L. W. ROSENTHAL AND G. J. LANG.

RENEWABLE FUSE.

APPLICATION FILED DEC. 24, 1918.

1,378,136. **Patented May 17, 1921.**

Fig. 1,

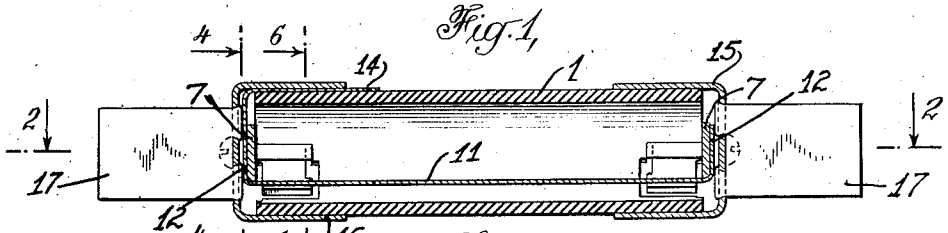


Fig. 2,

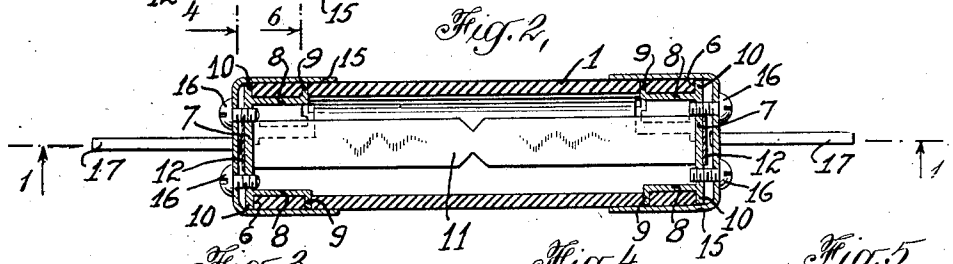


Fig. 3,

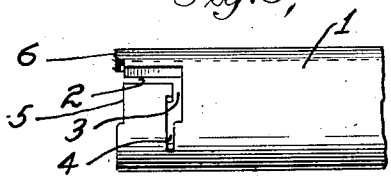


Fig. 4,

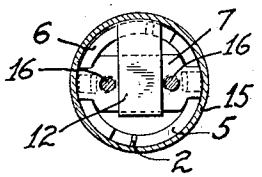


Fig. 5

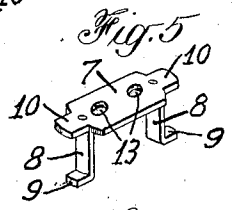


Fig. 6

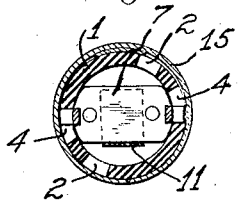


Fig. 7,

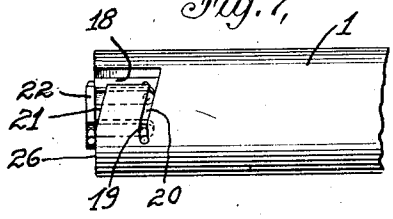


Fig. 8,

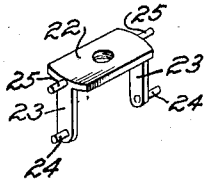


Fig. 9,

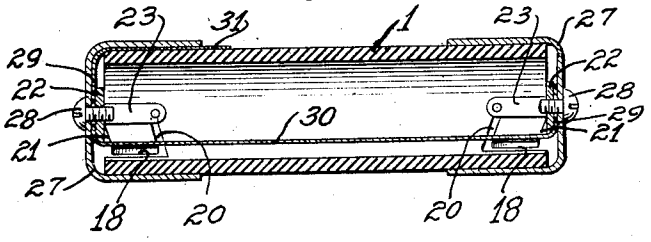
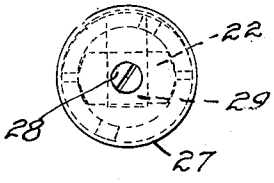


Fig. 10.



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& Gustave J. Lang
By their Attorney
Leon W. Rosenthal

UNITED STATES PATENT OFFICE.

LEON W. ROSENTHAL, OF NEW YORK, N. Y., AND GUSTAVE J. LANG, OF WEEHAWKEN, NEW JERSEY, ASSIGNORS TO ARTHUR T. MURRAY, OF ALLENTOWN, PENNSYLVANIA.

