No. 737,282. PATENTED AUG. 25, 1903.

J. SACHS.

SAFETY FUSE.

APPLICATION FILED JAN. 13, 1902.

NO MODEL.

Fig. 1.

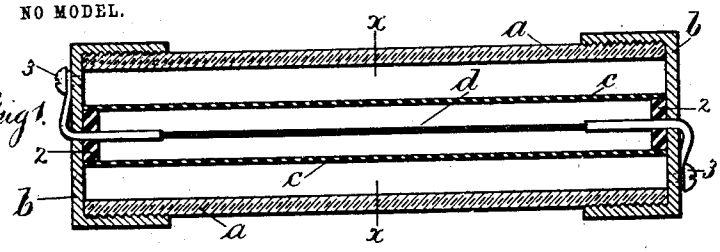


Fig. 2.

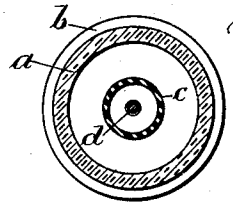


Fig. 3.

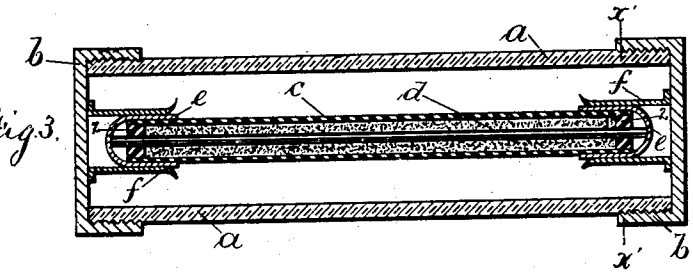


Fig. 4.

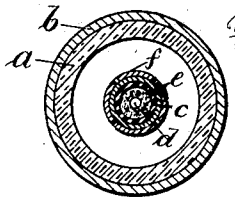


Fig. 5.

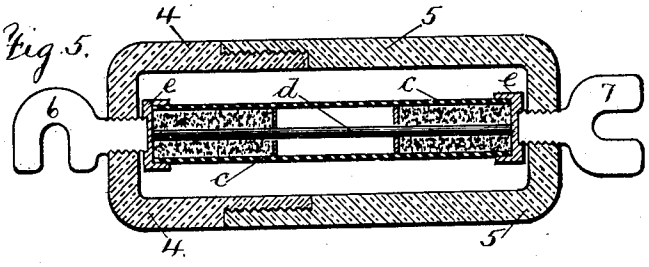


Fig. 12.

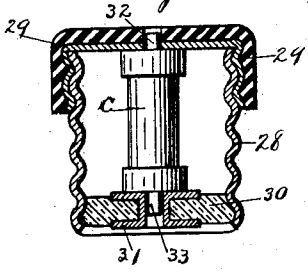


Fig. 6.

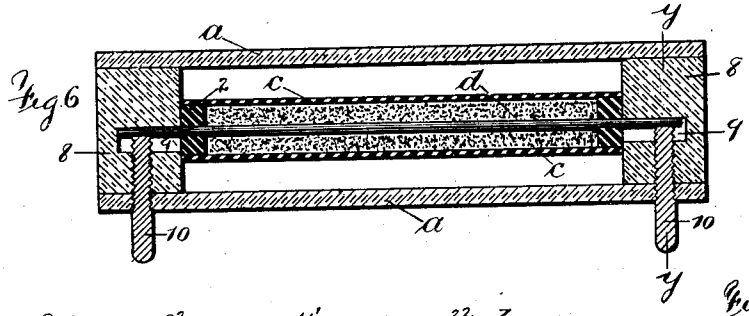


Fig. 7.

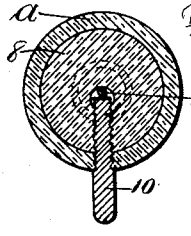


Fig. 8.

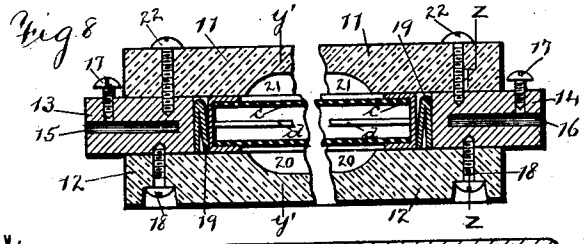


Fig. 10.

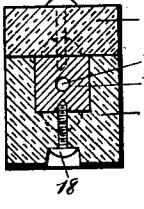
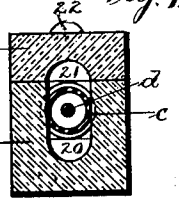


Fig. 9.



