UNITED STATES PATENT OFFICE.

RICHARD BERNSTEIN, OF LIND, NEAR COLOGNE, ASSIGNOR TO THE DEUTSCHE SPRENGSTOFF ACTIENGESELLSCHAFT, OF HAMBURG, GERMANY.

GRANULAR NITRO-CELLULOSE.

SPECIFICATION forming part of Letters Patent No. 363,197, dated May 17, 1887.

Application filed January 27, 1886. Serial No. 189,961. (No specimens.) Patented in Germany October 3, 1885, No. 36,061; in England October 24, 1885, No. 12,778; in France November 16, 1885, No. 172,309; in Belgium November 16, 1885, No. 70,865; in Italy December 31, 1885, No. 19,109, and in Spain March 18, 1886, No. 8,178.

To all whom it may concern:

Be it known that I, RICHARD BERNSTEIN, a citizen of Germany, residing at Lind, near Cologne, in the German Empire, have invented a new and useful Improvement in Manufacture of Granular Nitro-Cellulose, (for which I obtained Letters Patent in Great Britain October 24, 1885, No. 12,778; in Germany October 3, 1885, No. 36,061; in France November 16, 1885, No. 172,309; in Belgium November 16, 1885, No. 70,865; in Italy December 31, 1885, No. 19,109, and in Spain March 18, 1886, No. 8,178,) of which the following is a specification.

The nitro-cellulose usually employed for explosives or for production of celluloid is liable to mat together or otherwise cohere, so that it is inconvenient in many cases to deal with it. When it is to be used, for instance, as an explosive, it cannot be poured like fine-grain gunpowder, and when it is to be used for producing celluloid it is difficult to mix it intimately with other substances without dissolving it.

This invention relates to the manufacture of nitro-cellulose in form of fine, loose, and smooth grains, which can be packed closely together without cohesion, can be freely poured like fine dry sand, and can be readily mixed with other substances. For this purpose the solid fruits, nuts, or shells of nuts produced by various plants of the palm tribe, particularly the product of *Phytelephas macrocarpa*, usually known as "vegetable ivory," and of several species of *Mauritia*, or the fragments or waste cuttings, sawings, or turnings of these, preferably freed as much as possible from bark, are in the first place reduced by grinding to a fine powder. This is boiled in alkaline lye or treated with sulphides, benzine, or other known reagents, so as to eliminate as completely as possible all ingredients except pure cellulose. The powder is then washed clean with water and thoroughly dried, if necessary, by artificial heat up to a boiling-point. The dry powder, which is almost absolutely pure cellulose, is then nitrated in the usual way by treatment with nitric and sulphuric acids. The resulting product, carefully washed and dried, is a nitro-cellulose of great purity, consisting of fine smooth grains, like those of fine sand, which have great chemical stability, can be freely poured, and can be packed very closely together. This powder can be used as an explosive either alone or in combination with other substances, or it can be employed for the manufacture of celluloid or other materials to which nitro-cellulose is applicable.

Some of the fruit-products, especially those that are very rich in cellulose—such as vegetable ivory—may be nitrated without first undergoing the chemical treatment above described for purification of the cellulose; and the nitro-cellulose may be freed from impurities, especially other nitro-compounds, by boiling and washing in pure water.

Having thus described the nature of my invention and the best means I know for carrying it into practical effect, I claim—

As a new article of manufacture, granular nitro-cellulose prepared from the pulverized nuts, fruits, or shells of nuts of the *Phytelephas macrocarpa* and kindred plants, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 7th day of January, A. D, 1886.

RICHARD BERNSTEIN.

Witnesses:
HENRY KIRCHENER,
P. BREVET.