

W. S. ATKINSON.
INCLOSED FUSE FOR ELECTRIC CIRCUITS.

(APPLICATION FILED FEB. 10, 1902.)

NO MODEL.

Fig. 1.

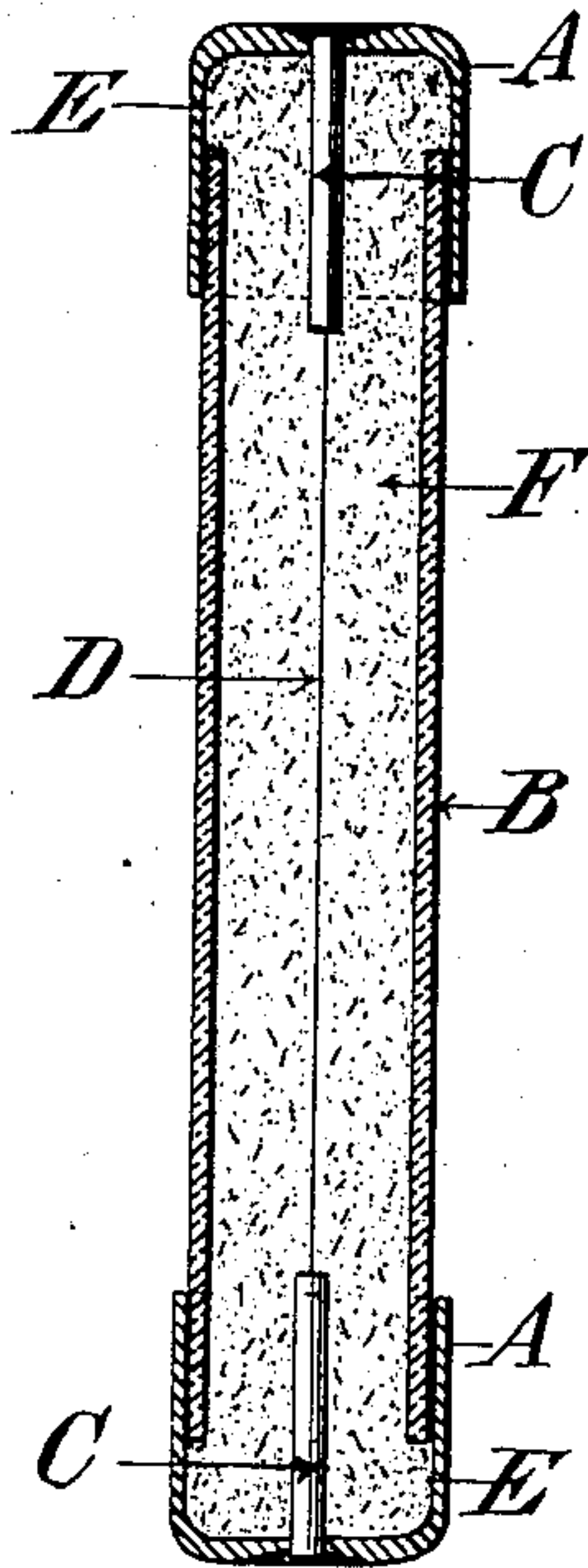


Fig. 2.

