

UNITED STATES PATENT OFFICE.

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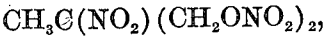
EXPLOSIVE.

No Drawing.

Application filed April 15, 1927. Serial No. 184,181.

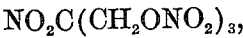
This invention relates to explosives and particularly relates to a process of producing an explosive compound comprising a branched chain hydrocarbon to which are attached two nitrate ($-\text{ONO}_2$) groups and one nitro ($-\text{NO}_2$) group, to the product thereof, and to an explosive containing such product. The major objects of the invention are the provision of such a process, product, and explosive.

In detail the invention relates to nitroisobutyl glycol dinitrate,

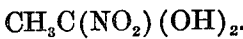


a new explosive oil with properties closely resembling those of nitroglycerine and nitroisobutyl glycerine. Nitroisobutyl glycol has the advantage over nitroisobutyl glycerine of being much less viscous and hence much easier to handle in the nitrating and separating equipment. In the case of the new compound the tendency to form a permanent emulsion, in the process of washing with dilute alkali, is much less pronounced than in the case of nitroisobutyl glycerine, thus making purification and stabilization easier than in the case of the latter explosive.

I am aware that explosives containing in one compound a combination of nitro and nitrate groups have been known for some time. Nitroisobutyl glycerine trinitrate,



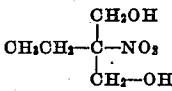
first prepared by Hofwimmer (Zeit. f. Schiess. und Spreng. 1912, p. 43) is an example of this type of explosive. Its preparation involves the nitration of a trihydroxy alcohol containing a nitro group. I have found that a glycol containing a nitro group may be nitrated with mixed acid in a similar manner to give an explosive of great strength. I prefer to use nitroisobutyl glycol



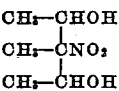
As an example of the invention, but not in restriction thereof, I give the following for the production of nitroisobutyl glycol dinitrate:—Add nitroisobutyl glycol to a mixed acid of approximately 40% nitric acid and 60% sulfuric acid (by weight)

keeping the temperature at 5 to 10° C. The explosive separates readily on the surface of the waste acid as an oil and is then drawn off and neutralized in the usual manner, using a dilute alkaline solution. The explosive thus prepared is an oil having a specific gravity of about 1.5. A nitrometer determination for nitrate nitrogen in the explosive gives a value very near to the theoretical for nitroisobutyl glycol dinitrate (12.45% N).

Although nitroisobutyl glycol is particularly referred to in the above example, it is to be understood that other branched chain hydrocarbons may be used, for instance, nitroisooamyl glycol



or 1, 2, 3, trimethyl 2 nitro propane diol 1—3



The use of these does not necessitate any changes in the process.

The compound may be used as a substitute for nitroglycerine, or in conjunction with nitroglycerine and the other usual ingredients of dynamite, to give a dynamite of good strength and sensitiveness. The following composition exemplifies a dynamite embodying the same, it being understood, of course, that I do not restrict myself to the composition given:—

	Parts by weight.
Nitroisobutyl glycol dinitrate	15
Glycerine trinitrate	15
Sodium nitrate	56
Wood meal	13
Chalk	1

The new explosive compound may be used wholly or in part as a substitute for such explosives as tetranitrodiglycerine, nitroglycol, glycerine chlorhydrin dinitrate or nitro sugars. It may also be used in conjunction with nitro cellulose to form a gelatinized explosive, or with various oxidizing salts such

as potassium nitrate, ammonium nitrate, or ammonium perchlorate to make a dynamite. I may also use any of the recognized carbonaceous combustibles in carrying out my invention.

I claim:

1. An explosive compound comprising a branched chain hydrocarbon to which is attached a nitro group and two nitrate groups.
2. An explosive compound comprising a

branched chain glycol nitrate ester to which is attached a nitro group.

3. An explosive compound comprising a branched chain glycol dinitrate ester to which is attached a nitro group.

4. As a new chemical compound, nitroisobutyl glycol dinitrate.

In testimony whereof I affix my signature.

FRANK H. BERGEIM.