F. N. CONANT.

RENEWABLE FUSE.

APPLICATION FILED JULY 10, 1919.

1,422,419.

Patented July 11, 1922.

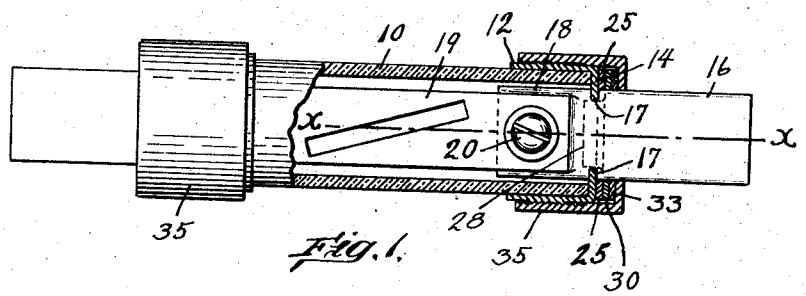



Fig. 1.

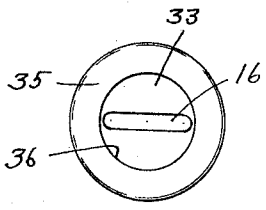



Fig. 3.

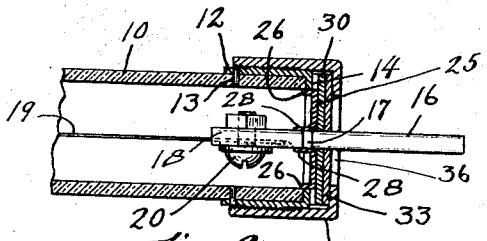



Fig. 2.

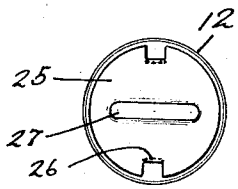



Fig. 4.

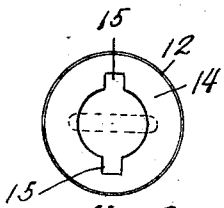



Fig. 5.

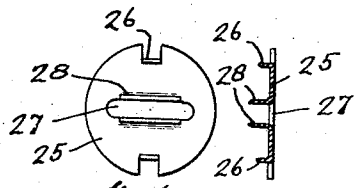



Fig. 6. Fig. 7.

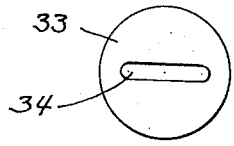



Fig. 8.

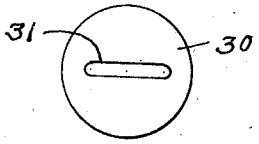



Fig. 9.

Inventor,

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by

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Atty

# UNITED STATES PATENT OFFICE.

FRANKLIN N. CONANT, OF NEWBURYPORT, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE CHASE-SHAWMUT COMPANY, A CORPORATION OF MASSACHUSETTS.

## RENEWABLE FUSE.

1,422,419. Specification of Letters Patent. Patented July 11, 1922.

Application filed July 10, 1919. Serial No. 309,813.

*To all whom it may concern:*

Be it known that I, FRANKLIN N. CONANT, a citizen of the United States, a resident of Newburyport, in the county of Essex and State of Massachusetts, have invented an Improvement in Renewable Fuses, of which the following is a specification.

This invention relates to electric fuses of the cartridge type and is in general based on the inventions described in the Gibbs Patent No. 797,054, dated August 15, 1905, and my Patent No. 1,299,132, dated April 1, 1919.

Such fuses have a non-conducting, tubular casing and a fusible element longitudinally arranged within, having terminals of the knife blade type.

More particularly my fuse has a tubular casing supplied with metal ferrules with inturned flanges or lips. These flanges have openings to receive the knife blade terminals and projections to engage notches in the knife blade terminals when the same have been partially rotated axially so as to lock the terminals in fixed position longitudinally, a plate having a central opening with projections therefrom adapted to hold the knife blade and means for holding said plate in fixed position with relation to the ferrule flanges and removable end caps.

Fig. 1 is a side elevation and partial longitudinal section of an electric fuse embodying this invention.

Fig. 2 is a sectional detail of an end portion of a fuse on the line *x*—*x*, Fig. 1.

Fig. 3 is an end view of the fuse.

Fig. 4 is a similar view, the end cap, the packing washer and metal washer being removed.

Fig. 5 is a similar view, with the removable elements removed.

Fig. 6 is a plan view, and,

Fig. 7 is a vertical section of the holding plate for the fusible element.

Figs. 8 and 9 are views of the metal and packing washers respectively.

10 represents the tubular non-conducting fuse casing of any suitable dimensions, and 12 a ferrule securely fixed on the end thereof by pins 13, in the usual manner or by other suitable means.

Said ferrule is composed of metal and is externally screw-threaded, and has an inturned lip 14 at its outer end provided with a pair of notches 15 arranged at diametrically opposite points.

16 represents the terminal of the fusible link, which is made as a blade or flat plate, having notches 17, 17, in its edges which receive the lip 14, when said blade is projected through the open end of the ferrule by way of the notches 15 and turned a quarter of a revolution.

