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PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improved Process for the Manufacture of Explosives or Priming Substances

We, DYNAMIT-ACTIEN-GESELLSCHAFT, VORMALS ALFRED NOBEL & Co., of Troisdorf, Bez. Köln.) Germany, a German Company, and DR. WALTER FRIEDERICH,

of 14, Mülheimerstrasse, Troisdorf-Oberlar, Germany, of German nationality, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

Tetrazyl azide is a shattering and highly energetic explosive, and its heavy metal salts have already been proposed as priming explosives. However, these have not up to now had any practical application in the explosive art, because of their excessive sensitivity to friction and because they cannot be obtained in granularity suitable for filling into caps.

The present invention provides a process for making explosives and priming substances which are free from these drawbacks, and which are suitable for use for all purposes. According to the process of the invention the explosives and priming substances are prepared by interacting salts of tetrazylazide with chlorides, sulphates or nitro-compounds of organic bodies in aqueous solution or in solution in organic solvents. The substances prepared in this way are outstandingly stable and highly energetic explosives, the sensitivity of which varies within wide limits so that the utility thereof for the various purposes of the explosive art is very different.

If desired the products obtained by the process may be mixed with inert absorbents, such as kieselguhr or cellulose. If desired also the usual priming composition constituents, known explosives or inert substances may be admixed with the products, e.g. glass powder, calcium silicide, lead dioxide, barium nitrate, antimony sulphide, guanlylnitrosoamino-guanlyltetrazene.

The following organic tetrazyl azide compounds may be mentioned as examples of products obtained by the process of the invention.

methyltetrazyl azide, ethyltetrazyl azide, ethylene ditetrazyl azide;

[Price 1/-]

mono- and di- tetrazyl azide of acetone; picryltetrazyl azide and trinitrophenyl-aminotetrazyl azide.

The above compounds are only given as examples of compounds made by the process of this invention; numerous other compounds may of course be made.

Picryltetrazyl azide is obtained by interacting equimolecular quantities of picryl chloride and a salt of tetrazylazide, e.g. the sodium salt, in a non-aqueous solvent, such as acetone, or in a solvent which contains only small amounts of water, the sodium uniting with the chlorine and the picryl residue uniting with the tetrazylazide residue. Trinitrophenylamino-tetrazylazide is formed analogously from tetranitroaniline and alkali metal tetrazylazide, the alkali-metal forming alkali metal nitrite with a nitro group whilst the trinitroaniline residue unites with the tetrazyl residue.

Methyltetrazyl azide results by adding methyl chloride or methyl sulphate to a salt, e.g. sodium salt, of tetrazylazide. It is not necessary to exclude water from the solvent used.

Mono- and di- tetrazyl azides of acetone are obtained by interacting mono- and dichloroacetone respectively with an alkali metal or alkaline earthmetal salt of tetrazylazide, preferably in stoichiometric proportions.

The reactions may be carried out in aqueous solution in suitable cases.

The tetrazyl azides mentioned above as products of the process of this invention are, with the exception of ethyleneditetrazyl azide, solid bodies, whilst the latter is an oil. The methyl-, ethyl-, and acetone-compounds of tetrazyl azide are very powerful priming explosives and, when employed in detonators as a charge on secondary explosives, such as nitropenterythrite, cyclotrimethylenetrinitramine, tetranitromethylaniline, trinitroalcohol, cause these to detonate readily. They have high shock sensitivity and can therefore also be used in percussion caps for fire arms (e.g. small arms) and so forth. Picryl- and trinitro-phenylamino-tetrazyl azide have a somewhat lower priming power than the foregoing bodies. They

are, however, still suitable priming explosives for detonators. They can be used as filling for detonating fuze cords. The oily ethylene di-tetrazyl azide has an extraordinary shattering power and is readily ignitable by sparks and flames. When sucked up in porous substances, such as cellulose, paper or kieselguhr, it still has an outstanding priming capability for explosives. It gelatinizes nitro-cellulose and forms with it a readily ignitable gelatine of high shattering power.

The above-said substances may be used by themselves, in mixture with one another, or together with other explosives or inert substances, as well as the usual priming composition constituents, as priming explosives and explosives for detonators, percussion or priming caps, electric pellet primers, detonating fuze cords and igniting or priming agents of every kind.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A process for making explosives or priming substances for all purposes, cha-

racterised by the feature that salts of tetrazylazide are interacted with chlorides, sulphates or nitro-compounds of organic bodies in aqueous solution or in solution in organic solvents.

2. A process for making explosives or priming substances as claimed in claim 1 characterised by the feature that inert absorbent substances, such as for example kieselguhr or cellulose, are added.

3. A process for making explosives or priming substances as claimed in claim 1 or 2 characterised by the feature that the usual priming composition constituents, known explosives or inert substances, such as for example glass powder, calcium silicide, lead dioxide, barium nitrate, antimony sulphide, guanylnitrosoamino-guanyltetrazene, are admixed with the product.

4. The improved process for making explosives or priming substances of all kinds substantially as hereinbefore described.

5. Explosives or priming substances for all purposes when made by the process hereinbefore described and claimed.

Dated this 4th day of June, 1938.

MARKS & CLERK.