UNITED STATES PATENT OFFICE.

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PROCESS FOR THE MANUFACTURE OF EXPLOSIVES.

1,398,098. Specification of Letters Patent. Patented Nov. 22, 1921.

No Drawing. Application filed June 28, 1921. Serial No. 481,077.

To all whom it may concern:

Be it known that I, THOMAS HAWKINS, a subject of the King of England, residing at Slatington, in the county of Lehigh and State of Pennsylvania, have invented new and useful Improvements in Processes for the Manufacture of Explosives, of which the following is a specification.

The present invention relates to an improved high-explosive compound, which is also suitable for use as a detonator composition or as an ingredient thereof, and the process of making such material.

As a starting material from which the explosive is prepared, I preferably use picric acid (trinitrophenol). This is dissolved in water, preferably boiling water, and while boiling, an oxid of lead, such as ordinary scale litharge or red lead, can be used. The mass is kept boiling for a short period, and is then allowed to settle and the filtrate and the precipitate and excess of lead oxid are separated in any other manner.

A solution of a nitrate, preferably potassium nitrate (or some other non-deliquescent or non-hygroscopic nitrate preferably employed) is then added, which causes a precipitation of the explosive compound. The resulting mass, which may be in a paste form, is then placed on a fine filter, and as much water as possible removed by filtration. The material is then dried, at a temperature not above the boiling point of water.

As a specific example of the invention, to which the claims are not limited, the following is given:

1 lb. of picric acid (trinitrophenol) is dissolved in 2 gallons of water, preferably boiling, or is heated to boiling. While the boiling operation is continued, there is added, in small quantities, at intervals, 3 lbs. of scale litharge, oxid of lead, or ordinary red lead oxid, in the form of a powder. The liquid is kept boiling during this operation, and after the agitation and reaction have ceased, the contents are allowed to stand for a while, in order to allow the solid reaction products and the excess of lead to precipitate. The clear liquid is then filtered through a fine filter so as to remove all particles of undissolved material, and to the liquor is then added a solution of 2 ounces of nitrate of potassium dissolved in one pint of warm water. This causes a chemical reaction which precipitates the whole composition in the form of a paste. This paste or resulting reaction product is then placed on a fine filter, suction applied if desired, to remove as much of the adherent liquor as possible. The solid material resulting is then dried, at a temperature not above 100° C.

This solid material constitutes the base of the explosive compound. It can be compressed into pellets, or into metal cylinders of any suitable size to be used as a detonator compound for blasting. It can also be used as a high explosive in a similar manner. The detonator is fired in the same manner as fulminate of mercury, and may be used as a substitute therefor.

In order to increase the sensitiveness of the product, a small amount, say 2% or so, of nitro-glycerin may be incorporated therewith. Any desired damp-proofing composition may be employed to protect the composition from moisture. The composition can be desensitized by incorporating desensitizing agents, such as nitro-kerosene, mixed with a small amount of nitro-glycerin if desired, or the composition containing the solid material and nitro-glycerin can be desensitized by the employment of nitro-kerosene. The compound is much easier and much safer to manufacture and handle than is fulminate of mercury. It can be substituted for fulminate of mercury in all of the compositions in which the latter is used. It is to be understood that other explosive compounds can be incorporated therewith particularly when the same is to be used as a propellant powder or as a blasting powder. It has no effect on metals, and is safe in mines even when the mines contain considerable gas.

One of the objects of the introduction of the oxid of lead is to neutralize and combine with the mineral acids and the impurities which may be contained in the picric acid. If these materials were allowed to remain in the picric acid they would be detrimental, for example they would under some conditions absorb moisture and thereby destroy the detonating and explosive properties.

The dry product above referred to can be treated to further increase the explosive properties, by being re-nitrated, for example with fuming nitric acid of a gravity

of 1.5. In this operation, to one molecular part of the finished dry high explosive is added four molecular parts of fuming nitric acid of gravity of 1.5, and the whole allowed to stand for an hour, with occasional stirring at intervals. The free acid is drawn off, the deposit remaining may be again dissolved in boiling water, and treated in a manner similar to that above described.

I claim:

1. The herein described detonating and explosive compound comprising the reaction product of picric acid, a lead oxid, and a soluble nitrate.

2. The herein described detonating and explosive compound comprising the reaction product of picric acid, a lead oxid, and a soluble nitrate, together with other nitro compounds.

3. The herein described detonating and explosive compound comprising the reaction product of picric acid, a lead oxid, and a soluble nitrate, renitrated.

4. A process which comprises dissolving picric acid, adding a lead oxid thereto, allowing reaction to take place, removing undissolved material, adding a soluble nitrate, separating aqueous liquid from the solid material present therein.

5. A process which comprises dissolving picric acid, adding a lead oxid thereto, maintaining the liquid at a boiling temperature until the reaction is completed, removing undissolved material, adding a soluble nitrate, separating aqueous liquid from the solid material present therein.

6. A process which comprises dissolving picric acid, adding a lead oxid thereto, maintaining the liquid at a boiling temperature until the reaction is completed, removing undissolved material, adding a soluble nitrate, separating aqueous liquid from the solid material present therein, and thereafter further nitrating the latter.

In testimony whereof I have affixed my signature.

THOMAS HAWKINS.