

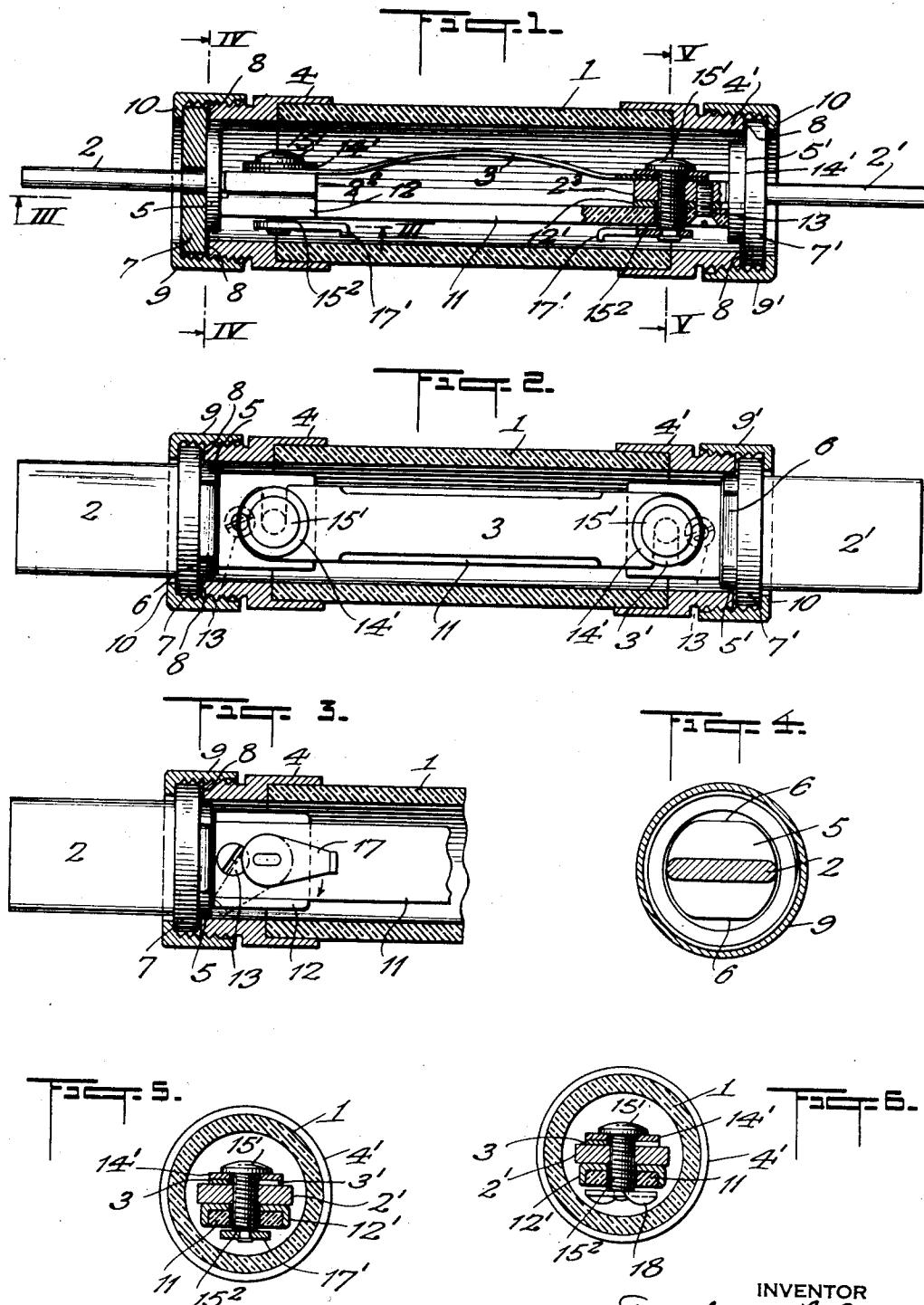
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ELECTRIC FUSE

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ELECTRIC FUSE

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1 Claim. (Cl. 200—119)

This invention relates to electrical devices, especially to electrical devices for interrupting an electric circuit upon an abnormal flow of current therein, and more particularly to such a device including an easily fusible link, commonly known as a fuse.

