrawn to the right, the said knife blade 8 passing through the notches 7 in both heads and the plate 10 through the apertures 6. The terminal blade unit now being entirely removed from the casing, the nuts 23 may be loosened readily and the ends of the blown fuse link removed, the links 9 preferably having transverse open-ended slots 28 therein (as shown in Fig. 1), through which the bolts 21 are adapted to pass, and the insulating member 13 being approximately the same width as the thickness of the blades to permit the links adjacent the blade to be removed without considerable movement of the nuts 23 on the bolts. After inserting a new link or links, the nut 23 may be tightened and the fuse reassembled by inserting the terminal blade unit into the casing, the blade 8 entering between the notches 7 of the heads. When the plate 10^a enters the aperture 6 the blade 8^a is central of the casing and the shoulders 11 of the blade abut the webs 5 to prevent further longitudinal movement inwardly. Then the wider terminal portion of the blade 8 has passed through the notches 7 in the left hand head, thus permitting a transverse movement of that blade to position it centrally of the head as shown in Fig. 5. with the shoulders 11 abutting the outward sides of the webs 5. The washers 25 may then be slid on the blades and against the plates 10 and 10^a and the caps 26 screwed tightly on the heads.

For properly venting the casing any suitable means may be provided to supplement the passages formed between the parts herein shown due to their relative positions or loosely fitting interengagement.

From the foregoing, it will be apparent that we have provided an improved cartridge fuse embodying a terminal blade unit of simplified construction which is detachable from the casing and bodily removable therefrom for purposes of renewing the fusible links. The insulating bridge section is also of unitary construction to permit of ready replacement should it in any way become damaged, and is particularly adapted to secure the terminal blades in rigid alignment, the insulating members being secured to the clips and the clips secured to the blades in a manner

adapted to prevent pivotal movement of the clips relative to the insulating members and blades.

The division of the insulating portion of the bridge section into members adjacent the opposite edges of the blades, in addition to providing a rigid structure, permits the use of a plurality of fusible links such as is required in fuses of large capacity, and renders them readily accessible for renewal purposes.

We claim as our invention:—

1. A renewable cartridge fuse having, in combination, a tubular casing, a terminal blade unit comprising a pair of knife blade terminals, a plurality of fusible elements detachably joining said blades, an insulating bridge section securing said blades in spaced relation, said bridge section comprising a pair of laterally spaced insulating members adjacent the edges of said blades, a pair of U-shaped metal clips fixed between the adjacent ends of said members to secure them in said spaced relation, and means to secure said clips to said blades, said clips being adapted to engage three sides of said blades and two sides of said insulating members to prevent relative pivotal movement, and means to secure said terminal blade unit in said casing.

2. A terminal blade unit for cartridge fuses comprising in combination, a pair of knife blades, a fusible element joining said blades and detachably secured thereto, and an insulating bridge section securing said blades in spaced relation, said bridge section comprising a pair of U-shaped clips secured to and fitting snugly against three sides of said blades and having outwardly extending longitudinal flanges thereon, and a pair of laterally spaced insulating members secured at their opposite ends to said clips and against said flanges.

3. A terminal blade unit for cartridge fuses comprising, in combination, a pair of knife blades, a fusible element joining said blades and detachably secured thereto, and an insulating bridge section securing said blades in spaced relation, said bridge section including two insulating members positioned longitudinally of the said blades and adjacent the side edges thereof.

4. A terminal blade unit for cartridge fuses comprising, in combination, two blades, a fusible element detachably joining said blades, and an insulating bridge section secured to and holding said blades in spaced relation, said bridge section comprising a pair of insulating bars disposed along opposite edges of said blades.

5. In a terminal blade unit for cartridge fuses, the combination of a pair of knife blade terminals, a fusible element detachably joining said blades, and an insulating bridge section securing said blades in spaced relation, said bridge section including an insulating

member positioned adjacent the edges of said blades and a metallic clip adapted to engage one side and an edge of one of said blades for a substantial distance longitudinally of the blade, and means to secure said clip to said insulating member and against relative pivotal movement.

