

A. G. FAY.
ELECTRICAL FUSE.

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936,227.

Patented Oct. 5, 1909.

Fig. 1.

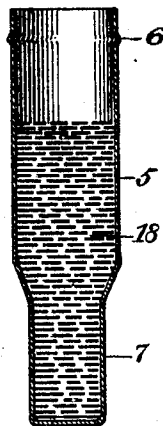


Fig. 2.

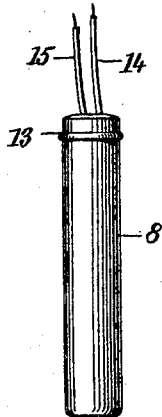


Fig. 3.

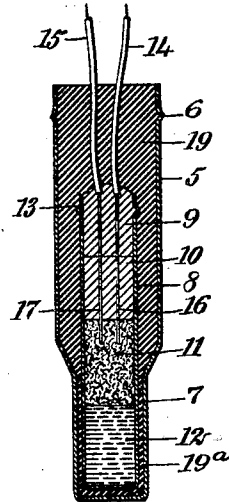
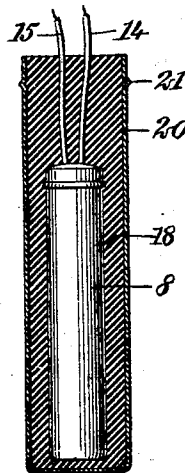


Fig. 4.



WITNESSES

William P. Loebel.
Walter Harrison

INVENTOR

Addison G. Fay

BY Wm. D. Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

ADDISON GRANT FAY, OF HIGHLAND PARK, ILLINOIS.

ELECTRICAL FUSE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ADDISON GRANT FAY, a citizen of the United States, and a resident of Highland Park, in the county of Lake and State of Illinois, have invented a new and Improved Electrical Fuse, of which the following is a full, clear, and exact description.

My invention relates to electrical fuses of the type used for blasting, my more particular purpose being to protect the materials and containing shells of the fuse against the action of moisture.

To this end my invention relates to the addition of an outer shell and a filling, the size of the diameter of the outer shell being slightly reduced at one end thereof for the purpose of sharpening the effect of detonation of the fuse.

Reference is to be had to the accompanying drawings forming a part of this specification, in which drawings like characters of reference indicate like parts throughout the views, and in which—

Figure 1 is a vertical section showing the outer shell filled with plastic material, preferably asphaltum compound, and ready to receive the fuse which is contained in a separate shell to which wires are connected; Fig. 2 is an elevation of the fuse provided with a shell and connecting wires, the shell being adapted to be placed within the outer shell and enveloped within the filling; Fig. 3 is a central vertical section through the fuse complete, comprising the inner shell, the outer shell, and the filling disposed intermediate the inner and outer shells, and completely enveloping all of the explosive parts; and Fig. 4 is a vertical section showing another form of my device, the inner shell being disposed within an outer shell having a different form from the outer shell shown in Figs. 1 and 3.

An outer shell 5 is provided adjacent to one of its ends with an annular rib or bead 6, and is provided at its opposite end with a reduced cylindrical portion 7. A smaller shell 8 of cylindrical form is made of metal and is filled with the following mentioned members, to wit, 9, a plug of sulfur compound of the kind ordinarily used in fuses, 10 another sulfur compound or button of non-explosive material, 11 a priming of gun cotton, or of a mixture of fulminate of mercury and chlorate of potash, and 12, a charge

of fulminate of mercury. In practice the charge 12 of fulminate of mercury is placed within the inner tube 8, the gun cotton 11 is next lowered into the tube, the member 10, which is connected with wires 14—15, is next placed in position, and over this member is poured a plastic solution of sulfur compound which forms the member 9. The wires 14—15 are provided with exposed metallic conducting members 16—17. These conducting members are preferably molded directly into the member 10. The inner tube is provided with a bead 13 and is typical of fuses as now constructed.

My invention relates more particularly to the construction which is added to the shells 8 and their contents, and the manner in which the shells and contents are protected. The shell 5 is filled with a quantity of molten asphaltum compound 18, and this is allowed to cool, if necessary, until its temperature is considered as safe. The shell 8, with the wires 14, 15 connected as above described, is next taken by hand and inserted within the shell 5 and pushed downwardly into the asphaltum compound 18 and centered as nearly as practicable. The entrance of the shell 8 into the asphaltum compound causes the latter to rise and cover the top of the shell 8, as will be understood from Fig. 3, and as this asphaltum compound hardens, owing to its cooling, it becomes a waterproof filling, as will be understood from 19 in Fig. 3. A portion 19^a of this filling completely encircles the lower end of the shell 8. As shown in Fig. 4, the form of the outer shell 20 is cylindrical, though this shell is provided with a bead 21, as in Fig. 3. In other respects the invention is practically the same for Figs. 3 and 4.

In the fuses as ordinarily constructed, the members 9, 10 do not sufficiently protect the priming 11 and fulminate 12 from the action of moisture. This is because slight variations in the temperature of the shell 8 cause slight differences in temperature between this tube and its contents, and, again, the compounds used in making the members 9—10 are liable to shrink slightly away from the tube 8 in cooling. By submerging the shell 8 and its contents completely below the upper level of the asphaltum compound, as above described, the inner shell 8 is rendered completely waterproof.

I find that by reducing the diameter of

the portion 7 of the outer shell 5, as indicated in Figs. 1 and 3, the force of the detonation is preserved much better.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a fuse, the combination of an outer shell, provided with a reduced portion, an inner shell disposed partly within said reduced portion, explosives disposed within said inner shell and connecting wires leading to said explosives, and a filling of waterproof material enveloping said inner shell and disposed within said outer shell.

2. A fuse comprising an inner shell, explosives disposed therein, wires leading into said inner shell, an outer shell containing said inner shell, and a filling of asphaltum compound poured into said outer shell and completely enveloping said inner shell.

3. A fuse comprising an inner shell, explosive materials disposed within said inner shell, an outer shell encircling said inner shell, a filling of waterproof material disposed intermediate said outer shell and said inner shell for the purpose of excluding the

entrance of water into said outer shell, and means for firing said explosive materials.

4. A fuse comprising an inner shell, explosives disposed within said inner shell, wires for firing said explosives, an outer shell encircling said inner shell, and a filling of waterproof material engaging said inner shell and said outer shell for the purpose of excluding the entrance of water from said outer shell.

5. A fuse comprising an inner shell, explosives disposed therein, connecting wires extending into said inner shell for the purpose of firing said explosives, an outer shell of longitudinal form having one of its ends closed, and a filling of waterproof material disposed intermediate said inner shell and said outer shell for the purpose of preventing water from entering said outer shell.

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

ADDISON GRANT FAY.

Witnesses:

J. H. ROGERS,

C. A. WEVER.