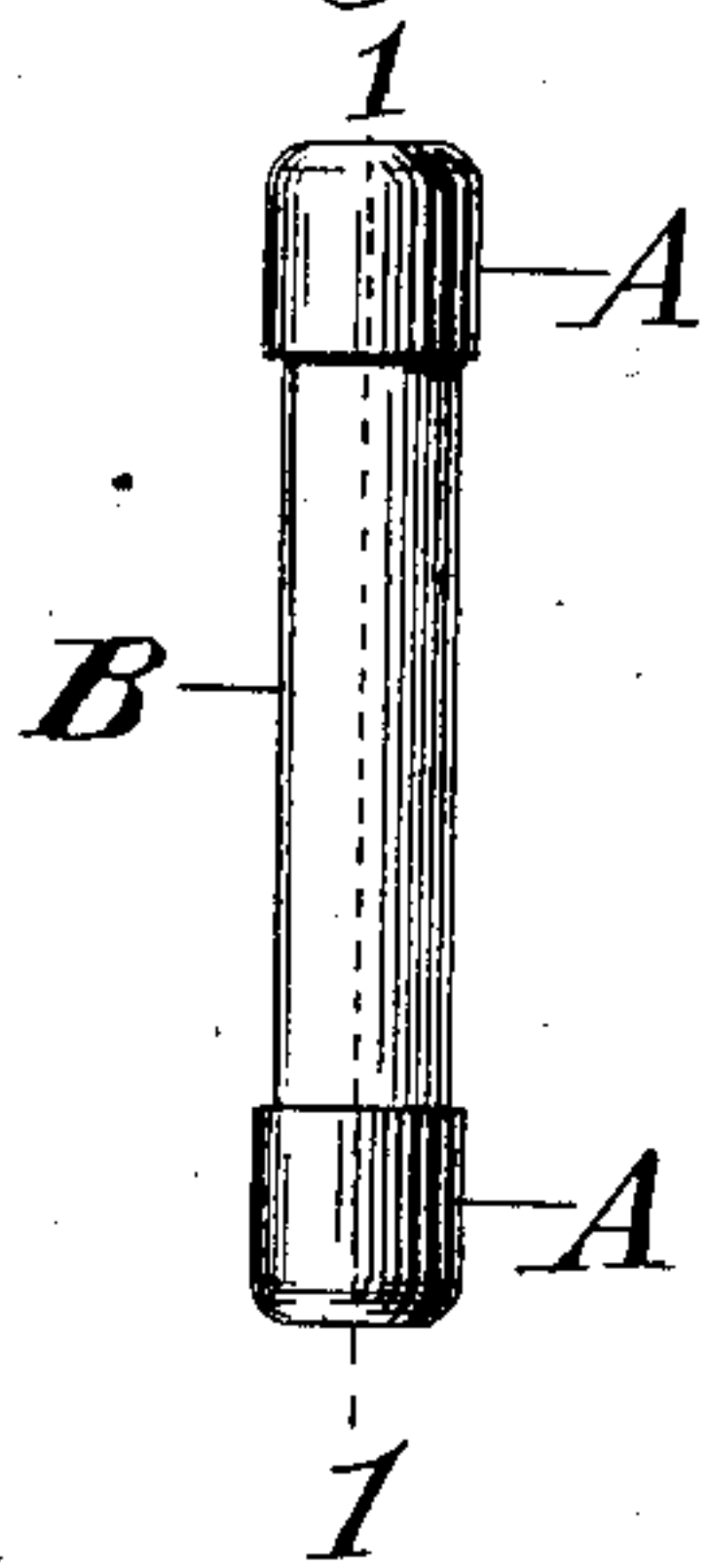
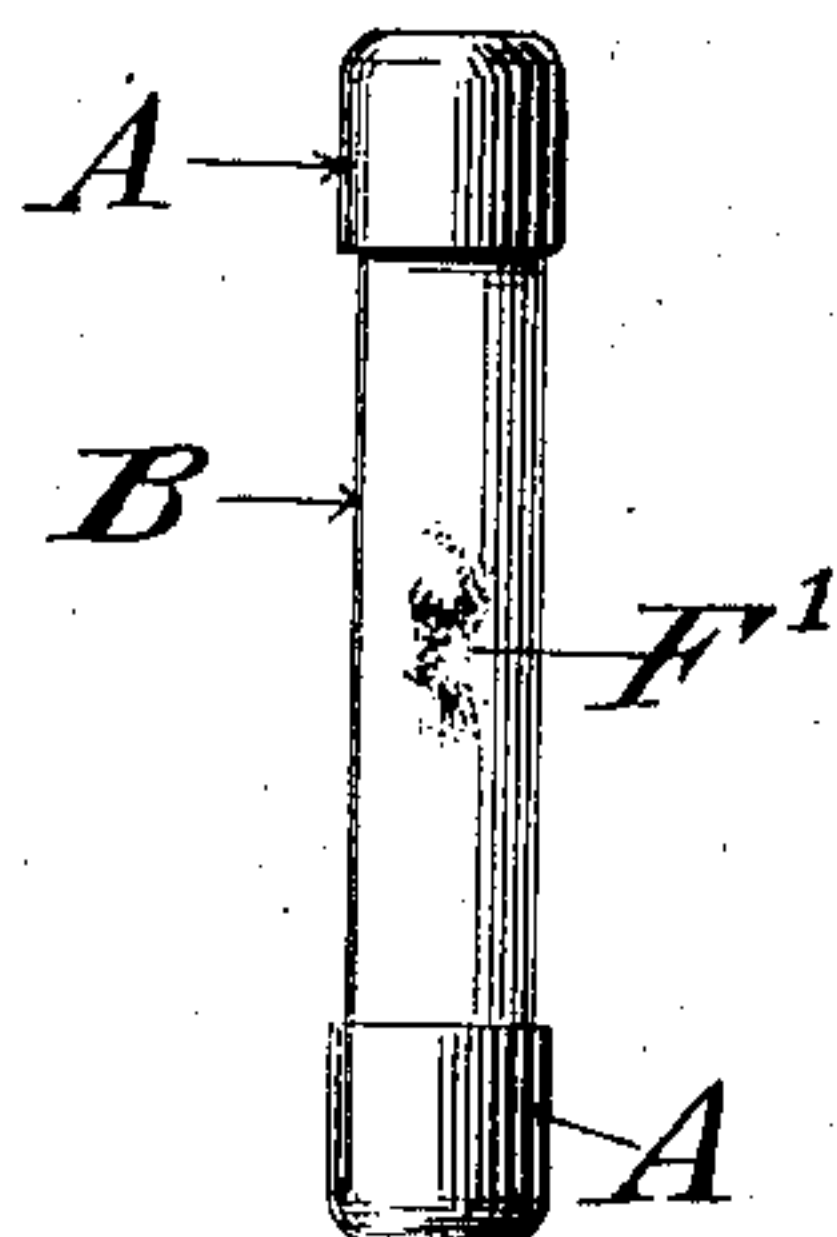


Fig. 3.