Said terminal blade 16 has an extension 18 at its inner end over which extends the end portion of the fusible strip 19, which is or may be detachably secured thereto by a bolt 20, or other means.

A plate is arranged to be threaded on the blade 16 and pressed into position on the end of the ferrule. When so placed it extends over and substantially closes the opening at the end thereof.

As here shown, it consists of a circular plate 25 composed of metal and made of a diameter substantially equal to the diameter of the ferrule, against the open end of which it is placed.

The plate 25 has oppositely disposed ears 26, struck up from it, or otherwise provided, which extend downwardly, and when the plate is placed in position on the end of the ferrule said ears will enter the notches 15 in the lip 14 and thereby be held against rotary movement.

Said plate has an elongated aperture 27, substantially corresponding in shape and size with a transverse section of the terminal blade, to receive said blade, and said aperture is extended diametrically across the center of the plate so that the blade will be centrally localized with relation to the ferrule.

The plate is thin, being made of sheet metal, and to increase its contact area with the blade lips 28, 28, are provided at opposite sides of the aperture 27, which extend downward and have a normal tendency to incline toward each other slightly so that when the blade is projected through the aperture said lips will be engaged by it and will be slightly sprung apart.

These lips may or may not extend the full length of the sides of the aperture 27, as desired, being here shown as extended only along the middle portions thereof.

The elongated aperture 27 is narrow and one of the lips 28 may be struck up from

the plate, but so far as my invention is concerned, the formation of the lips as well as their dimensions may be varied.

With the parts so far described there will be a leakage of gas from the casing when the fusible elements blow, or explode, on a rupture of the fuse, hence means are provided for preventing an undue escape of the gaseous products of combustion, and, as here shown, a yielding washer 30 of leather, leather substitute or some such material, and of circular form is arranged on the plate 25 which has an elongated aperture 31 tightly fitting the terminal blade.

When this washer is pressed down hard by means to be hereinafter described, as upon assembling the component parts, the end portion of the ferrule will become tightly closed.

A metal washer 33, of circular form and having an elongated aperture 34 fitting the terminal blade is designed to be placed next the packing washer 30.

It is made of substantially the same diameter as the packing washer so as to engage said packing washer over all.

35 represents an end cap which is internally screw-threaded for engagement with the externally screw-threaded ferrule, and has an aperture 36 at its outer end, through which the terminal blade projects.

Said aperture is of circular form and of considerable lesser diameter than the cap so that an inwardly extended lip is provided around the margin of the cap, for engagement with the metal washer 33.

Upon screwing said end cap onto the ferrule the metal washer 33 and yielding washer 30 and terminal holding plate 25 will be pressed hard together and against the end of the ferrule, thereby binding the several components tightly together and holding the several components including the terminal blade in fixed relation to each other, and localizing said blade with relation to the other components.

So far I have described in detail the structure of one end portion of the fuse, and it will be understood that the other end portion will be similarly constructed.

In case the fuse "blows" the holding means at both ends of the casing are removed to permit the removal of the terminal blade and in order that the new fusible link may be provided and the casing cleaned out.

This operation may be easily and quickly performed and a new fusible element supplied, whereupon the several components will be reassembled.

I claim

1. In an enclosed electric fuse of the cartridge type, the combination of a ferruled insulating casing, having an inturned lip at the end of the ferrule with oppositely disposed notches, a fusible element having a terminal blade with notches in its edges for engaging said lip by way of the notches therein, a holding plate for the terminal blade substantially closing the open end of the casing having an elongated aperture for the terminal blade and lips engaging said terminal blade and means including an end cap for holding the parts assembled.

2. In an enclosed electric fuse of the cartridge type, the combination of a ferruled insulating casing, having an inturned lip at the end of the ferrule with oppositely disposed notches, a fusible element having a terminal blade with notches in its edges for engaging said lip by way of the notches, a holding plate for the terminal blade which substantially closes the open end of the casing having ears which enter the notches in the lip and having an elongated aperture for the blade and lips engaging the blade and means including an end cap for holding the parts assembled.

3. In an enclosed electric fuse of the cartridge type, the combination of a ferruled insulating fuse casing having an inturned lip at the end of the ferrule with oppositely disposed notches, a fusible element having a terminal blade with notches in its edges for engaging said lip by way of the notches therein, a holding plate for the terminal blade which substantially closes the open end of the casing, having an aperture with extended walls engaging the terminal blade with spring pressure, a yielding packing washer snugly fitting the blade and means to exert pressure thereupon to hold the parts assembled.

4. In an enclosed electric fuse of the cartridge type, the combination of a ferruled insulating fuse casing having an inturned lip at the end of the ferrule with oppositely disposed notches, a fusible element having a terminal blade with notches in its edges for engaging said lip by way of the notches therein, a holding plate for the terminal blade which substantially closes the open end of the casing, and lips fitting with the notches in the ferrule flange and other lips hugging the terminal blade with spring pressure, a yielding packing washer snugly fitting the blade and extended over the holding plate, a metal washer arranged over said yielding washer, and an end cap exerting pressure on said washer and holding the parts assembled.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

FRANKLIN N. CONANT.

Witnesses:

HARRY P. MOORE,
FRANCIS BROWN.