

UNITED STATES PATENT OFFICE.

MAX VON FÖRSTER, OF BERLIN, PRUSSIA, GERMANY.

COATING GUN-COTTON.

SPECIFICATION forming part of Letters Patent No. 315,357, dated April 7, 1885.

Application filed December 11, 1884. (No specimens.) Patented in Germany March 9, 1883, No. 23,808, and July 31, 1883, No. 26,014; in Italy August 20, 1883, XVII, 15,774, and in Austria-Hungary December 13, 1883, No. 33 and No. 2,486.

To all whom it may concern:

Be it known that I, MAX VON FÖRSTER, a subject of the King of Prussia, residing at Berlin, in the Kingdom of Prussia and German Empire, have invented new and useful Improvements in Treating Gun-Cotton, of which the following is a specification.

This invention relates to a new product, which consists of an article made of trinitro-cellulose or gun-cotton provided with a coating of the same substance. Gun-cotton or trinitro-cellulose can be readily distinguished from collodion cotton (which term comprises the less-highly-nitrated compounds) by its insolubility in alcohol and ether, or in wood-alcohol alone or mixed with ether. It is soluble in ethylic acetate, and it has the formula $C_6H_7(NO_2)_3O_5$. (See Watt's Dictionary of Chemistry, 1877, Vol. IV, page 777, and Fownes' Manual of Chemistry, Philadelphia, 1878, page 634, under the articles in said works on pyroxyline.) This trinitro-cellulose or gun-cotton is the only one of the nitrated compounds of cotton adapted for gunnery.

In carrying out my invention I select gun-cotton which is free from all admixture of any other substance, or of any of the lower substitution compounds which are soluble in mixtures of alcohol and ether, or in ether or in glacial acetic acid. This gun-cotton I compress into the required form—such as a disk or pellet—and these disks or pellets I treat with a solvent—such as ethylic acetate. As soon as the solvent has penetrated into the disk or pellet to a certain depth the article is removed and dried, and upon the evaporation of the solvent a compact coating of gun-cotton is formed which protects the article, when it is dry, against crumbling to pieces, and also against the influence of moisture and the formation of fungus, or if the coating is formed on the surface of a wet article it (the coating) retards the evaporation of the moisture present. By this treatment I obtain a product which retains all the qualities of gun-cotton, since no foreign substance is introduced which would be liable to change the combustion and behavior of the trinitro-cellulose or gun-cotton, while my product is protected against the

influence of moisture and the formation of fungus, as already stated.

I am aware that in Abel's British Patent No. 1,102 of 1863, it is stated that alcohol, wine-spirit, wood-spirit, and ether are used to obtain a binding material in the interior of the gun-cotton of which the pulp or the pieces are composed; but it should be noticed that trinitro-cellulose or the most explosive kind of pyroxyline is not soluble in alcohol, wine-spirit, wood-spirit, or ether, and consequently Abel's invention is applicable only to less-highly-nitrated compounds of pyroxyline which are soluble in alcohol, wine-spirit, wood-spirit, or ether, otherwise no binding effect can be produced. This is apparent from Abel's specification, in which he mentions soluble and insoluble gun-cotton. The soluble gun-cotton of Abel designates collodion cotton or a less-highly-nitrated compound, while the "insoluble gun-cotton" is meant to designate trinitro-cellulose, which alone of these compounds is serviceable in gunnery. The result produced by the admixture of collodion cotton to the trinitro-cellulose is an article the action of which differs widely from my product, which is composed of pure trinitro-cellulose without the admixture of any foreign substance. The same remarks apply to the British Patent No. 4,917 of 1882, which sets forth the process of compressing gun-cotton and dipping it into a mixture of collodion and bisulphite of carbon to form a hard coating, which protects the gun-cotton against the influences of damp and the weather.

I am also aware of the British Patent No. 3,127 of 1867, which describes a process of impregnating gun-cotton with a solution of either india-rubber, gutta-percha, or balata diluted either with their own solvents or with other light spirits—such as benzole or paraffine-spirit—which solution on drying leaves a uniform deposit upon and between the particles of gun-cotton, the object, as set forth, being to render the gun-cotton more or less water-proof and retard the explosive properties. In all these processes extraneous matter is added to the trinitro-cellulose, and consequently the properties of the finished product

differ essentially from those of pure trinitro-cellulose, while my product retains all the properties of pure trinitro-cellulose.

What I claim as new, and desire to secure
5 by Letters Patent, is—

1. The process of applying a coating to trinitro-cellulose or pure gun-cotton, consisting in treating the latter with a solvent which will dissolve part of the gun-cotton and leave a
hard film when dry, substantially as described.

2. As a new product, compressed pure trinitro-cellulose having a coating of the same mixture, substantially as described.

In testimony whereof I have hereunto set my
hand and seal in the presence of two subscri- 15
ing witnesses.

MAX VON FÖRSTER. [L. S.]

Witnesses:

G. P. MICHEL,

JOHN H. SCHNABEL.