Witnesses

A. D. Sewell,

Chas. H. Smith.

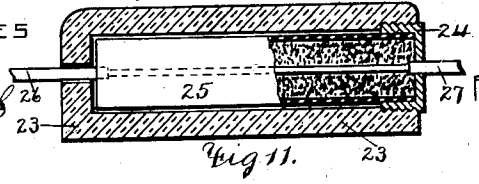


Fig. 11.

Inventor

Joseph Sachs

by L. W. Serrell & Son

Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 737,282. Patented August 25, 1903.

UNITED STATES PATENT OFFICE.

JOSEPH SACHS, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE JOHNS-PRATT COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

SAFETY-FUSE.

SPECIFICATION forming part of Letters Patent No. 737,282, dated August 25, 1903.

Application filed January 13, 1902. Serial No. 89,423. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH SACHS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented an Improvement in Safety-Fuses, of which the following is a specification.

My present invention relates to safety-fuses, particularly the type known as "inclosed" safety-fuses.

Heretofore inclosed safety-fuses have been constructed of an integral casing, an interior fuse-wire, and a filling as a substantially inseparable device. When the fuse of these devices was blown, the structure was either destroyed and had to be renewed by the consumer at an appreciable expenditure or the structure as a whole was rendered inoperative and required to be saved and sent to the maker to be substantially remade, also at an appreciable expenditure of both time and money. In these structures there was not always sufficient strength to prevent the bursting of the casing nor was the structure of a form adapted for continuous use.

The object of my present invention is to provide an inclosed safety-fuse device of cheap construction adapted for continuous use and in which the same results can be obtained as are obtained with the very best type of inclosed fuses and in which the operative element is easily, quickly, and cheaply renewable.

In carrying out my invention I employ what may be termed a "commercial" fuse-cartridge—that is, a fuse of suitable metal incased in a small tubular envelop of insulating material, the said envelop being partially or wholly filled with insulating material or entirely without an insulating filling. The respective ends of this small tubular envelop are to be filled with plugs or covered with end caps, so that the cartridge as such is complete. The exterior casing is formed of parts of strong, massive, and substantial character that are separable the one from the other. This casing may be in the form of a tube with removable end plugs or removable end caps, or it may be in the form of a block longitudinally or transversely divisible into two parts and hollow in the center to receive the fuse-cartridge and provided with means for securely holding the parts together. The small tubular envelop of the fuse-cartridge is preferably made of some cheap material which need not have sufficient strength to resist the explosive energy of the blowing of the fuse; but the outer casing should be of sufficient strength to resist any explosive energy affecting the fuse-cartridge. I do not limit myself to the size, form, or details of the outer case so long as the parts thereof are arranged so that a fuse-cartridge can be securely placed within, supported and held by the outer case, and be readily renewable by a new fuse-cartridge when the same is blown, nor do I limit myself to any form of metal contacts exterior of the outer casing. The outer casing is to be provided with terminals so that when the fuse-cartridge is put in place within the same and the casing closed or sealed electric contact is made with the terminals at the ends of the fuse-cartridge, or the terminal wires from the fuse-cartridge within the casing may extend to direct contact with the terminals of the casing.

In my improvement the substantially indestructible strong outer casing receives and incloses the inexpensive, renewable, and commercial fuse-cartridge, and in this device economy is effected by having the outer casing of such form and strength that it is not affected by the blowing of the fuse and is of such strength as to prevent injury from other than electrical causes to the cheap and inexpensive fuse-cartridge received thereby, and all that it is necessary to do after a fuse has blown is to remove this interior fuse-cartridge and replace it with another in good condition at a very nominal cost, the cost being so slight that there is no value to the parts of the blown fuse and these may be thrown away. The outer casing may be of separable parts adapted to screw together or of parts adapted to be connected by screws, or it may be an inclosing part receiving the fuse-cartridge and with which a connecting union is effected, and the joints, if desirable, may be so leaded that the outer casing is hermetically sealed.

In the drawings, Figure 1 is a longitudinal section of my improved safety-fuse. Fig. 2

is a cross-section on line $x\,x$ of Fig. 1. Figs. 3, 5, 6, and 8 are longitudinal sections of modified forms of my invention. Fig. 4 is a cross-section at $x'\,x'$ of Fig. 3. Fig. 7 is a cross-section on line $y\,y$ of Fig. 6. Fig. 9 is a cross-section on line $y'\,y'$ of Fig. 8. Fig. 10 is a cross-section on line $z\,z$ of Fig. 8. Fig. 11 is a longitudinal section and partial elevation representing a modified and simple form of my invention, and Fig. 12 is a longitudinal section of a modified form of my invention as applicable to fuse-plugs for socket-terminals.

