

UNITED STATES PATENT OFFICE.

WILLBUR F. JOHNSTON, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN EXPLOSIVE MIXTURES.

Specification forming part of Letters Patent No. 173,961, dated February 22, 1876; application filed August 13, 1875.

To all whom it may concern :

Be it known that I, W. F. JOHNSTON, of Brooklyn, Kings county, New York, have invented an Improvement in Explosive Mixtures, of which the following is a specification:

Gunpowder is composed of charcoal, sulphur, and either nitrate of potash or nitrate of soda, finely ground and intimately mixed. Until within a few years nitrate of potash was exclusively used in the manufacture of powder, both for war and blasting purposes, nitrate of soda being considered too deliquescent. It (nitrate of soda) is still used chiefly in the composition of blasting-powders, and generally excluded from war-powders.

Nitrate of ammonia has properties which render it theoretically superior to either of the first-mentioned nitrates for use in explosive mixtures; but it is even more deliquescent than nitrate of soda. It is also very much more expensive.

The object of my invention is to overcome these objections to the use of nitrate of ammonia in explosives. If nitrate of ammonia is substituted directly for nitrate of potash, (wherever that salt is used,) its attraction for the moisture of the air is so strong as greatly to endanger the stability of the compound in which it is used; hence, instead of thus making use of the nitrate of ammonia directly, I provide in the gunpowder, or in the nitro-glycerine mixture, salts from the double decomposition of which nitrate of ammonia can be formed. These shall be added to the nitro-glycerine mixture, or to the other ingredients of the powder, in solution, or in a finely-comminuted state. For example: If to one hundred pounds of dynamite, dualin, or other nitro-glycerine compound it is desired to add twenty pounds of nitrate of ammonia, I would, instead, add sixteen and one-half pounds of finely-powdered sulphate of ammonia and twenty-one and one-fourth pounds of finely-powdered nitrate of soda. The resulting decomposition of these salts, under proper circumstances, will be twenty pounds of nitrate of ammonia. If nitrate of ammonia had been added to the explosive mixture its deliquescence would have soon caused liquefaction,

which would have rendered the compound unfit for sale and shipment. If added to some other explosive compounds the same deliquescent property of the nitrate of ammonia would cause the decomposition of the compound.

It should be understood that in all compounds in which I use the salts I retain a sufficient proportion of the original compound, or add a sufficient quantity of any of the other well-known explosive compounds, to inaugurate the combustion and explosion, and produce the heat necessary to decompose the salts. For example: When the salts are used in a gunpowder composition, the composition will consist of charcoal, sulphur, the salts, and a small portion of the usual nitrate of soda or potash, sufficient to inaugurate the combustion, as usual, the heat generated by this primary or preliminary combustion serving to decompose the salts and bring the resultant nitrate of ammonia into action. The best authorities admit that for general use the best explosive known is nitrate-of-ammonia powder combined with a small percentage of nitro-glycerine. In preparing this compound I omit the nitrates, as such, entirely, and substitute the salts therefor, as the nitro-glycerine will serve to produce the primary combustion and decompose the salts.

My invention consists not in a special composition containing the salts, but in the employment of the salts in any of the common and well-known explosives in which the nitrate of ammonia can be used as a substitute for the nitrates of soda or potash, such explosives being familiar and well-known to those skilled in the art.

It is plain that other salts containing nitric acid, and other salts containing ammonia, might be employed instead of those named. I prefer nitrate of soda and sulphate of ammonia on account of their cheapness, and because they are readily obtained. The cost of these two salts is not more than half the present market value of the nitrate of ammonia which may be made from any given weight of them. The usual method of making nitrate of ammonia is by the decomposition of carbonate of ammonia by nitric acid, or by adding nitric acid to aqua ammonia,

and evaporating and fusing. I have found that nitrate of ammonia may be produced by mixing together nitrate of soda and sulphate of ammonia in the proportion of their combining numbers, and heating them until they fuse together, when nitrate of ammonia results. When the salt containing nitric acid and the salt containing ammonia are ground and mixed with the other components of an explosive mixture, they remain inert until the commencement of the explosion, when the heat developed by the ignition of the compound causes them to fuse together and to form nitrate of ammonia, which is instantly ready to do duty in the explosion of the powder.

I do not claim the use of nitrate of ammonia in explosive compounds; but

What I do claim is—

1. As a component part of an explosive compound, salts containing nitric acid and ammonia, which, by their decomposition at the

time of the explosion, will produce nitrate of ammonia, as and for the purposes described.

2. An explosive compound consisting of the following ingredients: an explosive material or compound to produce a primary combustion, salts which, being decomposed by the primary combustion, produce nitrate of ammonia, sulphur, and charcoal, as described.

3. An explosive compound consisting of sulphur, charcoal, salts containing nitric acid and ammonia, and a small percentage of nitro-glycerine.

4. The combination, in an explosive compound, of salts containing nitric acid and ammonia, and a small percentage of gunpowder, nitro-glycerine, or other common explosive, to produce a primary combustion and convert the salts into nitrate of ammonia.

WILLBUR F. JOHNSTON.

Witnesses:

A. K. JOHNSTON,
THEO. E. GREEN.