

(No Model.)

R. B. DASHIELL.  
FUSE FOR HIGH EXPLOSIVES.

No. 571,342.

Patented Nov. 17, 1896.

FIG. 1.

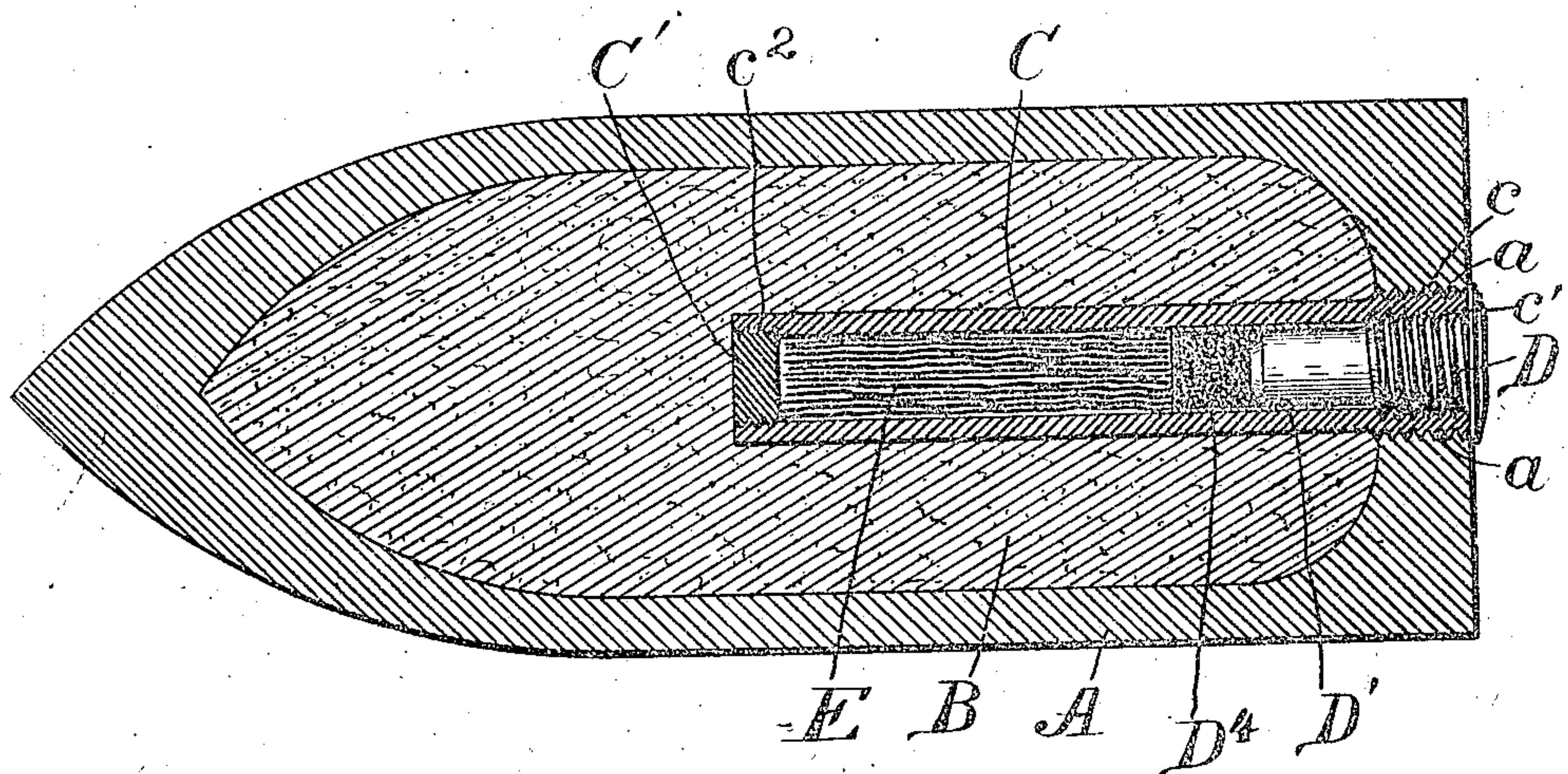
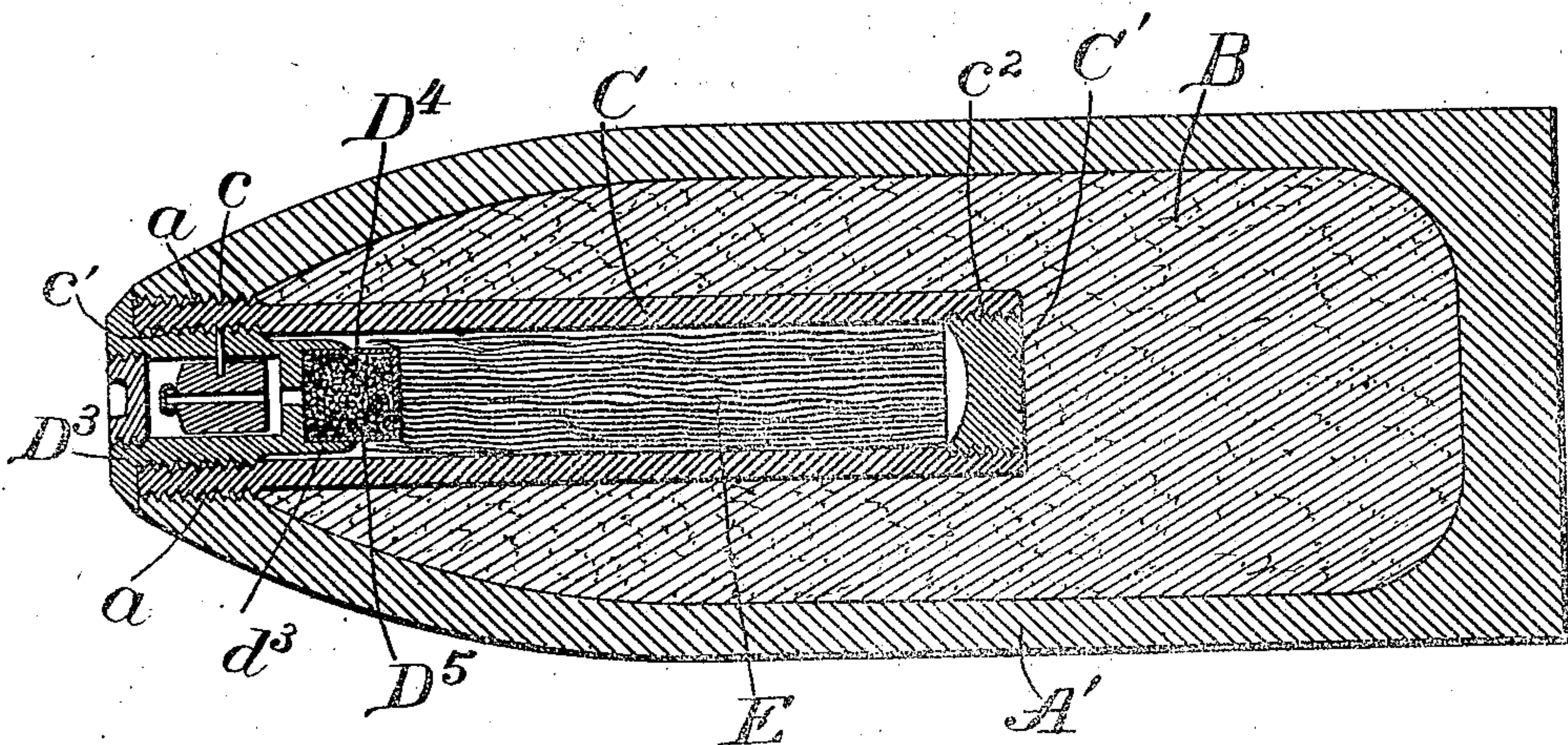


