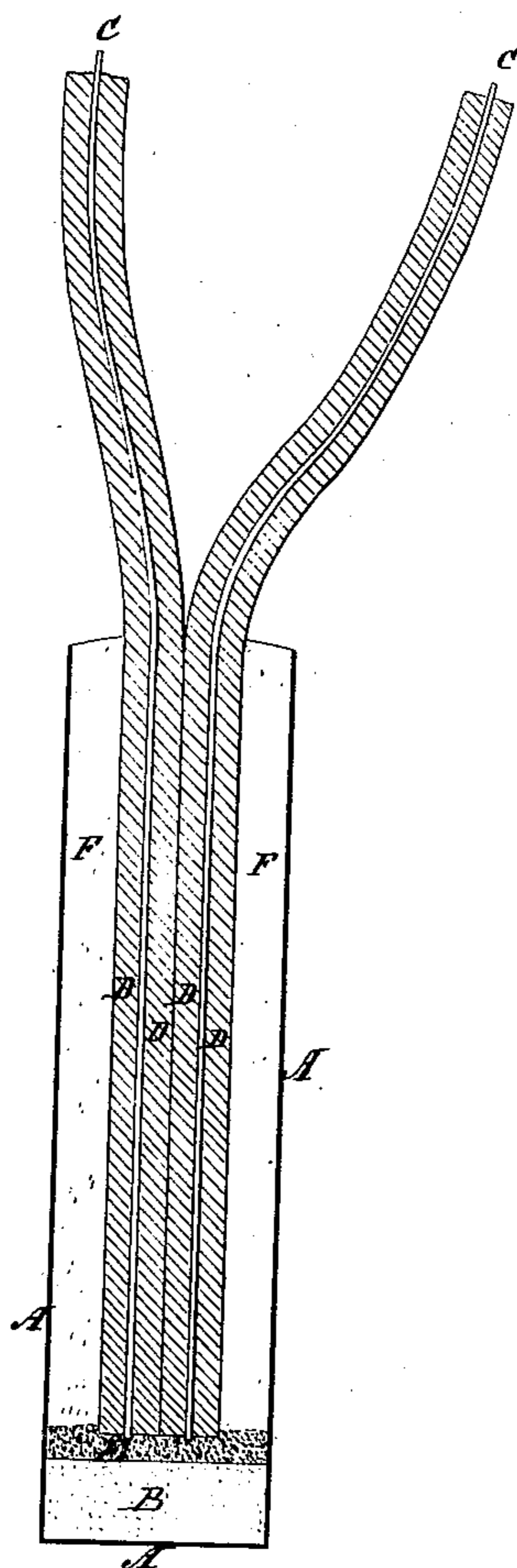


T. VARNEY.
Electric-Fuses.

No. 148,338.

Patented March 10, 1874.



Witnesses:

George A. Doe
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Inventor:

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UNITED STATES PATENT OFFICE.

THOMAS VARNEY, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN ELECTRIC FUSES.

Specification forming part of Letters Patent No. 148,338, dated March 10, 1874; application filed November 15, 1873.

To all whom it may concern:

Be it known that I, THOMAS VARNEY, of the city and county of San Francisco and State of California, have invented an Improved Electrical Exploder, of which the following is a specification:

The object of my invention is to prepare, in a cheap and simple manner, the percussion or fulminating cap, commonly used to explode dynamite and other like substances, for being itself exploded with ease and certainty by electricity, and at the same time to have the cap and its attachments when thus prepared (then called an electrical exploder) small, convenient for use, and secure against being injured by violence, dampness, time, or temperature, and also secure against accidental explosion.

The accompanying longitudinal central section view of my exploder enlarged forms a part of this specification.

The kind of wire best adapted to my purpose, so far as I am now informed, is that known as gutta-percha wire, No. 14 outside and No. 24 inside—that is, the copper wire is No. 24, and covered with so much gutta-percha as to make it No. 14 outside of all. This size of wire and covering proves to be satisfactory in the distance between the copper extremities within the cap, in the room it occupies, in the insulation it affords, in the current it is able to carry, in strength, in its security against injury, in tamping, and in all other particulars.

The electro-sensitive powder made use of by me is made as follows: Ten parts of subphosphide of copper, forty-five parts of subsulphide of copper, and fifteen parts of chlorate of potash. Moisten them well with alcohol, and pulverize, and thoroughly mix in a mortar. Carefully dry, and keep in close vessels.

The exploder is constructed as follows: The wire is first cut into lengths somewhat greater than the depth of bore-hole in which they are to be used. The cutting should be done with nippers having sharp edges that meet, so as to leave the ends of the wires as regular and little disturbed as possible. As much of the sensitive powder as will lie on the point of a pen-knife, or just sufficient to cover the face of the fulminate within the cap, is put into the

cap. The ends of two wires are now placed even with each other and side by side, and held for an instant over the blaze of a spirit-lamp, so as to soften the gum enough to cause it to adhere; then press the wires together while they cool. This insures the proper distance between the wires. The ends of the wire thus stuck together are now inserted into the cap, and into contact with the sensitive powder, and the vacant space about them in the cap filled with molten sulphur. The temperature should not be allowed to rise but very slightly above the melting-point, or the sulphur will become too thick to fill in well.

Referring to the drawing, A is the shell of the cap; B, the fulminate; C, the copper wires; D, the gutta-percha; E, the electro-sensitive powder, and F the sulphur.

It will be observed that the size of the exploder proper does not exceed that of the cap. The junction of the several parts is made within the cap. This is very important. A large plug of wood, paper, or other compressible material diminishes the effectiveness of the blast.

The ease and certainty with which the metallic ends of the wires are placed at a proper and uniform distance apart and in contact with the sensitive powder is apparent. The sulphur holds the wires so firmly that it requires great force to displace them, and its solidity and hardness protect the fulminates from percussions, as well as from all exterior influences. Thus we have all the essential qualities of a good exploder—compactness, solidity, safety, durability, uniformity, and cheapness.

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

An electric fuse composed of a single shell containing the requisite fulminate or detonating powder, the electro-sensitive powder, and the ends of the conducting-wires, all in proper contact, and secured therein by sulphur, or its equivalent, substantially in the manner and for the purpose set forth.

THOMAS VARNEY.

Witnesses:

WM. F. WALSH, Jr.,
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