Referring to Figs. 1 and 2, a represents a tubular case of insulating material, preferably cylindrical, and provided with metallic end cap terminals b, which are preferably interiorly threaded and screwed onto the ends of the case a. This case and these terminals are made of material sufficiently heavy and durable to be uninjured by the blowing of the fuse-cartridge and to stand the wear and tear of repeated and continuous use. Within the casing a I provide a tubular envelop c, of thin insulating material—such, for instance, as paper. The ends of the tubular envelop c are closed with disks 2, also preferably made of insulating material and centrally perforated. A fuse d extends longitudinally through the tubular envelop c, and the terminals of said fuse pass through holes in the disks 2 and are secured therein, the whole forming a fuse-cartridge. The protruding terminals of the fuse d may be passed through holes in the end caps b and at least one end cap b screwed down on the casing a after the insertion of the fuse-cartridge, when the ends of the fuse-tube c will come flush with the inner surface of the end caps. The fuse-terminals are then to be bound to the end cap-terminals by the set-screws 3 or equivalent means.

Referring to Figs. 3 and 4, illustrating a modification of the construction shown in Figs. 1 and 2, the envelop or fuse-tube c of the cartridge may be provided with rounded metal end caps e and the case-terminals b provided with socket-contacts f, receiving the caps e when the parts are connected. The ends of the fuse d are electrically connected to the caps e, which latter are made to fit the sockets f, and the cartridge is thus supported within the case.

In Fig. 5 I have shown a case of porcelain or similar material of parts 4 and 5 longitudinally separable and which screw together and are provided, respectively, with the terminals 6 and 7, passing through the ends. In this form the metal end caps e of the fuse-cartridge are preferably provided with central recesses into which the bases of the terminals 6 and 7 fit when the parts are in place, as shown. The fuse-cartridge is thus centered and supported. The fuse-cartridge is partially filled with an insulating material.

The modification shown in Fig. 6 comprises a casing a, preferably cylindrical, the ends of which are plugged with disks 8 and in which are openings 9. Terminals 10 pass transversely through the shell of the casing a into the disks 8 and into the openings 9 therein. The form of tubular fuse envelop or cartridge used in this modification is preferably the same as that shown in Fig. 1, the protruding portions of the fuse-strip being placed in the openings 9 and bound in position by the terminals 10, pressing thereon and by means of which electrical connection is completed through the instrument.

In Figs. 8, 9, and 10 I have shown a modification of my improvement wherein the same is applicable to use in a fuse-block. The fuse-block may be made of any good insulating material, preferably porcelain, and in two parts 11 and 12. The lower part 12 is provided with a central longitudinal recess 20 and end longitudinal recesses, and metal terminals 13 and 14 are fitted into the end recesses. The tops of the terminals 13 and 14 are flush with the top of the lower portion 12 of the fuse-block, and the said terminals protrude appreciably beyond the ends of the said block and are provided with holes 15 and 16 for the reception of line-wires, which may be held thereto by means of set-screws 17, the said terminals being held in position in the recesses of the block by screws 18. The inner ends of the terminals 13 and 14 are provided with spring members 19. The central recess 20 in the lower part 12 and a similar and corresponding recess 21 in the upper part 11 are made to provide a receptacle for the diffused metal of a blown fuse. The ends of the fuse-cartridge preferable for use in this modification are of metal, to which the fuse is electrically connected. The fuse-envelop extends between the springs 19, and when the cap or upper part 11 of the block is secured in place by the screws 22 the fuse-envelop is forced down and held in position by the said top part of the fuse-block and the electrical connection through the block is complete.

Another modification of my invention is shown in Fig. 11, wherein I have illustrated a small casing 23, of porcelain or other suitable insulating material, which is preferably cylindrical and may be a portion of a fuse-block. This casing 23 is in one piece of material, one end being closed, and the mouth or open end is somewhat enlarged interiorly and preferably threaded to receive the terminal 24 of the fuse-cartridge 25. The fuse in this cartridge is electrically connected to terminals 26 and 27, the former passing through an opening in the closed end of the casing 23 and both being adapted to be engaged by electrical devices of any desired character.

