A. P. BENDER.

ELECTRIC FUSE.

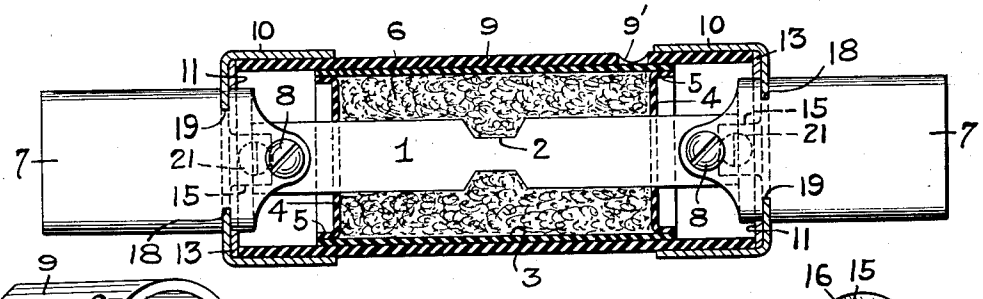
APPLICATION FILED DEC. 5, 1914.

1,290,860.

Patented Jan. 7, 1919.

2 SHEETS—SHEET 1.

FIG. 1



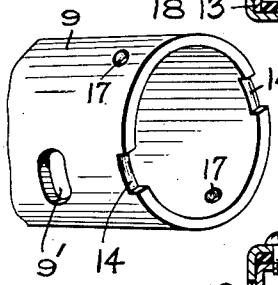


FIG. 7

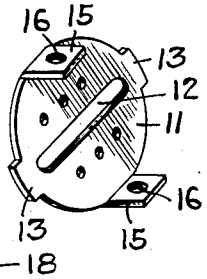


FIG. 8

FIG. 2

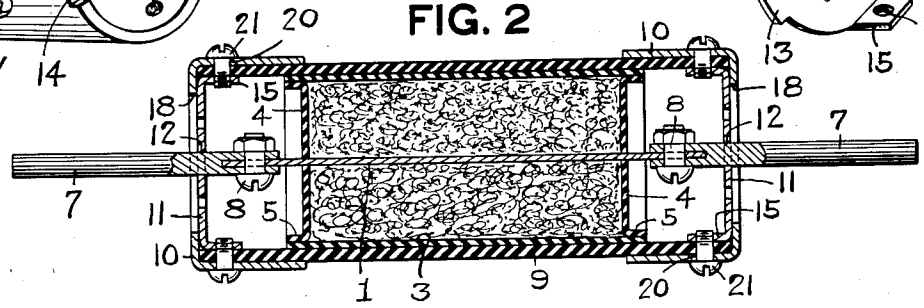


FIG. 3

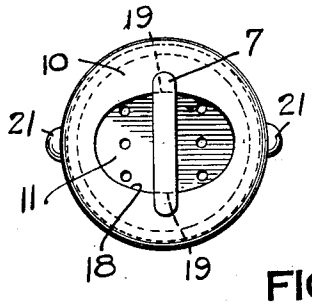


FIG. 4

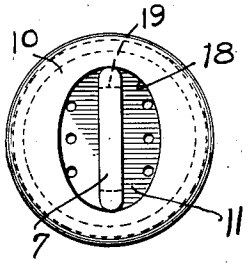


FIG. 5

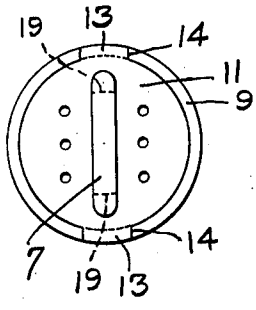
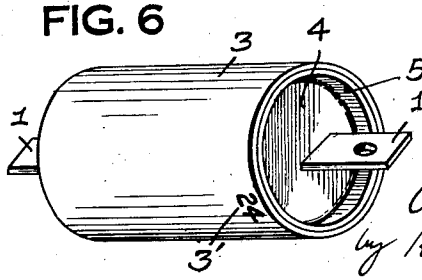


FIG. 6



WITNESSES

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ELECTRIC FUSE.