A principal object of applicant's invention is to provide a device of the type specified of such construction that the easily fusible link therein may be replaced, after being fused by an abnormal flow of current, by a fresh link, without the use of any tools whatsoever.

A further object of the invention is to provide a fuse of the type specified which not only may be assembled without the use of tools but which will preferably be so constructed that a fuse link may not be replaced by a fresh link of a higher current carrying capacity.

Other objects and advantages will appear as the description of the particular physical embodiments selected to illustrate the invention progresses, and the novel features of the invention will be particularly pointed out in the appended claim.

In describing the invention in detail and the particular physical embodiments selected to illustrate the invention reference will be had to the accompanying drawing and the several views thereon in which like characters of reference designate corresponding parts throughout, and in which:

Figure 1 is a longitudinal sectional view of a renewable cartridge fuse of the knife blade type; Fig. 2 is a longitudinal sectional view of the device, as shown in Fig. 1, but taken on a plane at a right angle to the plane upon which the section shown by Fig. 1 is taken; Fig. 3 is a fragmentary longitudinal sectional view on the plane indicated by the line III—III of Fig. 1, viewed in the direction of the arrows at the ends of the line; Fig. 4 is a cross-sectional view of the device, as shown by Fig. 1, taken on the plane indicated by the line IV—IV, viewed in the direction of the arrows at the ends of the line; Fig. 5 is a cross-sectional view of the device, as shown by Fig. 1, taken on the plane indicated by the line V—V of Fig. 1, viewed in the direction of the arrows at the ends of the line; Fig. 6 is a cross-sectional view corresponding to Fig. 5, but illustrating a modified form.

In order to illustrate the invention, a well-known form of knife blade cartridge type renewable fuse has been selected.

The form of knife blade cartridge type renewable fuse selected for illustration and shown in the drawing is substantially conventional and

consists generally of a tubular shell 1, formed of insulating material; knife blades 2 and 2' formed, preferably of copper, one extending outwardly from each end of the member 1; and a renewable fusible link 3, formed of metal, connecting the tangs of the knife blade terminals 2 and 2'.

Various constructions have been devised for supporting the knife blade terminals, as 2, in association with the tubular casing 1, and for closing the ends of the casing so that flames and hot gases generated by the fusion of the fusible link 3, by an abnormal flow of current, may be properly directed and cooled.

In the arrangement shown in the drawing, the knife blades are supported and associated with the tubular casing 1 by a substantially conventional arrangement. Each end of the tubular casing 1 has a metallic ferrule thereon, as 4 and 4'. Each knife blade, as 2, has rigidly attached thereto a shoulder member, as 5 and 5'. This shoulder member 5, as best shown in Fig. 4, is in the form, substantially, of a disc, or washer, just fitting within the bore of a ferrule, as 4, somewhat flattened at diametrically opposite points, as at 6. Above the shoulder 5 there is a slotted washer, as 7 and 7' on each knife blade. Each of these slotted washers has spaced protuberances 8 spacing the washers, as 7, slightly from the end of a ferrule, as 4.

An internal threaded cap, as 9 and 9' cooperates with each ferrule, as 4. Each cap has a flange, as 10, which cooperates with the slotted washer, as 7, for forcing that washer against the shoulder 5 with its protuberances 8 in contact with the end of a ferrule, as 4.

The insulating spacing, or bridge bar 11, extends from one tang end 2² to the other 2³. This spacing bar 11 is attached to the tang of each of the knife blades, as 2. This is done, preferably, by providing metal saddles, as 12 and 12'. These saddles are best made substantially U shaped, as is best shown in Fig. 5. The saddles, as 12', are attached, together with the proximate end of a bridge bar 11, to the adjacent knife blade tang 2³ by any suitable appropriate means. It is preferred to use a flat headed screw, as 13, threaded into the tang end of the knife blade. This flat headed screw 13 passes through the end of the insulating bridge piece 11 and through the metal saddles as 12' and so holds the tang, the metal saddle and the end of the bar firmly together.

