No. 803,131. PATENTED OCT. 31, 1905.

F. I. DU PONT.

METHOD OF FIRING A POWDER CHARGE SIMULTANEOUSLY THROUGHOUT ITS LENGTH.

APPLICATION FILED FEB. 25, 1905.

Fig. 1.

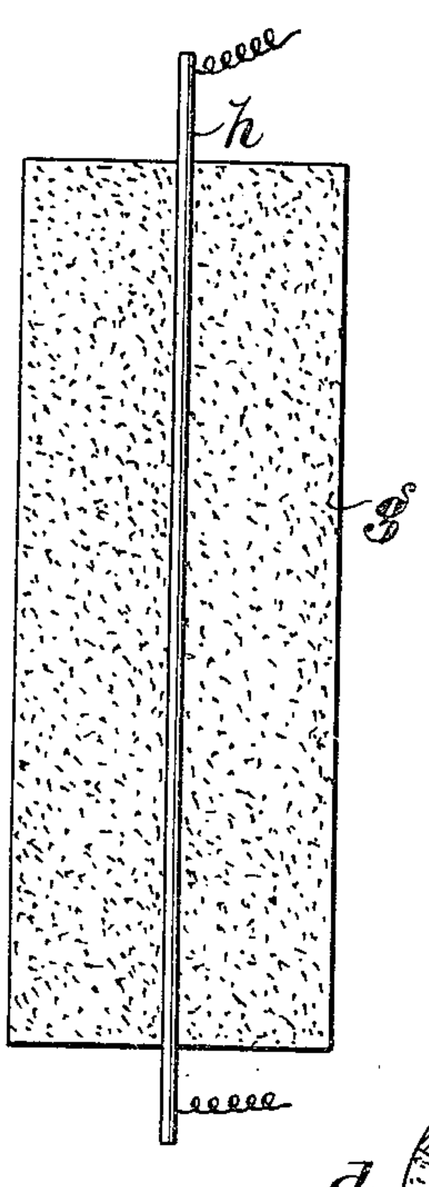


Fig. 2.

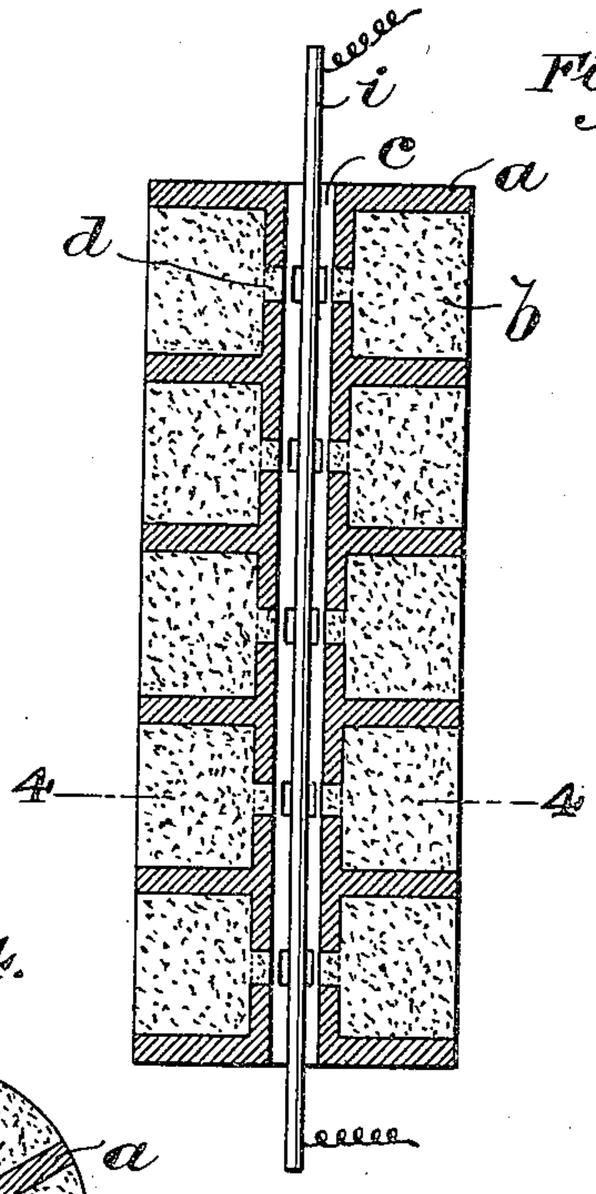


Fig. 4.

