

UNITED STATES PATENT OFFICE.

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MANUFACTURE OF GUNPOWDER.

SPECIFICATION forming part of Letters Patent No. 429,516, dated June 3, 1890.

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To all whom it may concern:

Be it known that I, RICHARD VON FREEDEN, a subject of the Grand Duke of Oldenburg, residing at Walsrode, Kingdom of Prussia, Germany, have invented a new and useful Improvement in the Manufacture of Gunpowder from Nitro-Cellulose, whereof the following is a specification.

My invention is based on the discovery made by me that gelatinized nitro-cellulose still containing the solvent employed for its gelatinization on being exposed to certain liquids or to vapors thereof undergoes a kind of coagulation and a division into small lumps, which latter is promoted by stirring. This peculiar behavior of the gelatinized nitro-cellulose I make use of in the manufacture of granulated gunpowder from nitro-cellulose or compounds thereof with other substances. In view of producing such gunpowder, which is not affected by moisture, the nitro-cellulose, whether pure or mixed with other materials, is at present either converted in its original state into particles, which are thereupon gelatinized on the surface, or it is at the onset thoroughly gelatinized, and subsequently divided by mechanical means into small pieces or laminae. In the first case the powder is not sufficiently resistant against the influence of damp air, while in the second case it is impossible to obtain grains of like size and form, which is so much the more prejudicial, as this non-uniformity is an obstacle to the complete expulsion of the solvents employed in the gelatinizing process, in consequence whereof a difference in the chemical constitution and explosive power of the grains results. For the purpose of obviating these defects I proceed as follows:

The nitro-cellulose, or compound thereof with other substances, is first mixed with a liquid adapted to dissolve the former—such as ethyl-ether, methyl-ether, a solution of camphor in ether, a mixture of ether and alcohol, dinitro-toluol, &c.—and the mixture is kneaded or rolled until it has become plastic and the nitro-cellulose completely dissolved. To the mass thus obtained I introduce a liquid or vapor incapable of dissolving or otherwise acting chemically either on the nitro-cellulose or on the ingredients of the said compound thereof. Preferably I employ

water or steam, or both together. At the same time the mass is stirred. By these means the mass is caused to split up into particles or grains, which become smaller in the measure as the stirring is continued and the temperature is raised. The grains are heated together with the same or any other like liquid, vapor, or steam unadapted to act chemically thereon, the temperature being carried to a degree somewhat above the boiling-point of the solvent employed in order to completely drive out the latter. The said solvents are thereby extracted from the grains and evaporated; but they may be recovered by distillation. Thereupon the grains are separated from the liquid or withdrawn from the steam or vapor and dried, and finally they are treated in the ordinary manner in view of producing finished gun or blasting powder.

The described method of extracting the solvents may also be applied to grains composed of or containing gelatinized nitro-cellulose, which are produced by means different from those specified.

I claim as my invention—

1. The process of gelatinizing and granulating nitro-cellulose or a compound thereof with other substances, which consists in adding to the said nitro-cellulose or compound a solvent of the former, kneading the mass until the same has become plastic and the nitro-cellulose thoroughly gelatinized, introducing thereto a liquid or vapor chemically indifferent to the constituents of the mass, and stirring the latter until complete granulation has been produced, substantially as described.

2. The process of treating grains composed of gelatinized nitro-cellulose or of a compound thereof with other substances and still containing the solvent employed for the purpose of gelatinization, the said process consisting in exposing the grains to a heated liquid or vapor chemically indifferent to the solid constituents thereof and afterward drying the grains, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

RICHARD VON FREEDEN.

Witnesses:

W. H. EDWARDS,
W. HAUPT.