Improvement in mfr of explosives

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F A Abel

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## PROVISIONAL SPECIFICATION.

### Improvements in the Manufacture of Explosives.

We, FREDERICK AUGUSTUS ABEL, of No. 1, Adam Street, Adelphi in the County of Middlesex, Knight, and JAMES DEWAR of No. 1 Scroop Terrace, Cambridge, in the County of Cambridge, Professor of Chemistry, do hereby declare the nature of this invention to be as follows :—

Hitherto certain explosives have been manufactured in a gelatinous condition by compounding nitroglycerine with soluble nitrocellulose with or without the addition of other substances. According to our present invention, instead of employing soluble nitrocellulose, we employ gun cotton or the highest nitrated varieties of nitrocellulose which are not of the kinds usually known as soluble, and we compound this along with a solvent for it, such as acetone or acetic ether, with nitroglycerine, and, if necessary, with other substances for moderating or retarding explosive action. We thus produce an explosive of gelatinous consistence which may be formed into sheets, rods, or other shapes, becoming firm after the solvent is evaporated.

The explosive produced as above described may be used alone or in admixture with blasting gelatine produced in the usual way; or, in manufacturing the explosive, a mixture of gun cotton with the lower varieties of nitrated cellulose may be employed.

Dated this 22nd day of July 1889.

ABEL & IMRAY,
Agents for the Applicants.

## COMPLETE SPECIFICATION.

### Improvements in the Manufacture of Explosives.

We, FREDERICK AUGUSTUS ABEL, of No. 1 Adam Street, Adelphi, in the County of Middlesex, Knight and JAMES DEWAR, of No. 1 Scroop Terrace, Cambridge, in the County of Cambridge, Professor of Chemistry, 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 :—

Hitherto certain explosives have been manufactured in a gelatinous condition by compounding nitroglycerine with soluble nitrocellulose which is dissolved in the former by the aid of heat and without the use of any other solvent, and which may or may not have other substances mixed therewith. Such compounds are of a very uncertain composition owing to the fact that in manufacturing nitrocellulose that shall be soluble in nitroglycerine, the product always consists of a mixture of nitrated cellulose of different compositions and solubility, and frequently contains a proportion of insoluble gun cotton or trinitrocellulose which being undissolved acts very prejudicially upon the gelatinous explosive produced.

Our invention has for its object to obviate these defects in the manufacture of such gelatinous explosives by producing them in a stable form and of definite uniform composition, and it consists in employing for this purpose, in lieu of soluble nitrocellulose, cellulose of the highest nitrated varieties of "gun cotton" which is not soluble in nitroglycerine under the conditions above named, by causing the gun cotton to be dissolved or gelatinised by the addition of such solvents or gelatinising

agents as acetone or acetic ether or similar reagents, in order to induce mutual incorporation.

In carrying out this manufacture we prefer to proceed as follows:—

We take about equal parts by weight of ordinary nitroglycerine and dry gun cotton, and after mixing with the nitroglycerine about one sixth of its weight of the solvent, we add the gun cotton and thoroughly incorporate the whole in a pug mill either in the cold or up to about the temperature of 90° Fahr. until it becomes of a uniform consistence similar to a very stiff jelly, during which operation care is taken, by enclosing the pug mill, to prevent the escape of the solvent.

The mass is then ready to be formed into sheets, rods, wires or other shapes which, on the evaporation of the solvent, become firm and tough. The above described mode of preparing the gelatinous explosive is only intended to serve as an example, as it may be greatly varied both as regards proportions and the mode of production.

Thus, there may be taken from 50 to 60 *per cent.* of nitroglycerine and 50 to 40 *per cent.* of gun cotton, or 50 to 40 *per cent.* of nitroglycerine and 50 to 60 *per cent.* of gun cotton, and, instead of mixing these ingredients as above described, we may first dissolve or gelatinise the gun cotton and then add the nitroglycerine. To the gelatinous explosive prepared according to our above described invention may be added other substances for moderating the force of explosion, such as lamp black, graphite, solid hydrocarbons, fatty oils and fats, tannin, cellulose, oxalate of ammonia, and nitro derivatives of hydrocarbons.

The gelatinous explosive can also be mixed with ordinary blasting gelatine prepared with soluble nitro cellulose. The practically pure gun cotton which we employ for the purposes of our invention being always of uniform composition, the gelatinous explosive produced therefrom is consequently equally constant in its composition and uniformly reliable in its action.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, we declare that we are aware that it has been proposed to manufacture explosives by admixture of gun-cotton with nitro glycerine, castor oil or other suitable oil, and acetone or similar solvent, and we do not claim such manufacture but what we claim is:—

The manufacture of a gelatinous explosive by admixture of nitroglycerine with the highest nitrated cellulose, or gun cotton, effected with the aid of a solvent such as acetone, substantially as described.

Dated this 22nd day of April 1890.

ABEL & IMRAY,
Agents for the Applicants.

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