UNITED STATES PATENT OFFICE.

CARL WALTER VOLNEY, OF NEW YORK, N. Y.

PROCESS OF MAKING GUNPOWDER.

SPECIFICATION forming part of Letters Patent No. 592,485, dated October 26, 1897.

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To all whom it may concern:

Be it known that I, CARL WALTER VOLNEY, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in the Manufacture of Gunpowder; and I render in the following a full, clear, and correct description of the invention, so that those skilled in the art to which it appertains are thereby enabled to make and use the same.

My invention refers to those gunpowders which contain guncotton, and particularly to those in which the guncotton is combined or mixed with nitroglycerin and effects certain improvements in their composition after these powders have been granulated or shaped for use.

To explain the character and purpose of my invention, I further state that the lower nitrates of cellulose are soluble in nitroglycerin and form therewith, under certain conditions, compounds which are more or less solid, according to the proportions between nitrocellulose and nitroglycerin, and are capable of firmly holding, retaining, and binding the latter in this solid state. The higher nitrate of cellulose, the hexanitrate, or the trinitrocellulose, is not soluble in nitroglycerin and forms therewith a mechanical mixture only, from which it separates under pressure or by changes of temperature and evaporation. This is the cause of undesirable changes of the gunpowder and may be also a source of danger. As it is, however, desirable to use in gunpowder the trinitrocellulose, I obviate the above-mentioned drawbacks by changing the trinitrocellulose on the surface of the grains or shapes of powder into dinitrocellulose, which combines readily with nitroglycerin, forming thereby, from the constituent parts of each grain, a surface which prevents exudation or evaporation and secures the necessary stability of the powder. For this purpose I subject the granulated powder to the action of reducing agents, whereby the trinitrocellulose on the surface of the grains or masses is reduced to dinitrocellulose, which readily combines with the other constituent parts of the grains, especially nitroglycerin, forming a chemical compound of dinitrocellulose and nitroglycerin from the constituent parts of each grain or mass on the surface of each grain or mass, for the purpose above explained. As such reducing agents sulfurous acid, or sulfites, hyposulfurous acid, or hyposulfites, may be be used. All these reduce trinitrocellulose to the dinitro compound, but sodium hyposulfite is most convenient and preferable.

For the practical execution of my invention I subject the grained gunpowder to the action of the reducing agents in revolving cylinders, so that an intimate contact of each grain or mass with said agents is assured. The latter are preferably dissolved in water.

The sulfites and hyposulfites of potassium, sodium, and ammonium are all easily soluble in water, and I find that a solution containing ten per cent. of any of the above-named salts is of sufficient concentration to react in a desirable manner on the granulated powder. These solutions should always be provided in excess and the grained powder covered entirely thereby during the operation. As a rule fine granulations need less time than coarser grains or large shapes. An exposure during four to six hours in the described baths is, however, sufficient. The grains are then removed from the bath, washed shortly with pure water, and dried. After this treatment the grains present a hard unchangeable surface and the exudation or evaporation of any of their constituent parts is thereby prevented.

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

The method of providing grains of gunpowder, containing trinitrocellulose, with a surface coating of dinitrocellulose by reducing the trinitrocellulose upon such surface to dinitrocellulose by reducing agents, such as alkaline sulfites, as hereinbefore described.

CARL WALTER VOLNEY.

Witnesses:

JOSEPH A. STERLING,

H. DUNCAN NOODI.