Witnesses
Edward Rowland
Ermina E. Walker.

Inventor
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By his Attorney
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UNITED STATES PATENT OFFICE.

WILLARD S. ATKINSON, OF NEW BRUNSWICK, NEW JERSEY.

INCLOSED FUSE FOR ELECTRIC CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 730,594, dated June 9, 1903.

Application filed February 10, 1902. Serial No. 93,330. (No model.)

To all whom it may concern:

Be it known that I, WILLARD S. ATKINSON, of New Brunswick, in the county of Middlesex and State of New Jersey, have made certain new and useful Improvements in Inclosed Fuses for Electric Circuits, of which the following is a specification.

My present invention relates to inclosed fuses for electric circuits, and has for its object to provide an improved form of these now well-known devices by which the condition of the fuse may be discerned by inspection. Some forms of these fuses are now made in which indicating apparatus of one form or another is employed to show the condition of the fuse. So far as I know these have proved unreliable in practice. One with which I am acquainted consists of a fine wire upon the outside of the inclosing case of the fuse. This wire is usually of iron and is therefore of higher specific resistance than the fuse. When the fuse blows, the iron wire immediately overheats and flashes. In practice, however, the wire (which is of extreme tenuity) is often broken by accident, and in some cases it is broken without being observed, so that the fuse may blow without making any indication. Other visible indicators have been proposed, but so far as I know have not been attended in practice with sufficient certainty to cause their adoption.

My invention resides in combining with an inclosed fuse of the modern type a transparent inclosing case filled with a powder which changes its condition under the influence of the arc, so as to present a distinctive or characteristic appearance and to exhaust in so doing the energy in the arc, thus extinguishing it. Of course the usual inclosing tube is of glass, which need be of only moderate thickness, since it is not subjected to any severe strain. For a surrounding medium for the fuse I prefer sodium bicarbonate or some similar material which fuses in the presence of heat. These powders form a glass-like substance and are of different color or appearance when fused, besides acting as efficient insulators. To obviate any severe shock on the glass or other transparent inclosing medium, I prefer to employ a little powdered or comminuted mica in addition to the sodium bicarbonate. I have found that

this mixture possesses peculiar properties, inasmuch as the mica serves to cushion the shock and prevent fracture of the tube, and by its different physical condition from the sodium bicarbonate it prevents the latter caking and assists it to lie close to the fuse, so that the latter does not rest in a tube of the bicarbonate with a thin film of air surrounding it, as is otherwise apt to be the case. In addition the mica, which is itself a silicate, is reduced by the action of the bicarbonate under the influence of the arc and the latter is quickly extinguished.

In the accompanying drawings, Figure 1 is a section upon the line 1 1 of Fig. 2 of a fuse constructed according to my invention. Fig. 2 is the device as it appears before and Fig. 3 after the blowing of the fuse.

In Fig. 1, A A are the usual terminal caps of brass or other metal, B is the inclosing tube, which is of glass, although other transparent substances might be used with suitable precautions. Ordinarily glass is cheaper and better than anything else. C C are terminals connected to the brass caps A A, and between these stretches the fuse D. Occupying the major portion of the tube B is the powdered substance F, the nature of which I have already pointed out. This entirely surrounds the fuse, and the energy expended in the arc caused by the blowing of the latter is exhausted in changing the condition of the surrounding powder, resulting in the practically immediate extinguishment of the arc.

Fig. 2 shows the device as it appears before the blowing of the fuse. The tube then appears like a white stripe on the switchboard or other background, while in Fig. 3 a portion F' of the center of it is shown to be perceptibly discolored.

I have found the indication of my improved fuse to be more certain than any other with which I am acquainted. Not only is the rupture of the circuit certain and positive, but it is immediately apparent to the switchboard attendant. Many of the devices of this general type with which I am acquainted are inclosed in hard-fiber tubes, and their condition can only be certainly known by a test applied to the terminals, whereas by the use of my fuse the condition of the circuit may be immediately ascertained by inspection.

In addition to the advantages above pointed out I have found that the liberation of carbonic-acid gas from the soda when the fuse blows is of very great assistance in promptly
5 extinguishing the arc.

Having thus described my invention, what I claim, and desire to protect by Letters Patent of the United States, is—

10 In an inclosed fuse, a fuse-wire, terminals, a surrounding powder composed of a mixture

of comminuted mica and sodium bicarbonate and a glass tube inclosing the fuse and powder.

In witness whereof I have hereunto set my hand, this 7th day of February, 1902, in the
15 presence of two witnesses.

WILLARD S. ATKINSON.

Witnesses:

T. J. JOHNSTON,

ERMINA E. WALKER.