APPLICATION FILED DEC. 5, 1914.

1,290,860.

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2 SHEETS—SHEET 2.

FIG. 9

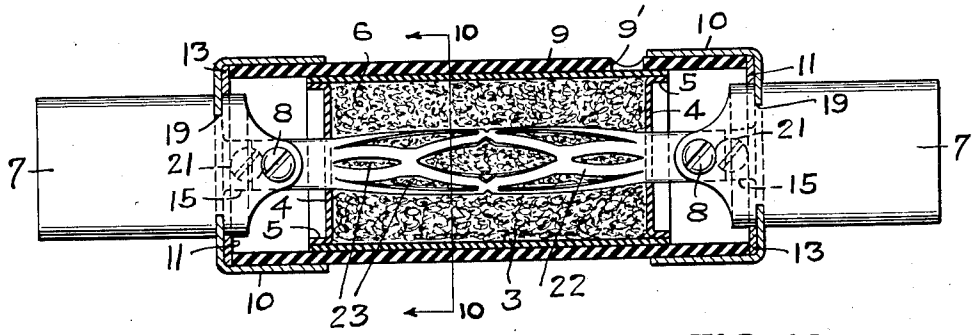


FIG. 10

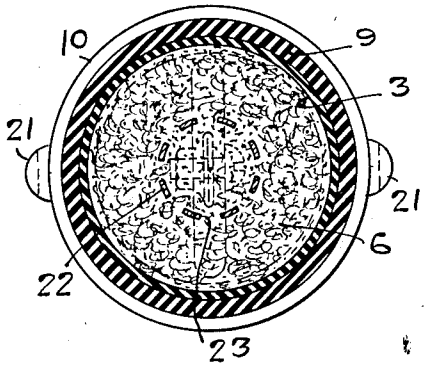


FIG. 11

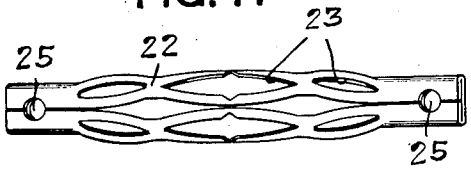


FIG. 12

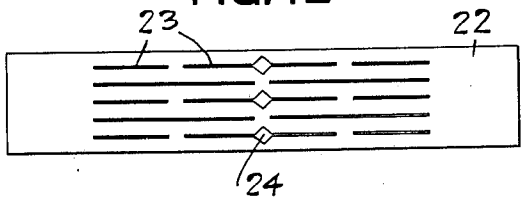
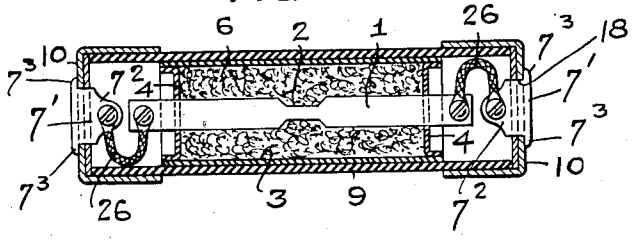


FIG. 13



WITNESSES.

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UNITED STATES PATENT OFFICE.

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ELECTRIC FUSE.

1,290,860. Specification of Letters Patent. Patented Jan. 7, 1919.

Application filed December 5, 1914. Serial No. 875,638.

To all whom it may concern:

Be it known that I, ALLAN P. BENDER, a citizen of the United States, and resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Electric Fuses; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to electric fuses adapted to be interposed in the usual manner in any electric circuit such as on a switch-board or the like, to prevent destructive action of the current due to overloading on electrical machinery or short circuits.

