H. H. BAKER.

FUSE.

APPLICATION FILED FEB. 25, 1920.

1,405,254. Patented Jan. 31, 1922.

Fig. 1

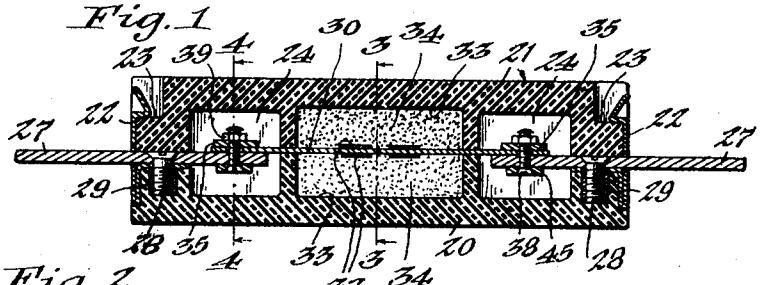


Fig. 2

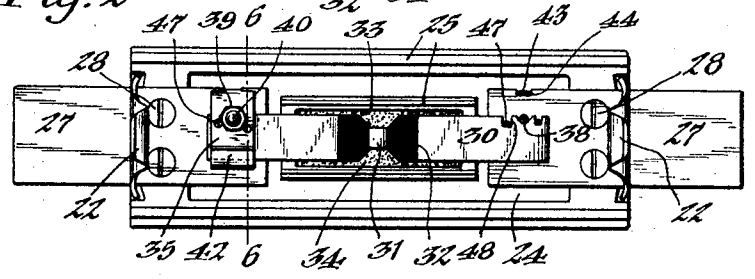


Fig. 3.

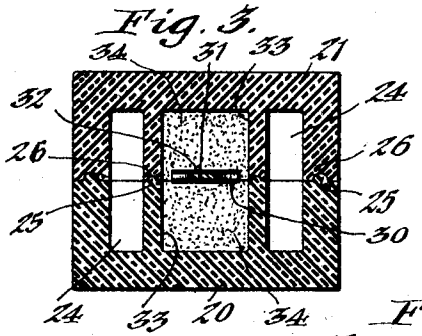


Fig. 4.

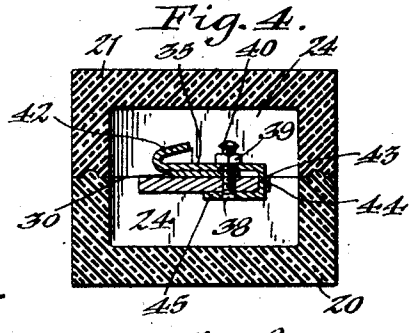


Fig. 5

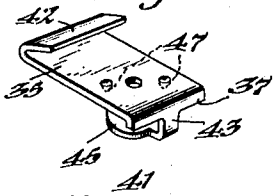


Fig. 6.

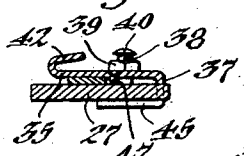


Fig. 7

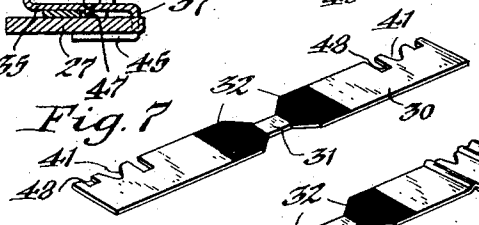


Fig. 8.

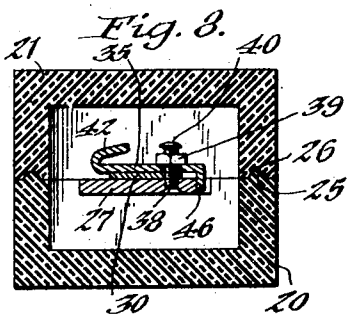


Fig. 9

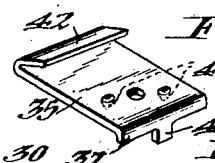


Fig. 10.

