

# UNITED STATES PATENT OFFICE.

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## METHOD OF MAKING EXPLOSIVES.

SPECIFICATION forming part of Letters Patent No. 674,292, dated May 14, 1901.

Application filed June 27, 1900. Serial No. 21,710. (No specimens.)

*To all whom it may concern:*

Be it known that we, JONAS E. BLOMÉN and HENRY C. ASPINWALL, citizens of the United States, and residents of Pompton township, in the county of Passaic and State of New Jersey, have invented a new and useful Method of Producing High Explosives, of which the following is a specification.

Our invention relates to the method of producing a high explosive, the object in view being the production of a high explosive which shall be relatively safe to manufacture and to handle, inexpensive, and not liable to freeze at low temperatures.

It is well known that dynamites and other mixtures containing nitroglycerin are liable to freeze at temperatures above the freezing-point of water and may be exploded by an accidental shock or concussion. Our invention contemplates the production of a high explosive or explosive base free from the undesirable qualities enumerated. It may be described, broadly, as follows: We co-nitrate (or nitrate together) one or more of the aromatic hydrocarbons with one or more of the hydroxyl derivatives of the hydrocarbons. As examples of the aromatic hydrocarbons may be mentioned benzene, toluene, and naphthalene, and of the hydroxyl derivatives phenol and cresol.

Our invention may be practically carried into effect in the following manner: First we produce phenol-sulfonic acid by treating ten parts of phenol with twelve parts of sulfuric acid of 66° Baumé at a temperature of about 70° centigrade for a period of eight days, more or less, with occasional stirring or until the resulting product is immediately soluble in cold water. We then nitrate this phenol-sulfonic acid with a weak nitric acid of about 36° Baumé or of sufficient strength to obtain the desired product. The resulting product is of a heavy syrupy consistency at a temperature of about 70° centigrade and consists of a mixture of mononitro and dinitro phenol with some unnitrated phenol. Care must be taken that the acid employed in this preliminary nitration is not too strong, so that the nitrated product shall not be of a higher nitration than is expressed by the terms "mononitro" and "dinitro." The vessel in which this nitration

is carried out is then cooled, with its contents, and the excess of acid and water cautiously drawn or decanted off. To this nitrated product of phenol we add naphthalene in about the proportion of one part, by weight, of naphthalene to one part, by weight, of phenol originally used for sulfonation and nitration. This mixture is then heated to about 80° centigrade and allowed to stand, with occasional stirring, for several days or until of uniform consistency. It is then nitrated with a weak nitric acid or mixture of nitric and sulfuric acid in a manner similar to that in which naphthalene alone is nitrated.

In treating naphthalene and phenol in the manner described above we produce a mixture of highly-nitrated naphthalenes in nitrophenols and form practically a combination of the substances. This result is important, because the temperature at which the highly-nitrated naphthalenes melt is high and frequently higher than that at which decomposition of the nitrophenols would be induced. The nitrophenols and lower nitrates of naphthalene will readily dissolve together; but the higher nitronaphthalenes will not do so readily, excepting by means of treatment as described above. The co-nitrated product thus produced is thoroughly washed and purified and then dried and may now be used as an explosive in this condition or as an explosive base mixed with other ingredients.

In order to produce the best results, develop more fully the explosive force, and obtain the highest value as an explosive, we may add one or more of the oxygen-bearing salts, such as the nitrates, chlorates, or perchlorates of potassium, sodium, barium, or ammonium. The addition or incorporation of the salts with the co-nitrated product may be effected by any well-known method of mixing. They may be added in a dry state or they may be wet, or the co-nitrated product may be melted or it may be dissolved in any suitable solvent, such as acetone, methyl alcohol, amyl acetate, acetic ether, or the like, and the salts may be added to the liquid or plastic mass thus formed. We do not confine ourselves to any particular method of mixing, as most of the well-known methods will effect the results desired.



The proportions of the oxygen-bearing salt or salts to be added to the co-nitrated product will vary with the results we desire to obtain and also according to the nitration of the co-nitrated product.

The strength of the explosive may be varied according to the proportion of the oxygen-bearing salts added.

A satisfactory explosive can be made in the following proportions: To forty-two parts of a co-nitrated product produced as above described and corresponding to trinitro-naphthalene and dinitro-phenol we add fifty-eight parts of an oxygen-bearing salt—say sodium nitrate. Another composition which gives a satisfactory high explosive is the following: To fifty parts of a co-nitration product corresponding in composition to tetranitro-naphthalene and trinitro-phenol is added thirty parts of sodium nitrate and twenty parts of ammonium nitrate.

What we claim is—

1. The method of forming an explosive consisting in co-nitrating a hydrocarbon and a hydroxyl derivative of hydrocarbon, substantially as specified.

2. The method of forming an explosive consisting in co-nitrating a hydrocarbon and a hydroxyl derivative of hydrocarbon, purifying the product and adding one or more oxygen-bearing salts, substantially as specified.

3. The method of forming an explosive con-

sisting in first sulfonating a hydroxyl derivative of hydrocarbon, then partially nitrating the product, then adding a hydrocarbon to the partially-nitrated product and then nitrating the mixture to desired nitration.

4. The method of forming an explosive consisting in first sulfonating a hydroxyl derivative of hydrocarbon, then partially nitrating the product, then adding a hydrocarbon to the partially-nitrated product, then nitrating the mixture to desired nitration, then purifying the product and finally adding a sufficient quantity of oxidizing material to oxidize the carbon, substantially as set forth.

5. The method of producing an explosive consisting in first sulfonating phenol, then partially nitrating the phenol-sulfonic acid, then adding naphthalene, then nitrating the mixture to a desired nitration, then purifying the product, then incorporating oxygen-bearing salts and finally pulverizing the product to the desired fineness, substantially as set forth.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of two witnesses, this 5th day of June, 1900.

JONAS E. BLOMEN.  
HENRY C. ASPINWALL.

Witnesses:

FREDK. HAYNES,  
EDWARD VIESER.