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EXPLOSIVE COMPOSITION

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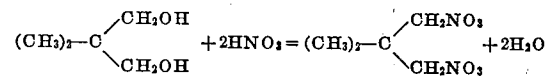
My invention relates to new and improved explosive compositions and particularly to explosive compositions containing as an ingredient dimethylol dimethyl methane dinitrate.

When isobutyl aldehyde is caused to react with formaldehyde under favorable conditions in the presence of a condensation agent such as lime, the dihydroxy alcohol, dimethylol dimethyl methane, is formed. This compound contains two methylol groups available for nitration.

I have found that, when the foregoing compound is treated with nitric acid under the proper conditions, dimethylol dimethyl methane dinitrate is formed according to the following reaction:



The nitration of dimethylol dimethyl methane may be brought about by various methods of procedure. For example, I may add the compound to concentrated sulfuric acid until it is completely dissolved, and then add this solution to concentrated nitric acid. I prefer, however, to nitrate by direct addition of the compound to a mixed acid of the approximate composition, 55% sulfuric acid, and 45% nitric acid. I find the nitration to take place satisfactorily if the initial temperature is 25–30° C., the temperature of the mixture being raised to 40° C. after the addition has been completed. The resulting compound separates rapidly from the waste acids and may be washed and neutralized in the usual manner.

Dimethylol dimethyl methane dinitrate, as prepared, is a liquid, having a slightly yellow color and a viscosity lower than that of nitroglycerin. The pure product has a nitrogen content of 14.43%.

I have found also that dimethylol dimethyl methane dinitrate has valuable properties when incorporated in explosive compositions. It may, for example, be used in nitroglycerin explosives as a freezing point depressant for the nitroglycerin. As such it is an active explosive compound as well as a freezing point depressant. It has the advantage over nitrated polymerized glycerin in such use that it does not unduly retard the gelatinization of the nitroglycerin by the nitrocotton.

As illustrative of a high explosive composition in which dimethylol dimethyl methane dinitrate is incorporated, the following example of a gelatin dynamite is given:—

Example I

	Per cent
Nitroglycerin	20.0
Dimethylol dimethyl methane dinitrate	10.0
Nitrocotton	1.0
Sodium nitrate	50.0
Carbonaceous combustible	18.0
Chalk	1.0
	100.0

While the foregoing example is a specific embodiment for an explosive composition in which dimethylol dimethyl methane dinitrate is used, it is to be understood that other embodiments exist and may be practiced within the scope of my invention, and that many variations in the composition may be used. For example, ethylene glycol dinitrate, or other of the known substitutes for nitroglycerin may be used with this compound. Also ammonium nitrate may be used if desired as an additional oxidizing agent, and as a substitute for a portion of the nitric ester content.

I have also found that propellent powder compositions containing dimethylol dimethyl methane dinitrate may be prepared, and in order to illustrate such compositions more fully, the following examples are given:

Example II

	Parts
Nitrocellulose (12.85 to 13.35% N.)	65
Dimethylol dimethyl methane	30
Petroleum jelly	5

Example III

	Parts
Nitrocellulose (12.85 to 13.35% N.)	65 to 90
Dimethylol dimethyl methane	35 to 10
Diphenylamine or other stabilizer	1

Example IV

	Parts
Nitrocellulose (12.85 to 13.35% N.)	65
Nitroglycerin	5 to 25
Dimethylol dimethyl methane	25 to 5
Petroleum jelly	5

It will therefore be understood that I am not to be limited in the scope of my invention except as indicated in the following patent claims.

I claim:

1. As a new compound dimethylol dimethyl methane dinitrate.

2. An explosive composition containing as an ingredient dimethylol dimethyl methane dinitrate.

3. A propellent explosive containing as an ingredient dimethylol dimethyl methane dinitrate.

4. A dynamite composition containing dimethylol dimethyl methane dinitrate as an ingredient.

5. A dynamite composition comprising nitrocellulose, gelatinized with a liquid nitric ester, and containing dimethylol dimethyl methane dinitrate.

6. A dynamite composition comprising nitroglycerin, nitrocellulose, one or more oxidizing agents, a carbonaceous combustible ingredient, and dimethylol dimethyl methane dinitrate.

In testimony whereof I affix my signature.

CHARLES P. SPAETH.