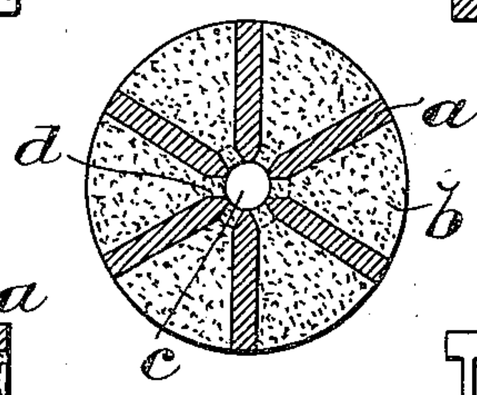


Fig. 3.

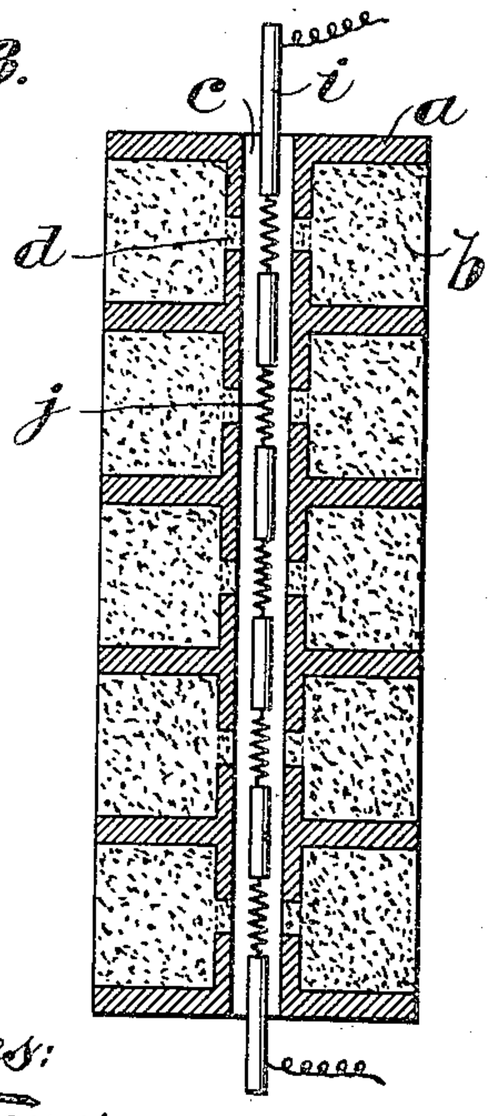
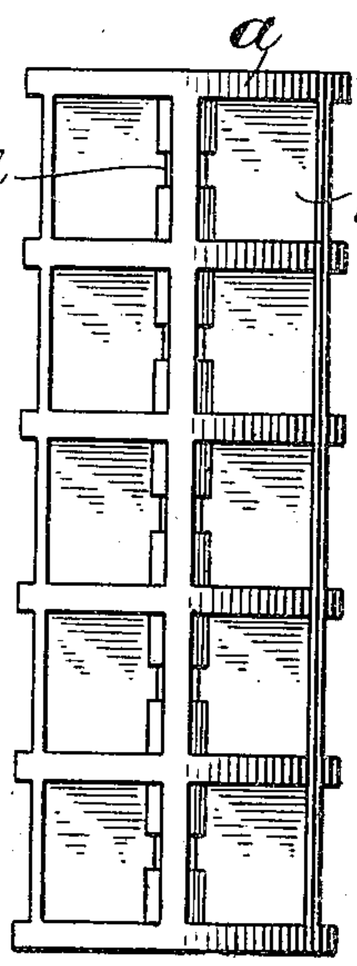


Fig. 5.



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UNITED STATES PATENT OFFICE.

FRANCIS I. DU PONT, OF WILMINGTON, DELAWARE.

METHOD OF FIRING A POWDER CHARGE SIMULTANEOUSLY THROUGHOUT ITS LENGTH.

