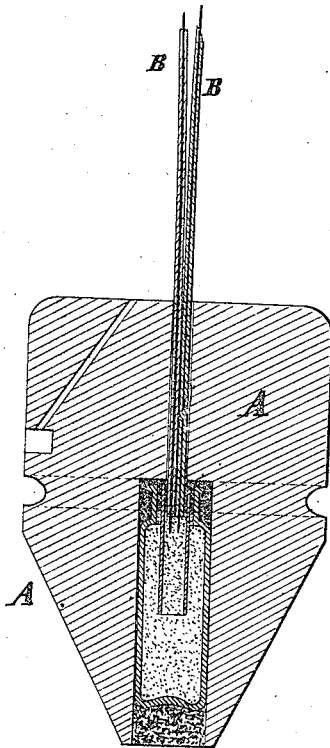


C. L. KALMBACH.
Electric-Fuses.

No. 164,921:

Patented June 29, 1875.



Witnesses:
A. Ruppert
A. H. J. C. E.

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Inventor.
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Atty

UNITED STATES PATENT OFFICE.

CHARLES L. KALMBACH, OF RICHMOND, VIRGINIA.

IMPROVEMENT IN ELECTRIC FUSES.

Specification forming part of Letters Patent No. 164,921, dated June 29, 1875; application filed June 24, 1874.

To all whom it may concern:

Be it known that I, CHARLES L. KALMBACH, M. E., of Richmond, in the county of Henrico and State of Virginia, have invented a new and useful Improvement in Primers for Exploding Mines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawing.

The object of my invention is to make a fulminate-primer which may be safely handled and used with absolute certainty and effect. To this end I take a wooden cylindrical plug, A, made conical at the end intended to rest on the charge, shaped substantially as shown, the diameter of which is sufficient to allow it to be introduced into the hole or cartridge containing the charge. For fastening a cartridge conveniently to this wooden case, I cut a groove around the case above the conical part, as shown, into which groove the upper edge of the cartridge may be bent or tied. I then take the wires or fuse and pass through the small hole in the axis of the case. If wires are used, the lower end is held over a lamp-chimney until the gutta-percha becomes plastic, when it is shoved back with moistened fingers until a lump is formed large enough to close one end of a piece of quill about an inch in length. The naked wires are cut off close to this lump, and it, with the ends of wire just protruding, is forced into the quill. Then the wire ends, being visible through the sides of the quill, may be adjusted so as to form proper terminal poles. When the gutta-percha has cooled enough to become hard, it will be firmly united with the quill, and the latter may be loaded with pure fulminate and closed with a small wad of raw cotton. Then the quill and wires are inserted in a glass vial of suitable size, and more or less fulminate, as may be desired, is poured into the vial, stoppered with more raw cotton, and covered with soft pitch, through which a small cork is forced, when more pitch is put over the cork. The vial is then drawn back into a recess formed in the case, care being taken to put pitch enough in the recess to entirely surround the vial.

When fuse is to be used it is of course not necessary to use the quill, and the vial being loaded, the end of the fuse is simply introduced and sealed, when the vial and fuse are carefully forced back into the pitch-lined recess of the cone, and the primer is ready. For light charges, fired by the spark, the vial may be dispensed with, and the quill alone, sealed in a similar manner, used. By this means I make a fulminate primer which may, with safety, be carelessly handled, and which may be kept indefinitely without being injuriously affected.

I am aware that copper capsules have been employed for such primers, and I do not therefore claim in this connection any impervious capsule. My claim is limited to the use of glass capsules, as I have found that it is safer to use them than metallic ones, as in case of premature explosion of the capsule the nitro-glycerine is liable to be exploded by the friction of the flying particles of metal, while a glass capsule will be, by the explosion of the fulminate, broken into a fine dust, which will not explode nitro-glycerine except by the sudden pressure exerted by the fulminate when the primer is firmly held in contact with the charge.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A fulminate primer constructed by sealing a glass vial containing the fulminate of mercury hermetically in a chambered wooden block, substantially as set forth.

2. In combination with the firing-wires, a quill within which the ends of the wires are adjusted in proper relation to one another, substantially as set forth.

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

CHARLES L. KALMBACH.

Witnesses:

ASA ROGERS,
J. H. HENRY.