UNITED STATES PATENT OFFICE.

FRANCIS I. DU PONT AND FIN SPARRE, OF WILMINGTON, DELAWARE, ASSIGNORS TO THE E. I. DU PONT DE NEMOURS POWDER COMPANY, OF WILMINGTON, DELAWARE, A CORPORATION OF NEW JERSEY.

PROCESS OF PRODUCING EXPLOSIVE-POWDER.

No. 836,704. Specification of Letters Patent. Patented Nov. 27, 1906.

Application filed February 17, 1906. Serial No. 301,540.

To all whom it may concern:

Be it known that we, FRANCIS I. DU PONT, a citizen of the United States, and FIN SPARRE, a subject of the King of Norway, residing at Wilmington, county of Newcastle, and State of Delaware, have invented a new and useful Improvement in Processes of Making Smokeless Explosives, of which the following is a full, clear, and exact description.

Our invention relates to certain improvements in the process of making smokeless-powder explosives forming the invention of Letters Patent No. 503,583, dated August 22, 1893. In that patent nitrocellulose and water are stirred up and a liquid not soluble in water, but which is a solvent of the nitrocellulose, is added and the mass kept in agitation, thus forming grains, the grains being solidified by heat. It has been found in practice with this process that there is a tendency for some grains to be formed which are more dense than others, due to the fact that there is less nitrocellulose in proportion to the solvent in these grains than in the others. These more dense grains on shooting do not burn in a gun in the same manner that other grains do, there frequently being a residue left after shooting.

We have discovered that if we partially replace the nitrocellulose solvent by a substance soluble in the nitrocellulose solvent insoluble in water and not a solvent of nitrocellulose and the process of the aforesaid patent, No. 503,583, be otherwise followed we obtain all the grains of proper density and nearly uniform as regards their complete burning in the barrel of a gun.

As an example of the proportions of our improved process we take one (1) part of nitrocellulose in eight (8) parts of water, to which is added one (1) part of amyl-acetate and one-quarter (¼) part of a diluter, either amyl-alcohol or benzin.

As the process forming this invention is otherwise the same as that described in Letters Patent No. 503,583, it is unnecessary to further describe the same.

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

The improvement in the process of making smokeless explosives, which consists in agitating with a nitrocellulose, in a liquid in which it is insoluble, an emulsion of a solvent of nitrocellulose diluted by a substance insoluble in the liquid in which the nitrocellulose is suspended and not a solvent of nitrocellulose, but soluble in the nitrocellulose solvent.

In testimony of which invention we have hereunto set our hands, at Wilmington, Delaware, on this 3d day of February, 1906.

FRANCIS I. DU PONT.
FIN SPARRE.

Witnesses:
RALPH DINSMORE,
IRVING EYER.