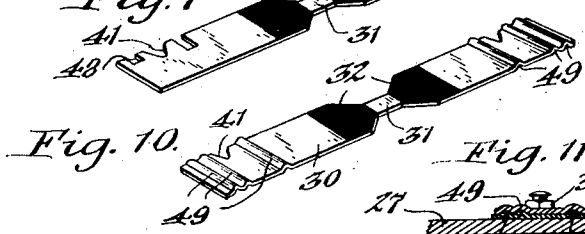
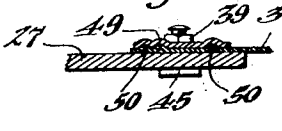


Fig. 11.



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UNITED STATES PATENT OFFICE.

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FUSE.

1,405,254. Specification of Letters Patent. Patented Jan. 31, 1922.

Application filed February 25, 1920. Serial No. 361,155.

To all whom it may concern:

Be it known that I, HOWARD H. BAKER, a citizen of the United States, residing in Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Fuses, of which the following is a specification.

This invention relates to a fuse, more particularly of the knife blade type, in which the fuse link is capable of being renewed when the same is blown out.

It is the object of this invention to produce a fuse of this type in which the fusing of the link is positively confined to the center or blow out portion of the link and the flame, fire and heat generated during the blowing of the fuse is confined to the central portion of the box of the fuse and prevented from reaching the terminals. This invention has the further object to provide improved means for detachably connecting the ends of the fuse link with the terminals so as to ensure a perfect contact between the same, also facilitating the easy insertion and removal of the link, also to prevent a link from being improperly applied and also to prevent any link other than the one designed for a particular fuse from being used, and thus avoiding the possibility of overloading the machine which is to be supplied with current through the respective fuse.

In the accompanying drawings: Figure 1 is a longitudinal section of a fuse embodying my improvements. Figure 2 is a plan view of the same with the cover removed. Figures 3 and 4 are cross sections, on an enlarged scale, taken on the correspondingly numbered lines in Fig. 1. Figure 5 is a perspective view of one of the link clamping or fastening jaws used in the construction shown in Figs. 1–4. Figure 6 is a fragmentary longitudinal section, on an enlarged scale, taken on line 6—6, Fig. 2. Figure 7 is a perspective view of the form of link used in the construction shown in Figs. 1 and 2. Figure 8 is a cross section similar to Fig. 4, but showing a modification of the means for fastening the fuse link to a terminal. Figure 9 is a perspective view of the link clamping jaw shown in Fig. 8. Figure 10 is a perspective view of a modified form of the fuse link. Figure 11 is a fragmentary longitudinal section, showing the means for clamping the fuse link shown in Fig. 10 between a clamping jaw and a terminal.

Similar characters of reference refer to like parts throughout the several views.

The preferred form of the fuse box shown in the drawings comprises a lower body 20 and a cover 21 which are arranged lengthwise side by side and are detachably connected with each other by means of spring catches 22 mounted on opposite ends of the body and engaging with shoulders 23 at opposite ends of the cover.

The opposing inner surfaces of the body and cover are hollowed out so as to form a chamber 24 between the same when assembled and to facilitate alinement thereof the longitudinal edges of these mmbrs are provided with interlocking means which in their preferred form consist of tongues 25 arranged lengthwise on the body and engaged with grooves 26 on the cover. Both of these box sections are made of suitable strong and durable insulating material such as "bakelite," but the spring catches 22 are constructed of brass or other resilient metal.

Mounted on opposite ends of the box are two terminals 27 preferably of copper which are secured respectively to the inner sides of the end portions of the body by means of screws 28 passing through the terminals and into screw nuts 29 anchored in the body. Each of these terminals is so mounted on the body that its outer end projects beyond the body and forms a contact blade which engages with a corresponding socket or seat on the fuse block, while the inner end of each terminal is arranged within the adjacent end of the fuse chamber 24 and is adapted to be connected with one end of the fuse link 30. The latter may be of any suitable construction, but in the form shown in the drawings, the same is constructed of flat fusible metal so as to form two comparatively wide end portions which are connected respectively with the inner ends of the terminals and a reduced or narrow central blow out portion 31 which is adapted to be fused or blown by the passage of an excess electric current through the same and thus save harmless the apparatus with which the fuse is associated.