One object of the invention is to provide a self-contained cartridge in which the fuse element is mounted, which cartridge may be slipped into the ordinary fuse casing and locked therein. This cartridge contains the usual inert material for preventing destructive effects of arcing between the terminals of the broken fuse and to prevent transmission of the current through the gases of the fused material from reaching the terminals of the fuse member. A further object is to provide improved means for positioning the fuse cartridge within the casing so that the securing caps may be readily slipped into place; and a further object is to improve the securing caps to provide a lock for holding the fuse cartridge in the casing in proper position. A further object is to provide means whereby the caps at the end of the casing may be secured to the casing without depending upon screw threads in the fibrous material of the casing itself. A further object is to provide means for determining the rating of the fuse without removing same from the casing. Other objects and advantages of the invention will appear from the following description taken in connection with the accompanying drawings, which illustrate preferred embodiments of the invention, and in which Figure 1 is a longitudinal sectional view of a fuse embodying the invention; Fig. 2 is a similar view taken at right angles to Fig. 1; Fig. 3 is an end view showing the casing cap in locking position; Fig. 4 is an end view showing the casing in unlocked position; Fig. 5 is an end view showing the cap removed; Fig. 6 is a perspective view of the fuse cartridge adapted to be slipped within the fuse casing; Fig. 7 is a fragmentary end view of the fuse casing showing certain details; Fig. 8 is a perspective view of a holding and alining member for the fuse element and the casing cap; Fig. 9 is a view similar to Fig. 1 of a modified form of fuse element; Fig. 10 is a transverse sectional view on the line 10—10, Fig. 9; Fig. 11 is a side elevation of the fuse element detached; Fig. 12 is a view of the blank from which the fuse element, Fig. 11, is formed; and Fig. 13 is a longitudinal sectional view of a further modification.

In the embodiment of the invention illustrated in Figs. 1 to 6, inclusive, the fuse element proper consists of a strip 1 of zinc or other suitable material, which may have a reduced central portion 2 to facilitate the fusing operation. This fuse element is contained within a cartridgelike structure comprising the cylindrical body portion 3 and the end pieces 4. These end pieces are flanged as at 5 to engage with the ends of the cartridge 3 and be secured thereto in any suitable manner. Within this cartridge member, the fuse element may be surrounded with a packing 6 of comminuted plaster of Paris, whiting, asbestos or the like to form a heat dissipating, flame quenching medium, which will prevent damaging effects of arcing between the terminals of the broken fuse member, and will also prevent access of gases formed during the fusing operation from reaching the terminals of the circuit.

To the fuse member 1 may be attached the copper terminals 7—7 in any desired manner, as by means of screws 8—8. The complete self-contained fuse member and its cartridge is illustrated in perspective view Fig. 6. This cartridge may be slipped within the ordinary fuse casing comprising the cylindrical casing body 9 and the end caps 10. The casing 9 may be provided with an aperture 9′, and the cartridge with a number 3′ indicating the rating of the fuse, adapted to be in alinement with the aperture 9′ so that said rating may be determined without removing the cartridge from the casing. In ordinary practice, it is usual to

thread the caps 10 and the ends of the fuse casing 9 and screw the one upon the other. This is found unsatisfactory since on account of the fibrous nature of the casing, the screw threads thereon quickly wear down and are stripped. I overcome this difficulty and at the same time, facilitate the proper alinement of the terminals of the fuse member within the casing by the following means.