RENEWABLE FUSE.

1,378,136. Specification of Letters Patent. Patented May 17, 1921.

Application filed December 24, 1918. Serial No. 268,136.

To all whom it may concern:

Be it known that we, LEON W. ROSENTHAL, a citizen of the United States, residing at 106 Central Park west, in the city, county, and State of New York, and GUSTAVE J. LANG, a citizen of the United States, residing at 849 Boulevard east, Weehawken, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Renewable Fuses; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to renewable fuses in which a permanent fuse holder has terminals for connecting it in an electric circuit and in which a renewable fuse is adapted to be inclosed by the holder and electrically connected in a detachable manner to the terminals thereof. The object of the invention is to provide a permanent and comparatively cheap fuse holder, which, when assembled, gives reliable and permanent contact between it and the inclosed fuse, and at the same time permits rapid renewal of a blown-out fuse without the use of special tools.

In prior fuses of this kind having detachable end plates and caps between which the fuse terminals are clamped, the end plates are sometimes held in the tube by depending legs inserted into openings in the tube by a lateral movement. While this arrangement holds the end plates, and therefore the caps attached to them by screws, against longitudinal movement with respect to the tube, it is necessary to accurately fit the parts together to prevent looseness, thereby entailing added cost in manufacture and rendering renewals comparatively slow.

In accordance with the present invention, the detachable end plates are fixed in position in the tube by means of bayonet slots, which eliminate the necessity for the nice fit and render the renewals more rapid, the end plates having depending legs engaging the bayonet slots and adapted to be fastened therein and detached therefrom by longitudinal and circumferential movements relatively to the tube. In this way, the caps are held against longitudinal movement on the tube when fastened to the end plates but both the caps and the end plates may be readily disassembled from and then fastened in place separately on the tube to renew the fuse. The terminals of the fuse are formed by the end portions thereof folded over the end plates and clamped between them and the caps by end screws passing through the caps into threaded engagement with the end plates.

The bayonet slots may have any suitable form to coöperate with the end plates, but we prefer to form each of the two bayonet slots at each end of the tube by a longitudinal passage extending from the end of the tube and joined to a circumferential passage with a terminal portion displaced from the bottom of the longitudinal passage, the tube having at its outer end correspondingly stepped seats, in which case the end plate comprises a bridge member adapted to rest on the outermost portion of the seats when the depending legs thereof are located in the terminal portions of the slots. More specifically, we prefer to join the longitudinal passage of each slot to an inclined passage with a terminal circumferential portion and to provide inclined seats on the outer end of the tubes parallel to the inclined passages. In this way both end plates are held against longitudinal movement, and circumferential movement thereof is, as a practical matter, prevented.

In the accompanying drawings illustrating two embodiments of the invention, Figure 1 is a section on line 1—1 of Fig. 2 of a knife blade type of fuse; Fig. 2 is a section on line 2—2 of Fig. 1; Fig. 3 shows an end portion of the tube; Fig. 4 is a section on line 4—4 of Fig. 1; Fig. 5 is a perspective view of the end plate of this embodiment; Fig. 6 is a section on line 6—6 of Fig. 1; Fig. 7 shows the end of the tube of a ferrule type of fuse in which a portion of the bayonet slot is inclined; Fig. 8 is a perspective view of the end plate coöperative therewith; Fig. 9 is a longitudinal section of the complete fuse; and Fig. 10 is an end view thereof.

In all of the embodiments illustrated, the cylindrical tube 1 is made or formed of fiber, impregnated paper, or other suitable material, and has at each end oppositely disposed bayonet slots and corresponding seats for the end plate.

In the fuse of Figs. 1 to 6, each bayonet slot consists of a longitudinal passage 2 joined to a circumferential passage 3 with

a terminal portion 4 stepped and therefore displaced from the bottom of the longitudinal passage. Each end of the tube is provided with depressed seats 5 and outer seats 6 registering with the stepped portions of the circumferential passage, whereby the distance measured along the tube from the outer end thereof to the passage is the same all along the seats.