6. An insulating bridge section for renewable cartridge fuses comprising a pair of insulating members in laterally spaced relation, and a pair of metallic clips positioned between and secured to said members adjacent their opposite ends.

7. An insulating bridge section for cartridge fuses comprising, in combination, a pair of laterally spaced insulating members, and a pair of U-shaped channel like metallic clips of substantial length positioned between and secured to said members and at the opposite ends thereof with the leg portions of the clips engaging the said members, said leg portions having outwardly turned longitudinal flanges also engaging said members.

8. A terminal blade unit for renewable cartridge fuses comprising, in combination, a pair of knife blade terminals, a metallic plate fixed transversely on each blade, a fuse element detachably joining said blade, an insulating bridge section adapted to secure said blades in spaced relation, said bridge section comprising a pair of laterally spaced insulating members positioned adjacent the opposite edges of said blades, and metallic clips secured to and joining the adjacent ends of said insulating members, and means to secure said clips to said blades and in abutment with said plates.

9. A terminal blade unit for renewable cartridge fuses comprising, in combination, a pair of knife blade terminals, a metallic plate fixed transversely on each blade, a fuse element detachably joining said blades, an insulating bridge section adapted to secure said blades in spaced relation, said bridge section comprising a pair of laterally spaced insulating members positioned adjacent the opposite edges of said blades, and a pair of U-shaped metallic clips secured to and joining the adjacent ends of said insulating members, said clips being adapted to engage two sides of said blades and two sides of said insulating members, and means to secure said clips in engagement with said blades and in abutment with said plates.

10. A terminal blade unit for cartridge fuses comprising, in combination, two terminal blades, a fusible element joining said blades and detachably secured thereto, and an insulating bridge section securing said blades in spaced relation, said bridge section including an insulating bar positioned longitudinally of said blades and adjacent the side edges thereof.

11. A terminal blade unit for renewable cartridge fuses comprising, in combination, a

pair of terminal blades, a fusible element detachably joining said blades, and a bridge section securing said blades in spaced relation, said bridge section comprising an insulating member and a pair of metallic clips, said clips being of an L-shaped section and adapted to engage a side and an edge of the said knife blades, one leg of each clip having an out-turned flange extending longitudinally of the clip, means to secure said insulating member to said legs and in engagement with said flanges, and means to secure said clips to said blades.

12. An insulating bridge section for renewable knife-blade cartridge fuses, comprising an insulating bar adapted to be positioned longitudinally of and adjacent the side edges of the knife blades, and a pair of metallic clips, one secured to each end of said bar and adapted to be attached to said knife blades.

13. A terminal blade unit for cartridge fuses, comprising a pair of knife blade terminals, a plurality of fusible elements joining said blades, means to secure the opposite ends of said elements to said blades, and an insulating bridge adapted to secure said blades in spaced relation, said bridge comprising an insulating bar having a metallic clip secured to each end thereof, and means to secure said metallic clips detachably to said blades independently of said fuse element securing means.

14. A terminal blade unit for renewable cartridge fuses comprising, in combination, a pair of knife blade terminals, a metallic plate fixed transversely on each blade, a fuse element detachably joining said blades, an insulating bridge section adapted to secure said blades in spaced relation, said bridge section comprising a pair of laterally spaced insulating members positioned adjacent the opposite edges of said blades, and a pair of metallic clips secured to and joining the adjacent ends of said insulating members, said clips being adapted to engage two sides of said insulating members, and means to secure said clips in engagement with said blades and in abutment with said plates.

15. A terminal blade unit for renewable cartridge fuses comprising, in combination, a pair of terminal blades, a fusible element detachably joining said blades, and a bridge section securing said blades in spaced relation, said bridge section comprising an insulating member and a pair of metallic clips, said clips having portions of an L-shaped section adapted to engage two sides of said insulating member, means to secure said insulating member to said clips, and means to secure said clips to said blades.

In testimony whereof we have hereunto affixed our signatures.

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