Heretofore, the fusible link 3 has been attached, at its ends, to the tang of a knife blade by placing it under a washer, which washer is pressed upon by the head of a machine screw which is

threaded into the tang of the knife blade. This screw was manipulated by means of an ordinary screw driver. This form of connection has its objections. It is necessary that a screw driver or similar tool be used in order to replace a burned out fuse link. Further, in the ordinary construction, if this link corresponding to 3, burns out, it may be replaced by a fuse link of greater carrying capacity or by a plurality of fuse links 10 of the same carrying capacity.

In order to avoid the disadvantage arising from the necessary use of a screw driver or similar tool, applicant provides a construction which may be manipulated without the use of any tools. 15 A washer 14' is provided against which bears the head 15' of a screw 15² screw threaded into the tang 2³. This screw 15² is manipulated, to tighten or loosen, by a member fixedly attached thereto which affords a manually operable extension. In 20 the preferred form, a lever, as 17', is fixedly attached in any appropriate manner to the end of the screw opposite the head. The arm 17' affords a means by which the screw 15² may be turned so as to cause the head 15' to move away from or 25 toward the tang 2³ so that the slotted end 3' of the fuse link 3 may be slipped under the washer 14' and partially around the screw 15², and then by manipulating the arm 17', the head 15' will force the washer 14' against the end of the link 3 30 into tight engagement with the tang 2³.

In order to prevent a link of increased carrying capacity being put in place after the proper carrying capacity link has been fused, applicant provides that the head 15' can be moved only such 35 a distance from the tang 2³ that only a link of proper carrying capacity, that is, a link of proper thickness can be positioned between the washer 14' and the tang 2³. In order to effectuate this limited movement of the screw 15², applicant prefers to arrange the arm 17' in such a manner that 40 it can only move through a limited arc, that is, its movement is restricted by a stop interposed in its path. It is preferable to use the underside of a shoulder, as 5', as the stop. In such case the arm 45 as 17, as shown in Fig. 3, when turned to the dotted line position has moved the limit and the head 15 has been moved as far from the tang 2³ as it may be moved.

Instead of using an arm such as 17' which contacts with a stop to limit its movement, I may 50 use a thumb terminal 18, as shown in Fig. 6. This thumb terminal is of such a size that it may turn completely around. It is, however, rigidly attached to the screw 15². Upon turning 55 the thumb terminal 18 the limit of its movement

in one direction the washer as 14' is drawn tightly against the end of the link 3. If the thumb terminal 18 is moved to the limit of its movement in the other direction, the head 15' will be moved away from the washer 14' and the thumb terminal 18 will contact with the outside surface of the bridge 11 thereby limiting its movement. The amount which the thumb terminal 18 may move or rotate may be made such that a proper thickness only of link 3 may be positioned under the washer 14' or the terminal 18 may be so positioned with regard to the bar 11 that it will not contact with the bar 11 until the head 15' of the screw 15² has been moved such a distance that two or more fuse links may be placed under the washer 14'.

From the hereinbefore given description it will be seen that applicant has provided a knife blade cartridge type renewable fuse which may be assembled and disassembled without the use of any tools whatsoever; that the fusible link may be assembled or replaced without the use of any tool; and a construction is provided whereby a fusible link of proper carrying capacity only can be inserted in the fuse.

It is to be understood that applicant by illustrating and describing a knife blade fuse does not intend to exclude the use of his new construction in connection with what are known as ferrule type fuses, which have no knife blades.

Although applicant has particularly described one particular physical embodiment of his invention and explained the principle and mode of operation thereof, nevertheless, he desires to have it understood that the form selected is merely 100 illustrative but does not exhaust the possible physical embodiments of the idea of means underlying the invention.

What I claim as new and desire to secure by Letters Patent of the United States, is:

In a renewable knife blade cartridge fuse two spaced knife blade tangs each formed with a screw threaded orifice therein; a screw threaded bolt positioned in the screw threaded orifice, said bolt being formed with an enlarged head; a manually operable arm fixedly attached to the other end of said bolt; and means for limiting the rotation of said bolt whereby the separation of the head thereof from the tang is limited so that only a fuse link not above the proper carrying capacity 115 may be inserted between the head of said bolt and said tang, and a shell enclosing and completely covering all of the above mentioned parts.

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