

UNITED STATES PATENT OFFICE.

BERNHARD JACQUES FLÜRSCHHEIM, OF FLEET, ENGLAND.

EXPLOSIVE.

1,045,012.

Specification of Letters Patent.

Patented Nov. 19, 1912.

No Drawing.

Application filed February 4, 1911. Serial No. 606,582.

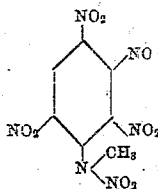
To all whom it may concern:

Be it known that I, BERNHARD JACQUES FLÜRSCHHEIM, doctor of philosophy and research chemist, by birth a German subject, but having applied for naturalization as a British subject, residing at Fleet, Hampshire, England, have invented certain new and useful Improvements Relating to Explosives, of which the following is a specification.

This invention relates to the use of a nitro-derivative of anilin, viz., tetra-nitro-anilin, as an explosive or as an ingredient in the manufacture of explosives.

In comparison with other aromatic nitro compounds, hitherto employed in the manufacture of explosive compositions, such as trinitro-toluol, this new compound possesses a considerably greater explosive power, as shown by careful experiments. Moreover, in spite of its high percentage of nitrogen and oxygen, tetra-nitro-anilin has a comparatively high resistance to heat and mechanical influences, and its manufacture is simple and cheap. It is therefore eminently suitable as an explosive or in the manufacture of explosives.

Besides tetra-nitro-anilin, those derivatives of the same, which contain substituents in the amino group, for instance methyl-nitro-tetra-nitro-anilin,



which melts at about 145° C., are also suitable for use as or in the manufacture of explosives.

Tetra-nitro-anilin is a very powerful explosive, and may be fired in a known manner, for instance by an ordinary detonator; it may therefore be used for instance as an

explosive charge for blasting purposes, also for shells, torpedoes and similar objects, or for the manufacture of gun-powder, as is the case, for instance with gun-cotton and some other known nitro compounds.

Tetra-nitro-anilin and its derivatives mentioned above may be employed together with other nitro compounds, or with oxidizing bodies, such as perchlorates, and combustible bodies, such as naphthalene or aluminium powder or other materials, which have been or may be used in combination with other nitro compounds, for instance by simply mixing or melting them together, or by causing them to unite by means of a suitable solvent or a colloid solution, such as nitro-cellulose in acetone, with or without the aid of pressure. They may also be used in detonating or priming compositions in conjunction with priming substances such as fulminate of mercury or nitrids, as is the case, for instance, with trinitro-toluene and tetra-nitro-methyl-anilin.

The following are examples of useful compositions:—

Example I.

Tetra-nitro-anilin	13 parts.	
Charcoal	6 "	75
Ammonium nitrate	81 "	
	100	

These proportions may be varied and a part or the whole of the charcoal may be replaced by a suitable quantity of naphthalene or other combustible bodies. The tetra-nitro-anilin and the naphthalene may be melted together. The ammonium-nitrate may be replaced by a suitable quantity of another oxygen carrier.

Example II.

1 part of tetra-nitro-anilin is dissolved in 2½ parts of melted m-dinitro-benzene, and the mixture rapidly cooled. An explosive

composition may be prepared from this mixture as follows:—

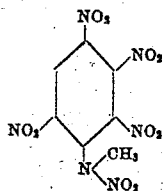
A mixture consisting of tetra-nitro-anilin and dinitro-benzene,	
5 as described above-----	7 parts.
Charcoal-----	6 "
Ammonium-nitrate-----	87 "
	100

10 *Example III.*

Fulminate of mercury composition (containing 10 to 20% of KClO ₃ and 90-80 of fulminate)	
15 about-----	25 parts.
Tetra-nitro-anilin, about-----	75 "
	100

Example IV.

20 Fulminate of mercury composition (containing 10 to 20% KClO ₃ and 90-80 of fulminate)	
about-----	25 parts.
25 Methyl-nitro-tetra-nitro-anilin,	



about.... 75 "

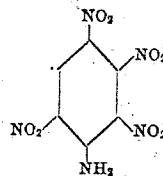
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Examples III and IV relate to detonating compositions in which the ingredients are usually not mixed together, but placed one above the other.

Tetra-nitro-anilin is a yellow crystalline product or powder having a specific gravity of about 1.8 and melting at about 210° C. with decomposition. It is easily soluble in acetone, less soluble in acetic acid, benzene and chloroform and almost insoluble in cold water. It can be recrystallized, for instance from glacial acetic acid, or from nitro-benzene or xylene, and is characterized by the remarkable facility with which its nitro group in the 3-position may be replaced by other groups. Thus the compound can in acetic solution, for instance, be quantitatively transformed into tri-nitro-meta-amino-phenol melting at 174 to 175° C. by treatment with an aqueous solution of sodium-acetate at ordinary temperature. The nitro group in the 3-position can also be replaced by numerous other radicals, for in-

stance by amins; the amino group can equally be replaced, though not so easily.

The chemical constitution may be indicated by the formula:



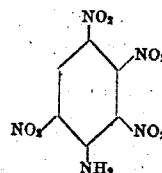
Tetra-nitro-anilin may be produced as follows:—1 part of meta-nitro-anilin and 2½ parts of sodium-nitrate are dissolved in 36 parts of concentrated sulfuric acid, the mass is then heated to about 70° C. to 90° C. and external cooling is applied, to prevent the temperature from rising. When the reaction has subsided, the mass is heated further to 100° C. for a few minutes, then allowed to cool, and the tetra-nitro-anilin separated by filtration.

In view of the foregoing it is to be understood that in the claims appended hereto the expression "an explosive containing" is to be interpreted to mean an explosive comprising at least one constituent in addition to the tetra-nitro-anilin.

What I claim is:—

1. An explosive containing a derivative of anilin having four nitro groups in the positions 2, 3, 4 and 6 in the benzene nucleus, substantially as described.

2. An explosive containing tetra-nitro-anilin of the constitution



substantially as described.

3. A detonating charge containing tetra-nitro-anilin in addition to a priming substance, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

BERNHARD JACQUES FLÜRSCHHEIM.

Witnesses:

J. WETTER,
H. D. JAMESON.