In order to confine the blowing out or fusing of the fuse link to the central part 31 thereof, the parts of the fuse link immediately adjacent to opposite sides of this

central part are coated or covered with a non-combustible insulating material, as shown at 32, which may be applied either from one side only of the fuse link or to both sides thereof as shown in Fig. 1, or a strip of this material may be wrapped around the link at the places indicated.

Whenever the fuse blows out this non-combustible or insulating materials confines the melting of the fuse to the central part 31 thereof and thus prevents the flame or heat from reaching the terminal 27, so that the latter and the means for connecting the fuse link thereto are not injured.

In order to still further guard against the possibility of the flame or heat, which is generated during the blowing of the fuse from each of the terminals and the means for fastening the fuse link thereto, each of the box members comprising cover and body are provided at their inner opposing sides with pockets 33 which are independent of the chamber 24 in the fuse box, which pockets, in the assembled position of the box, face each others and enclose between them the central portion of the fuse link, as shown in Fig. 1, thereby cutting off this part of the interior of the box from the surrounding space containing the inner ends of the terminals and the end portions of the fuse link and thereby further reducing the possibility of the flame and heat reaching the terminals.

To still further guard against the possibility of flame reaching the terminals when the central part of the fuse link blows, two pads 34 of insulating material, such as asbestos, are seated in the pockets 33 and are adapted to engage with opposite sides of the central part of the link and thus reduce to a minimum the presence of any air adjacent to the central part of the link so that any tendency to produce a flame when blowing of the fuse is promptly smothered and the terminals of the fuse saved from injury.

The means for attaching the ends of the fuse link to the inner ends of the terminals, as shown in Figs. 1, 2, 4, 5 and 6 are constructed as follows:

35, 35 represent two fastening or clamping jaws which are arranged transversely of the inner end portions of the terminals, one end of the fuse link being adapted to be gripped between the underside of each of these jaws and the upper surface of the inner end of one of the terminals. In order to ensure a full and proper contact between the fuse link and each of the terminals, the outer end of each of the clamping jaws is provided with a downwardly projecting heel 37 which rests on the upper surface of the respective terminal adjacent to one longitudinal edge thereof, as shown in Fig. 6, so that this jaw when pressed downwardly toward the terminal will rock on the heel 37 as a fulcrum and thereby produce a wide area of contact between opposite sides of the fuse link and the opposing front end of the jaw on the upper side of the terminal which operates to effectively conduct the electric current. The pressure of the jaw against the fuse link is preferably produced by means of a screw 38 secured with its lower part to the terminal and passing with its upper part through an opening in the clamping jaw and provided with a screw nut 39 on its upper part which bears against the upper side of the clamping jaw. Complete removal of the nut 39 from the screw 38 is prevented by providing the latter with a stop 40 at its upper end which is adapted to be engaged by the screw nut 39 and which is preferably formed by upsetting the screw, as shown in Fig. 4.

The ends of the fuse link are preferably of such width so that when the same is in its proper place between the undersides of the clamping jaws and the upper sides of the terminals, these elements engage with each other fully over a considerable area so as to made a good contact therebetween. In order to permit of thus engaging the end portions of the fuse link between the jaws and terminals, the corresponding longitudinal edges of the link are provided with notches 41 with which the screws 38 engage, as shown in Figs. 2 and 4.

It may be attempted to fasten the ends of the fuse link against the upper surfaces of the clamping jaws for the purpose of taking a fuse link which is heavier than the one for which it is designed and to carry a correspondingly heavier current, but such an attempt is prevented by providing the front end of each jaw with an upper reversely bent guard flange or lip 42 which latter is of such length that it extends over a considerable part of the upper surface of the jaw and renders it inconvenient to change a fuse link of excessive size against the upper side of the jaw and carry a current in excess of that for which the fuse is properly designed.

In order to prevent the rear end of the clamping jaw from becoming displaced lengthwise of the terminal, this end is provided with a downwardly projecting retaining lug 43 which engages with a notch 44 formed in the corresponding edge of the terminal, as shown in Figs. 2 and 4.