In Fig. 12 I have shown a further modification of my invention, illustrating its adaptability for use in plugs for socket-contacts. 28 represents a tubular shell of conducting material, being preferably threaded. A metal-

lined cap 29 screws onto one threaded end of the shell 28 to make an electrical connection between the lining and the shell. The outer portion of the cap 29 is of fiber, papier-mâché, or suitable insulating material. A disk 30, of porcelain or other insulating material, is screwed into the other end of the shell 28, and the edge of the latter slightly turned in against the disk 30 to keep the same in place. A tubular metallic contact 31, preferably of eyelet form, is placed centrally in the said disk. The fuse-cartridge extends between the contact 31 and the lining of cap 29 and is held thereby, and the fuse-terminals 32 and 33 are electrically connected to the said cap-lining and contact, respectively, in any desired manner. As shown, the terminal 32 passes through a hole in the cap 29 and the terminal 33 into the contact 31 and is soldered thereto.

I claim as my invention—

1. A safety-fuse casing for fuse-cartridges comprising a tubular body of suitable material, adapted to receive, hold and contact with the fuse-cartridge, with terminals continuing the electrical continuity of the ends of the fuse to the outside of the casing for connection with line-terminals.

2. A safety-fuse casing for fuse-cartridges, comprising a tubular body of suitable insulating material adapted to receive, hold and contact with the fuse-cartridge, with terminals continuing the electrical continuity of the ends of the fuse to the outside of the casing for connection with line-terminals.

3. A safety-fuse independent of line-terminals, but adapted to be placed in line therewith, comprising an outer casing of parts fitting one another and adapted to be held together and separable at the pleasure of the user, a tubular envelop of insulating material of small diameter within, independent of and supported by the outer casing, a fuse extending longitudinally through the said tubular envelop, closures for the ends of the tubular envelop, and means continuing the electrical continuity of the ends of the fuse to and outside of the outer casing for connection with the line-terminals, substantially as specified.

4. A safety-fuse comprising a tube-section of insulating material and metal end caps fitting the same and the parts adapted to be screwed together and separable at the pleasure of the user, a tubular envelop of insulating material of small diameter within and supported by the outer casing, a fuse extending longitudinally through the said tubular envelop, closures for the ends of the tubular envelop, and means continuing the electrical continuity of the ends of the fuse to and outside of the ends of the outer casing, substantially as specified.

5. A safety-fuse comprising a tube-section of insulating material and metal end caps fitting the same and the parts adapted to be screwed together and separable at the pleasure of the user, a tubular envelop of insulating material of small diameter within the outer casing, a fuse extending longitudinally through the said tubular envelop and closures for the ends of the same, the tubular envelop extending lengthwise through the tube-section with its ends contacting with the inner surfaces of the metal end caps and supported mainly thereby, and means continuing the electrical continuity of the ends of the fuse to and outside of the ends of the outer casing, substantially as specified.

6. A safety-fuse comprising a tube-section of insulating material and metal end caps fitting the same and the parts adapted to be held together and separable at the pleasure of the user, a tubular envelop of insulating material of small diameter within and supported by the outer casing, a fuse extending longitudinally through the said tubular envelop, closures for the ends of the tubular envelop and means continuing the electrical continuity of the ends of the fuse to and outside of the ends of the outer casing, substantially as specified.

7. A composite fuse comprising a casing and a commercial fuse-cartridge within and surrounded and supported by said casing, and means providing for continuing the electrical continuity of the ends of the fuse to and outside of the casing for connection with line-terminals.

8. The combination with a casing, consisting of parts fitting one another adapted to be held together but separable at the pleasure of the user, of a commercial fuse-cartridge received within and surrounded and supported by said casing with terminals continuing the electrical continuity of the ends of the fuse to the outside of the casing for connection with line-terminals.

9. The combination with a casing consisting of a tubular body adapted for continuous use with ends closing the same, of a commercial fuse-cartridge received within and surrounded and supported by said casing, with terminals continuing the electrical continuity of the ends of the fuse to the outside of the casing for connection with line-terminals.

10. The combination with a casing consisting of a tubular body of insulating material adapted for continuous use with metallic ends closing the same but removable therefrom, of a commercial fuse-cartridge received within and surrounded and supported by said casing with terminals continuing the electrical continuity of the ends of the fuse to the outside of the casing for connection with line-terminals.

11. The combination with a casing consisting of a tubular body of insulating material adapted for continuous use with metallic ends closing the same, at least one of which ends is removable therefrom, of a commercial fuse-cartridge received within and surrounded and supported by said casing with terminals continuing the electrical continuity of the ends

of the fuse to the outside of the casing for connection with line-terminals.

12. A composite fuse, comprising a casing and a commercial fuse-cartridge within and surrounded and supported by said casing and contacts upon the exterior of said casing providing for continuing the electric continuity of the ends of the fuse to the fuse-block terminals.

Signed by me this 4th day of January, 1902.

JOSEPH SACHS.

Witnesses:
GEO. T. PINCKNEY,
BERTHA M. ALLEN.