June 16, 1931. W. G. HARTWIG 1,810,653

ELECTRIC FUSE

Filed April 26, 1928

Fig. 1

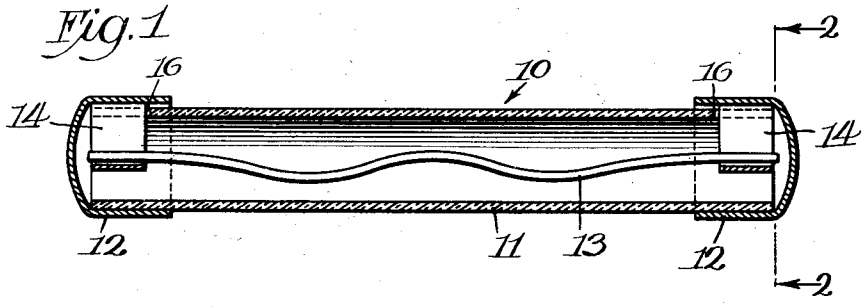


Fig. 2

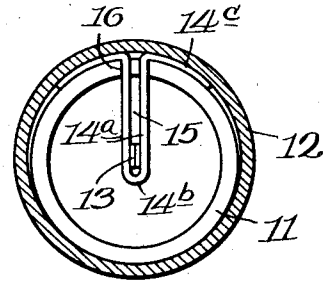


Fig. 3

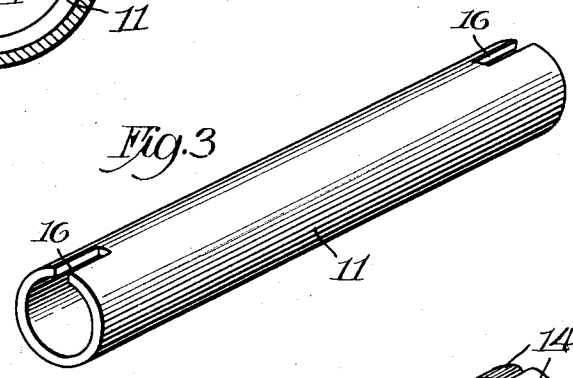


Fig. 4

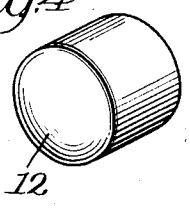


Fig. 5

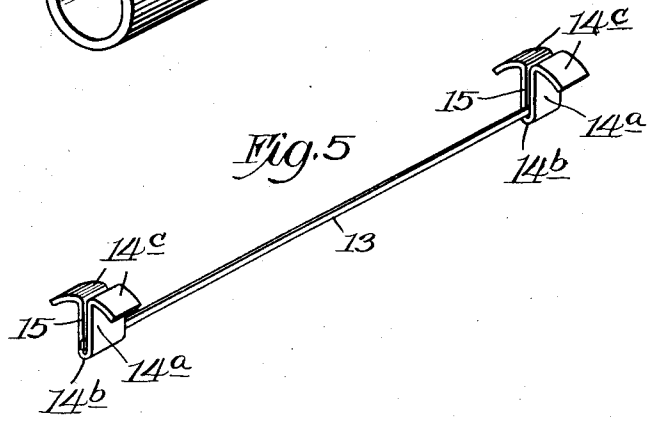
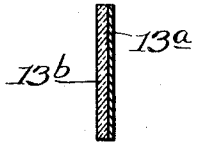


Fig. 6



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Patented June 16, 1931 1,810,653

UNITED STATES PATENT OFFICE

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ELECTRIC FUSE

Application filed April 26, 1928. Serial No. 272,965.

This invention relates to improvements in electric fuses adapted for use in safeguarding electrical circuits and the purpose of the invention is to provide a simple and efficient form of fuse particularly adapted for use in causing a circuit to open upon the passage of a relatively small maximum current. One object of the invention is to provide a fuse having the advantages of dependability and long life by reason of the omission in its construction of any salts and acids such as are usually employed for soldering the fusible elements employed in fuse construction. A further object of the invention is to provide a fusible element having a reinforcement which prevents breakage thereof due to jars and shocks encountered when in use or when being transported. A further object of the invention is to provide a fuse having a fusible element which is reinforced throughout its length by a fibrous strip adhering thereto. Still another object of the invention is to provide a fuse comprising a plurality of parts which are secured together by clamping frictional engagement without the use of any auxiliary fastening means. Other objects relate to various features of construction and arrangement which will appear more fully hereinafter.

