

UNITED STATES PATENT OFFICE.

ROBERT C. SCHÜPPHAUS, OF BROOKLYN, NEW YORK.

NITRO COMPOUND AND PROCESS OF MAKING SAME.

SPECIFICATION forming part of Letters Patent No. 514,838, dated February 13, 1894.

Application filed July 11, 1893. Serial No. 480,192. (No specimens.)

To all whom it may concern:

Be it known that I, ROBERT C. SCHÜPPHAUS, a citizen of the United States, residing in the city of Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Method of Securing the Chemical Stability of Nitro Compounds, of which the following is a specification.

The object of my invention is to produce a method of preventing the decomposition or of securing the chemical stability of nitro-compounds, it being a well-known fact that such compounds when stored for a long period of time often undergo decomposition which, slight at first, gradually increases until the whole compound has become more or less decomposed and otherwise chemically changed.

The nitrates of polyatomic alcohols such as glycerine and mannite and of related compounds as the carbohydrates for example starch, cellulose and the like, are especially susceptible to decomposition unless they are produced in an absolutely pure state, which is seldom the case in manufacturing these compounds for commercial use; and whenever traces of acid or of impurities of an unstable character remain in the finished product, decomposition always occurs after the lapse of a more or less short period of time. To prevent this decomposition in the finished product of nitro-compounds, various means have been devised and employed as in the manufacture of gun cotton or nitro-cellulose, it is not unusual to incorporate a small quantity of an alkaline substance, such as silicate of soda, to the compound in course of its manufacture to prevent its decomposition; and in the manufacture of dynamite it is not unusual to add carbonate of lime or magnesia for the same purpose; and in the manufacture of pyralin, celluloid, zylonite and similar compounds of pyroxyline and camphor, carbonate of magnesia is frequently added during the process of manufacture. In preparing high explosives diphenylamine and aniline are employed to prevent decomposition which is particularly destructive of the effectiveness of such explosives, and as they are capable of complete combustion they increase the volume of gases produced and moreover leave no residue. In addition to the fact that these

compounds with nitrous acid, which is a constant product of the decomposition of these nitro derivatives, are themselves unstable in character, their introduction in many cases is inadmissible because of the discoloration which they are apt to produce.

All of the above mentioned difficulties and many others are overcome by the use of urea or carbamide as a neutralizer, which substance I have discovered is an effectual neutralizer of impurities in nitro-compounds and absolutely prevents their decomposition.

In practice the nitro-compounds are freed as far as possible from all adherent acids by repeated washings, and they are subsequently dried, if necessary, after which I add the urea in suitable proportions according to the quantity of nitro-compound and the purpose for which the finished product is intended to be used, the urea itself being dissolved in a stable menstruum or flux compatible with the solvents employed in the respective manufactures of nitro-compounds which solvents are usually methyl or ethyl alcohol. As above stated the quantity of urea which is mixed with the compound is regulated, by the conditions above-mentioned and varies from one half per cent. ($\frac{1}{2}\%$) to two per cent. (2%). This solution of urea and solvent penetrates every particle of the nitro-compounds and neutralizes any acids or other impurities that may be present while the surplus remains evenly distributed throughout the whole mass. The complete neutralization thus attained is an absolute safe-guard against decomposition, but should however any part of the mass be subjected to disturbing influences of any character and decomposition set in the additional quantity or surplus of the "neutralizer," which as stated remains evenly distributed throughout the whole mass counteracts this incipient decomposition and prevents its spreading. The acids which have to be neutralized in such compounds are sulphuric, nitric and nitrous acids which may be found in faint traces in the adherent wash-water. As the nitrate and sulphate of urea are perfectly stable and colorless substances the product resulting from its use with nitro-compounds becomes absolutely stable, and no discoloration whatever occurs as with the use of the

substances heretofore added to prevent the decomposition of the nitro-compounds as above-mentioned. Furthermore as nitrous acid reacts with urea in a remarkable manner, yielding carbonic acid, nitrogen and water, any nitrous acid that may be present or become generated during the process of manufacture is thereby rendered absolutely harmless. As urea requires a minimum of oxygen to effect complete combustion it is a perfect neutralizer in the manufacture of high explosives and owing to its low molecular weight a smaller quantity will neutralize a given amount of free acid than any other organic base heretofore used for the same or similar purposes.

I do not limit myself to the quantity of urea or carbamide which may be introduced into the nitro-compounds for the purpose above stated, since as above-mentioned the quantity of urea will vary according to the character of the nitro-compound and the purpose

for which the resulting product is to be used; but

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In the process of securing the chemical stability of nitro-compounds, the improvement which consists in adding to or incorporating therewith urea, as set forth.

2. As a new article of manufacture an explosive compound, composed of a nitro-compound having urea incorporated therewith, as set forth.

3. As a new article of manufacture, a pyroxyline composition having urea incorporated therewith, as set forth.

This specification signed and witnessed this 2d day of December, A. D. 1892.

ROBERT C. SCHÜPPHAUS.

In presence of—

M. GIBSON,

E. M. TAYLOR.