No. 803,131. Specification of Letters Patent. Patented Oct. 31, 1905.

Application filed February 25, 1905. Serial No. 247,245.

To all whom it may concern:

Be it known that I, FRANCIS I. DU PONT, a citizen of the United States, residing at Wilmington, county of Newcastle, and State of Delaware, have invented a new and useful Improvement in Methods of Firing a Powder Charge Simultaneously Throughout Its Length, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

Speaking generally, I accomplish this result by embedding in the powder charge a high-resistance wire which forms part of an electric circuit.

This invention is applicable to smokeless-powder priming charges for guns of large caliber. In this case I form a cellular body of smokeless powder, in the cells of which is placed a quick-burning powder. A central orifice or passage extends through this body. The walls of the cells may come up close to or have openings into the central passage, or both. Through this central passage extends an electric conductor, which may be of high resistance throughout its length or may have resistances opposite each cell. By passing current through the circuit the resistances act to produce ignition of the powder at all points where they are.

I will first describe the embodiment of my invention illustrated in the accompanying drawings and then point out the invention in the claims.

In the drawings, Figure 1 is a sectional view showing the high-resistance conductor embedded in the powder. Fig. 2 is a sectional view of the central body of smokeless power containing in the cells quick-burning powder with my invention added thereto. Fig. 3 is a view similar to Fig. 2, the resistances not being continuous. Fig. 4 is a section on line 4 4, Fig. 2 or Fig. 3. Fig. 5 is an elevation of Fig. 2 or Fig. 3.

g, Fig. 1, is a block or charge of powder. *h* is a conductor of high resistance embedded in and extending through the whole length of the block *g*. One end of this resistance-conductor *h* is connected with one pole and the other end with the other pole of a source of current-supply. (Not shown.)

In Figs. 2 to 5, *a* represents a skeleton cylinder of smokeless powder, consisting of a cylinder having a series of cells *b*, a central orifice *c*, and provided with orifices *d* through the walls of the cells to the central orifice *c*. The cells *b* and, if desired, also the central orifice *c* are filled with quick-flashing powder or guncotton. Through the central orifice or passage *c* extends conductor *i*, which may be, as shown in Fig. 2, of high resistance throughout, or it may be, as in Fig. 3, provided with resistance *j* opposite each cell. The conductor *i*, like the conductor *h*, is connected at one end with one pole and at the other end with the other pole of a current-supply. (Not shown.)

In practice when the circuit is closed through the high-resistance conductor it, if as in Figs. 1 and 2, glows throughout or, if as in Fig. 3, at the point of the resistances, causing the simultaneous ignition of the powder at all or many points.

I do not in this application claim the cellular body of smokeless powder with the quick-flashing powder or guncotton in the cells thereof as described and illustrated alone, as the same forms the subject-matter of a separate application filed by me February 25, 1905, and serially numbered 247,244.

Having now fully described my invention, what I claim, and desire to protect by Letters Patent, is—

1. As a means of igniting simultaneously a plurality or all portions of a powder charge, a conductor of high resistance forming part of an electric circuit embedded in, and extending throughout the length of, the charge.

2. As means of igniting simultaneously a plurality or all portions of a powder charge, a conductor forming part of an electric circuit embedded in, and extending throughout the length of, the charge, said conductor being of high resistance at parts or throughout the conductor.

3. The combination with a cellular body of smokeless powder, having a quick-igniting powder in the cells of an electric conductor forming part of a circuit extending through the length of said body, said conductor being of high resistance in part or in whole.

4. The combination, with a cellular body of smokeless powder, having a central orifice and a quick-igniting powder in the cells, of an electric conductor forming part of a circuit extending through the length of said orifice, said conductor being of high resistance in part or in whole.

5. The combination, with a cellular body of

smokeless powder, having a central orifice and openings from said cells to said central orifice, a quick-igniting powder in the cells, of an electric conductor forming part of a circuit extending through the length of said orifice, said conductor being of high resistance in part or in whole.

In testimony of which invention I have hereunto set my hand, at Wilmington, Delaware, on this 17th day of February, 1905.

FRANCIS I. DU PONT.

Witnesses:

CLIFFORD V. MANNERING,

R. J. COYLE.