

UNITED STATES PATENT OFFICE.

STEPHEN H. EMMENS, OF HARRISON, NEW YORK.

EXPLOSIVE.

SPECIFICATION forming part of Letters Patent No. 423,230, dated March 11, 1890.

Application filed July 2, 1889. Serial No. 316,320. (No specimens.)

To all whom it may concern:

Be it known that I, STEPHEN H. EMMENS, a subject of the Queen of Great Britain and Ireland, residing at Harrison, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Explosives; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of my invention is the production of explosives of the gun-cotton class in such a manner as to render them more stable and more powerful than has hitherto been the case.

I prefer to carry my invention into effect in the following manner: In a bath of mixed sulphuric and nitric acid of the strength ordinarily employed in the manufacture of gun-cotton I steep unsized paper for a period of about two minutes. I then remove the paper and wash it a number of times successively with cold water. After this I place the washed paper in a bath consisting of a cold aqueous solution of carbonate of ammonia, and allow it to remain therein until all effervescence ceases. I then remove the paper to another bath containing a strong solution of picric acid heated to a temperature of 100° centigrade, or thereabout. In this bath the paper is allowed to remain for about ten minutes, and is then suspended in another vessel containing ammoniacal water until the adhering picric acid is by the action of the gaseous ammonia in the atmosphere of the vessel converted into picrate of ammonia. The paper

is then removed and dried, when it becomes ready for use as an explosive, either for the manufacture of cartridges for fire-arms or in any other way that may be desired.

If a granulated explosive be required, I employ any of the various forms of pulp used for paper-making, in preference to treating finished paper. The process to which such pulp is subjected is identical with that above described in the case of paper. The explosive substances thus produced differ from the ordinary forms of gun-cotton, gun-paper, and nitro-lignose in the following respects: First, all free acid adhering after removal from the nitrifying-bath is effectually neutralized by the carbonate of ammonia; second, the nitrate of ammonia formed in the pores of the substance is decomposed by the picric-acid bath, and the nitric acid thus set free tends to complete the nitrification of any particles of unchanged or partially changed cellulose; third, the exposure to an atmosphere of ammonia not only neutralizes any remaining free acid, but causes the pores of the substance to become charged with picrate of ammonia, which in itself is a powerful explosive.

I claim as my invention—

An explosive substance consisting of paper or paper-stock converted into a nitro compound and impregnated with ammonia and picric acid, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

STEPHEN H. EMMENS.

Witnesses:

H. EDGELL,
NEWTON W. EMMENS.