FIG. 2.



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# UNITED STATES PATENT OFFICE.

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## FUSE FOR HIGH EXPLOSIVES.

SPECIFICATION forming part of Letters Patent No. 571,342, dated November 17, 1896.

Application filed February 29, 1896. Serial No. 581,287. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT BROOKE DASHIELL, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Fuses for High Explosives; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to fuses for use with high explosives; and it consists in employing in a fuse of peculiar construction a compound of nitrocellulose, in order to obtain an explosion of a high order from high explosives, and yet to have the conditions of safety from premature explosion necessary for success in firing shell from guns or in the ordinary rough usage of mining operations.

I have found that great heat in the explosion of the fuse is a necessity in such results as are desired to be obtained with these high explosives, and to attain this high heat I inclose the fuse composition in a strong envelop, so that said composition may be thoroughly ignited and gas may be developed under great heat and pressure before the envelop is ruptured and the heat and flame communicate to the surrounding explosive.

The fuse composition is a nitrocellulose compound in which the nitrocellulose, preferably mixed with barium nitrate and calcic carbonate or like oxidizing agents or their equivalents, is colloidized by a proper solvent, such as nitrobenzol or acetone. This renders the nitrocellulose a tough bony substance, inert to shock, but easily ignited by an ordinary flame, such as a simple fuse-train or primer, yet, when confined, capable of powerful explosion of the character desired. The composition may be packed solid or in granules in the envelop.