The nature of the invention will be understood from the following specification taken with the accompanying drawings in which one embodiment is illustrated. In the drawings,—

Fig. 1 shows a longitudinal axial section through the completed fuse embodying the features of the present invention;

Fig. 2 shows a detail section taken on the line 2—2 of Fig. 1;

Fig. 3 shows a perspective view of the insulating tube embodied in the complete fuse shown in Fig. 1;

Fig. 4 shows a perspective view of one of the metal end caps of the fuse;

Fig. 5 shows a perspective view of the fusible element assembled in the two metal clamping members by which it is mounted in the insulating tube; and

Fig. 6 is a cross section, on an enlarged scale, through the fusible element, showing the reinforcing member to which the fusible element proper adheres.

As illustrated in the drawings, the improved fuse of the present invention, indicated at 10, is made up of a plurality of parts including an insulating tube 11 of suitable insulating material, a pair of caps or ferrules 12 of copper or other conducting material which are mounted on the ends of the tube 11, a fusible element 13, and a pair of clamping members 14 which hold the fusible element 13 in place within the tube 11. The clamps 14 are made up of copper strips which are bent to have the form shown particularly in Fig. 5, comprising a pair of parallel arms 14^a which are joined together at their lower ends as shown at 14^b and which are connected at their upper ends with the outwardly directed curved wings 14^c having a curvature corresponding to that of the outer surface of the tube 11. A slot 15 is formed between the arms 14^a of the clamping member and this slot is adapted to be engaged by one end portion of the fusible element 13, as shown in Figs. 2 and 5, and after the fusible element has been inserted in the slots of the two clamping members, these clamping members are caused to engage the slots 16 which extend inwardly from each end of the tube 11. The width of the slot 16 is such that when the clamping members are inserted, the arms 14^a are pressed together and caused to grip firmly the ends of the fusible element 13 and, when the clamping members are fully inserted, as shown in Fig. 2, the curved wings 14^c lie in close contact with the outer surfaces of the tube 11, after which the cup-shaped copper caps or ferrules 12 are slipped over the ends of the tube 11 to enclose the clamping members 14 and make

electrical contact therewith so that when the fuse is inserted in a fuse box, in the usual manner, the caps 12 will make electrical contact with the clips of the fuse box and thus connect the fusible element 13 in the circuit.

The fusible element 13 is preferably made up in the form shown in Fig. 6 where it is illustrated as comprising a strip 13^a of metallic foil, such as tin or aluminum, which is backed up with a strip 13^b of reinforcing material such as thin, strong-grained paper. This strip 13^b is secured to the strip 13^a of metal foil by a suitable cement or glue so that the two strips adhere firmly to each other. In this way the metallic foil 13^a is reinforced throughout its length and both strips are preferably of uniform cross section throughout so that no one point of the fuse is weaker than another. In this way the member 13 has great strength, even when the fusible element is one adapted to melt upon the passage of a relatively small current, for example, from one-tenth to one-half an ampere, and it permits the use of a cartridge type of fuse where protection at such small currents is desired. The paper backing for the fusible element permits a more accurate calibration of the fuse than would otherwise be possible and effectively prevents the breaking of the fuse under jars or shocks which are encountered during shipment of the fuse.

Although one form of the invention has been shown and described by way of illustration, it will be understood that it may be constructed in various other forms within the scope of the appended claims.

I claim:

1. The combination in a fuse of an insulating tube having slots at the ends thereof, a clamping member detachably mounted in each of said slots, each clamping member comprising a reversely bent conducting member having a pair of parallel arms having side wings extending over the outer surface of said insulating tube, said arms of said clamping members engaging the ends of said fusible element, and cap members seated over the ends of said tube to contact with said clamping members and thereby establish electrical connection with said fusible element.

2. A fuse comprising an insulating tube having a slot extending inwardly from each end thereof, a fusible element, a pair of clamping members each comprising a part arranged to grip said fusible element and to extend outwardly therefrom through said slot and another part extending circumferentially over said tube on the outer side of said slot, and cap members fixedly engaging the ends of said tube and contacting with the last named parts of said clamping members.

3. A fuse comprising an insulating tube having a single slot at each end thereof extending inwardly from the end of the tube, a fusible element, and a pair of clamping members each comprising a double arm gripping said fusible element and extending outwardly therefrom through one of said slots and having outer portions extending over the outer surface of said tube, and cap members extending over the ends of said tube and contacting with the outer parts of said clamping members.

In testimony whereof, I have subscribed my name.

WILLIAM G. HARTWIG.