Referring to Fig. 8, I provide a locking member consisting of a disklike body portion 11 having a slot 12 to receive the fuse terminals 7, said member 11 having opposite lugs 13 adapted to fit within notches 14, Fig. 7, of the fuse casing 9. Locking member 11 is also provided with the lugs 15 at right angles thereto, each having a threaded aperture 16. In assembling the fuse cartridge within the casing 9, the terminals 7 are first secured to the projecting ends of the fuse element 1, and the cartridge is then slipped into place within the casing 9. The locking members 11 are then slipped over the terminals 7 and the lugs 13 are seated within the notches 14 of the casing. This brings the threaded lugs 15 into register with apertures 17 in the ends of the casing 9. It will be seen, therefore, that the terminals 7 may thus be held in exact alinement within the casing. In order to hold the fuse cartridge and its terminals centrally within the casing 9, I provide the closing and locking caps 10, the ends of which are provided with elongated oval openings 18 of an extreme length slightly greater than the width of the terminal 7. These caps are slipped over the terminal 7 and down into place upon the ends of the casing 9. As shown in Fig. 1, the opposite side edges of the terminals 7 are kerfed or notched as at 19 so that when the caps 10 are turned after being seated upon the ends of the casing, the edges at the narrowed portion of the opening 18 engage these notches 19 and lock the fuse terminals in position. The caps 10 are also perforated as at 20, Fig. 2, to receive the locking screws 21, which pass through the apertures 17 of the casing and engage in the threaded apertures 16 of the lugs 15 of the locking member 11. Thus it will be seen that by threading the screws 21 into the lugs 15, the locking member 11, cap 10, and casing are securely fastened together, with the ends of the fiber casing simply clamped between the flange of the cap 10 and the lugs 15; and it will be seen further, that the fastening of the caps 10 on the casing does not depend upon threads formed in the fibrous material of the casing.

In the embodiment of the invention illustrated in Figs. 9 to 12, inclusive, all parts are as heretofore described with the exception of the fuse element proper. In this case, I have found that by forming the fuse element intermediate its ends in hollow form of so-called expanded metal, I may use a very much thinner material for the fuse element, and obtain better distribution of the fusible substance. In this case, referring to Fig. 12, the fuse element is formed of a blank 22 of very thin fusible material. This blank is provided with a number of parallel staggered cuts 23, and if desired, certain of these cuts may include apertures 24. The blank so prepared may then be folded upon itself and the central part expanded as indicated in Fig. 11 forming a cylindrical central body portion with flattened ends, said flattened ends being apertured as at 25 to receive the terminal attaching screws 8.

In the embodiment of the invention as illustrated in Fig. 13, the parts, in the main, may be as heretofore described, but the manner of attaching the terminals 7′ is modified in that I employ flexible connections 26 between the fuse member 1 and said terminals 7′. The terminals 7′ each consist of flat body portion 7^2, having lateral projections 7^3 at the outer end thereof. The cap 10 in this case, may be as heretofore described, the oval opening 18 thereof permitting the same to be slipped over the extended portion 7^3 of the terminals, and then rotated to permit the edges of the narrowed portions of the opening 18 to lock beneath the lateral projections 7^3 of the terminals.

While I have herein described preferred embodiments of my invention, it is to be understood that the same may be altered in details and arrangement of parts within the scope of the appended claims.

What I claim is:

1. An electric fuse comprising a fuse casing, a fuse element mounted therein and having the usual terminals, locking members adapted to be slipped over the said terminals, and having means to hold said terminals in alinement within said casing, a cap adapted to be slipped over said terminals and seated upon the ends of said casing, said cap having self-contained means to lock the fuse element within said casing, and auxiliary locking means to lock said cap, locking member, and casing together.

2. An electric fuse comprising a fuse casing, a fuse element mounted therein and having the usual terminals, locking members adapted to be slipped over the said terminals, and having means to hold said terminals in alinement within said casing, caps adapted to be slipped over said terminals and seated upon the ends of said casing, said caps each having means to lock the fuse element within said casing, said locking mem-

bers each having threaded lugs extending along the inner wall of said casing, and said cap having apertures in its flange whereby said cap and locking member and said casing may be secured together by means of screws passing through said cap-flange, casing wall and threaded into said lugs.

In testimony whereof, I the said ALLAN P. BENDER, have hereunto set my hand.

ALLAN P. BENDER.

Witnesses:
JOHN F. WILL,
J. R. KELLER.