The explosive described in the patent to Bernadou and Converse, No. 550,472, granted November 26, 1895, is well suited for the purposes of this invention. The nitrocellulose gives the necessary explosive power, the colloid form gives the inertness, and the strong

envelop insures the development of the necessary heat and force in the fuse to explode the high explosive contained in the shell.

My invention will be more fully understood by reference to the accompanying drawings, in which I have shown two forms of fuse constructed according to my invention.

Figure 1 represents a central longitudinal section through a shell provided with a base-fuse constructed according to my invention, and Fig. 2 represents a similar section of a shell provided with a front fuse constructed according to my invention.

The shell A or A' is filled with a charge B, of any suitable high explosive, such, for instance, as that described in the patent to Bernadou and Converse aforesaid; or as described in the patent to J. E. Blomen, No. 530,063, granted November 27, 1894.

C represents a strong steel envelop or shell, preferably cylindrical and enlarged somewhat at its outer end, with male screw-threads c to screw into the female screw-threads a in the opening of the shell. On the same end the envelop C is provided with female screw-threads c' to engage the threads on the exterior of the inner fuse-stock or igniter, while the inner end of the envelop C is closed with a screw-plug C', screwed into the screw-threads c'; but this end of the envelop may be closed in any other convenient way, if preferred.

The igniter includes an ordinary fuse, such as that described in the patent to W. H. Driggs, No. 419,143, granted January 7, 1890, and shown at D in Fig. 1, or the well-known form of percussion-fuse shown at D<sup>3</sup> in Fig. 2, to the end of which a small charge of black powder or similar explosive is connected in any suitable way. In Fig. 1 I have shown this charge D<sup>4</sup> inclosed in a metal case D', which slips over the exterior of the inner fuse-stock, while in Fig. 2 a like case D<sup>5</sup> fits in a chambered recess d<sup>3</sup> at the inner end of the inner fuse-stock.

The part of the chamber in the envelop C not occupied by the igniter is filled with the colloidized cellulose E. This colloid may be either arranged in parallel strips, as shown,



whereby the flame would rapidly spread to the entire mass in the envelop and quick action would be had, or the colloid may be packed in a solid or homogeneous mass, whereby slow action would be secured; or it may be packed in the form of grains or particles of any desired form or shape.

The operation of the device is as follows: The igniter sets fire to the charge D<sup>4</sup>, which ignites the colloid cellulose E, which burns in the envelop C until the pressure of the gases in the envelop is sufficient to burst the envelop, when the high heat and pressure of the said gases will explode the charge B. When used for mining purposes, the said charge B will be held in a blast-hole instead of in a shell, but the operation would be the same in either case.

The envelop C with its charge of colloid cellulose may be used in connection with most of the well-known types of time or percussion fuses, and adapts these fuses for use in exploding high explosives.

It will be obvious that various modifications in the herein-described apparatus might be made which could be used without departing from the spirit of my invention.

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

1. In a fuse for high explosives, the combination with a strong envelop partly filled with colloid cellulose, of means for igniting said nitrocellulose, substantially as described.

2. In a fuse for high explosives, the combination with a strong envelop partly filled with colloid cellulose and an oxidizing agent, of means for igniting said nitrocellulose, substantially as described.

3. In a fuse for high explosives, the combination with a strong cylindrical envelop partly filled with colloid cellulose and interiorly screw-threaded, of an igniting de-

vice screwed into said envelop, substantially as described.

4. In a fuse for high explosives, the combination with a strong envelop, partly filled with colloid cellulose, of an igniting device held therein, and a case containing black powder or like explosive connected to said igniting device, substantially as described.

5. In a fuse for high explosives the combination with a strong envelop partly filled with colloid cellulose and an oxidizing agent, of an igniting device held therein, and a case containing black powder or like explosive connected to said igniting device, substantially as described.

6. In a fuse for high explosives, the combination with a strong cylindrical envelop partly filled with colloid cellulose, of a fuse-stock screwed therein, and igniting mechanism contained in said fuse-stock, substantially as described.

7. In a fuse for high explosives, the combination with a strong cylindrical envelop partly filled with colloid cellulose, of a fuse-stock screwed therein, and igniting mechanism contained in said fuse-stock, and operated by the impact of the shell, substantially as described.

8. In a fuse for high explosives, the combination with a strong cylindrical envelop partly filled with colloid cellulose, of a fuse-stock screwed therein, and igniting mechanism contained in said fuse-stock, and a case containing black powder or like explosive connected to said fuse-stock substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT BROOKE DASHIELL.

Witnesses:

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