In order to utilize the resilience of the clamping jaw and cause the same to open or rise automatically when loosening the companion screw 39 the lower end of the lug 43 is provided with a forwardly projecting attaching ear 45 which is secured to the underside of the terminal by the head of the screw 38, as shown in Fig. 4.

By this means the introduction of the fuse,

as well as the removal thereof is facilitated, inasmuch as the clamping jaw does not require manual lifting for this purpose. If desired, however, the attaching ear may be omitted, as shown in the construction of the retaining lug 46 in Figs. 8 and 9 which construction, however, possesses all of the other advantages of the fuse link fastening means above referred to.

The space between the undersides of the clamping jaws and the upper sides of the terminals when the jaw is wide open is so determined, that the same will permit the easy insertion and removal of a fuse link of the proper thickness but which will prevent the insertion of a fuse link therebetween which is of a thickness in excess of that for which the fuse is designed, thereby preventing the introduction of excessively thick fuse links in attempting to cause the fuse to carry a heavier load than that for which it is intended. In order, however, to further guard against the insertion of an improper fuse link between the terminals and the clamping jaws, the surfaces at opposite ends of the fuse link and the co-operating surfaces of the clamping jaws are constructed of commutation or combination form so that only those fuse links having a commutation surface corresponding to those of the clamping jaws will be capable of use in the fuse. In the form of these commutation surfaces shown in Figs. 2, 5, 6 and 7, the underside of each jaw is provided with one or more commutation projections 47 which are adapted to engage with commutation notches 48 in the longitudinal edge portions of the fuse link which contain the screw receiving notches 41. The projections 47 and notches 48 are so placed relatively to each other that they will engage properly with each other upon assembling the parts and pressing the clamping jaws downwardly from the ends of the fuse link as shown in Fig. 6. These complementary co-operating surfaces of the jaws and fuse link are, however, differently located in fuses of different capacity, thereby preventing the introduction of a fuse link of one capacity from being properly applied to the terminals of a fuse of another capacity and thus guarding against improper use of the fuse.

These complementary commutation surfaces of the fuse link and the clamping jaws may be varied in many ways from that shown in Figs. 2, 5, 6 and 7, for instance as shown in Figs. 10 and 11, the fuse link may be provided at its opposite ends with transverse corrugations 49 which are adapted to be received by transverse grooves 50 on the underside of the clamping jaws, these corrugations and grooves for a fuse of a particular capacity being differently spaced or located relatively to each other from those in a fuse of another capacity and thereby preventing improper use of the fuse links in a fuse designed for another capacity.

I claim as my invention:

1. A fuse comprising a box, terminals mounted on opposite ends of said box and each having an outer and an inner end, and means for connecting the opposite ends of a fuse link to the inner ends of both terminals comprising two clamping jaws, each mounted at one end on one side of a terminal and provided at its opposite end with an upper reversely turned flange, and a screw connecting said jaw between its ends with said terminal and adapted to press the latter terminal against opposite sides of one end of the fuse link.

2. A fuse comprising a box, terminals mounted on opposite ends of the box and each having inner and outer ends, the inner end of each terminal being provided on one of its longitudinal edges with a notch, clamping jaws each arranged transversely of the inner end of one of the terminals and provided at its rear end with a lug arranged in said notch, the front end of said jaw being adapted to press an end of the link against the upper side of the respective terminal, and a screw connecting each jaw with the adjacent terminal.

3. A fuse comprising a box, terminals mounted on opposite ends of the box and each having inner and outer ends, the inner end of each terminal being provided on one of its longitudinal edges with a notch, clamping jaws each arranged transversely of the inner end of one of the terminals and provided at its rear end with a lug arranged in said notch, the front end of said jaw being adapted to press an end of the link against the upper side of the respective terminal, an ear arranged on the lower end of said lug and engaging with the underside of the adjacent terminal, and a screw connecting the ear with said terminal and provided with a nut adapted to press the jaw against a fuse link on the terminal.

HOWARD H. BAKER.