The end plate consists of a bridge member 7 and two legs 8 depending therefrom and having end portions 9. By inserting these end portions into the opposite longitudinal passages 2, the end plate may be moved longitudinally of the tube until the end portions come into the circumferential passages 3, whereupon the plate may be turned circumferentially, then lifted into the terminal stepped portion 4 and turned circumferentially until the end portions 10 of the bridge member rest on the outer seats 6 of the tube. In this position, the end plate is held against longitudinal movement on the tube.

The end portions of the fuse 11 are folded over the bridge members 7 to form terminals 12 between the screw-threaded openings 13 therein. One terminal of the fuse extends over the outside of the tube to form an exposed portion at 14 beyond the end of the cap to show a capacity marking thereon.

The caps 15 of metal are positioned over the ends of the tube and are fastened to the end plates by the end screws 16 which hold the caps against longitudinal displacement on the tube and draw the end portions 9 of the depending legs against the outer face of the terminal portions 4 of the bayonet slots while clamping the fuse terminals 12 between the end plates and caps. When the caps are thus positioned, circumferential movement of the end plates is, as a practical matter, prevented also.

The knife blades 17 are riveted or otherwise suitably fastened to the caps to provide terminals for the fuse holder adapted to be inserted in spring clips of a panel board.

In the ferrule type of fuse shown in Figs. 7 to 10, the longitudinal portions 18 of the bayonet slots are joined to the circumferential terminal portions 19 thereof by the inclined passage 20, and likewise inclined seats 21 are provided at the outer ends of the tube. The end plates in this case consist of the bridge member 22 having depending legs 23 with pins 24 extending from the legs and pins 25 extending from the bridge member. By this construction, the legs of the end plates are moved longitudinally through the passages 18 and are then turned up the inclined passages 20 until the pins 24 rest in the terminal portions 19, while the pins 25 are seated on the straight end portions 26 of the tube. The caps 27 are fastened to the end plates by the central end screws 28 threaded into the bridge members 22, to prevent longitudinal movement, and, as a practical matter, circumferential movement also, of the caps on the tube while clamping the terminals 29 of the fuse 30 between the end plates and caps. One terminal of the fuse is extended at 31 beyond the outer end of the cap to show an exposed capacity marking thereon. The caps are adapted to be directly inserted between the spring fingers of a panel board.

In both embodiments, an exhaust passage for the gases of combustion upon blow-out of the fuse is provided between the cap and the outer surface of the tube at the sides of the projecting end of the fuse terminal.

Having thus described our invention what we claim is:

1. A renewable fuse consisting of a tube having bayonet slots at its ends, detachable end plates having depending legs engaging the bayonet slots and adapted to be fastened therein and detached therefrom by longitudinal and circumferential movements relatively to the tube, a fuse extending through the tube and having end portions folded over the end plates to form fuse terminals, caps positioned over the outer ends of the tube, and end screws passing through the caps into threaded engagement with the end plates to prevent longitudinal movement of the caps on the tube while clamping the fuse terminals between the end plates and caps.

2. A renewable fuse consisting of a tube having at each end longitudinal passages joined to circumferential passages with terminal portions displaced from the bottom of the longitudinal passages, and also having at each end stepped seats registering with the displaced portions of the circumferential passages, detachable end plates each comprising a bridge member and depending legs adapted to be moved to the bottom of the longitudinal passages at that end and then turned circumferentially until the bridge member rests upon the outermost stepped seat with the legs in the terminal portions of the circumferential passages, a fuse passing through the tube and having end portions folded over the bridge members to form fuse terminals, caps positioned over the outer ends of the tube, and end screws passing through the caps into threaded engagement with the bridge members to prevent longitudinal movement of the caps on the tube while clamping the fuse terminals between the bridge members and caps.

3. A renewable fuse consisting of a tube having at each end longitudinal passages joined to inclined passages with terminal circumferential portions and also having inclined seats substantially parallel with the inclined passages, detachable end plates each comprising a bridge member and depending legs adapted to be moved to the bottom of the longitudinal passages at that end and then turned circumferentially along the inclined

passages until the bridge member rests on the outermost part of the end of the tube with the legs in the terminal circumferential portions, a fuse passing through the tube and having end portions folded over the bridge members to form fuse terminals, caps positioned over the outer ends of the tube, and end screws passing through the caps into threaded engagement with the bridge members to secure the caps against longitudinal movement on the tube while clamping the fuse terminals between the bridge members and caps.

In testimony whereof, we hereunto affix our signatures.

LEON W. ROSENTHAL.
GUSTAVE J. LANG.