UNITED STATES PATENT OFFICE.

STEPHEN H. EMMENS, OF LONDON, ENGLAND.

MANUFACTURE OF EXPLOSIVES.

SPECIFICATION forming part of Letters Patent No. 422,515, dated March 4, 1890.

Application filed March 30, 1889. Serial No. 305,445. (No specimens.)

To all whom it may concern:

Be it known that I, STEPHEN HENRY EMMENS, a subject of the Queen of Great Britain and Ireland, and a resident of London in England, temporarily residing at Harrison, in the State of New York, have invented a new and useful Improvement in the Manufacture of Explosives, of which the following is a specification.

My present invention consists in a novel process hereinafter set forth and claimed, and is additional to the invention patented to me January 10, 1888, by United States Letters Patent No. 376,145.

The object of the present invention is the production of an improved type or class of detonating explosive compounds having as a base or main element the new crystalline acid compound, or "crystalline acid," as it is hereinafter termed, crystallized from the liquid product of the action of heated fuming nitric acid on picric acid in excess, set forth in my specification forming part of said United States Letters Patent No. 376,145. I have discovered that by fusing the said new crystalline acid, and by adding to such fused acid a nitrate or nitrates of the alkalies or alkaline earths, powerful explosives of great technical utility and value may be formed. If, however, the operation be incautiously conducted, and the temperature be allowed to rise above the fusion-point, a chemical decomposition of the acid takes place, and there is a considerable loss of nitrous gas, thereby lessening the explosive power of the substance. It therefore becomes a matter of importance to lower the fusion-point, and this, I have discovered, can be effected by an admixture of allied nitro-hydrocarbons with the said new crystalline acid. The bodies that I have found most suitable for this purpose are trinitrocresylic acid, dinitroxylene, dinitronaphthalene, dinitrobenzine, and such samples of the so-called "picric acid" of commerce as begin to fuse at a temperature of 116° centigrade or under. The substances here named are practically the equivalents of each other—that is to say, they all form with the said new acid admixtures having a fusion temperature lower than 116° centigrade, and capable of explosion when incorporated with nitrates of alkalies or alkaline earths.

The fusion-point of the admixture varies somewhat with the proportion borne by the said new crystalline acid to the added nitro-hydrocarbon; but I have found that such proportion may itself range from twenty to seventy per cent. without injuriously affecting either the fusion temperature or the explosive capability of the admixture. The amount of nitrate added may also vary, according to the particular grade of explosive desired, from a quantity about sufficient to oxidize the carbon in the said compound to the condition of carbonic oxide to an amount about fifty per cent. in excess of that sufficient to oxidize such carbon to carbonic acid.

As a practical example of my present process as applied to the production of specific explosive compounds, I may cite the following: In an open vessel, heated by a steam-jacket to a temperature of 105° centigrade, I place three pounds of dinitrobenzine. When this is melted, I add thereto one pound of the said new crystalline acid, which quickly fuses and forms a clear liquid with the dinitrobenzine without any disengagement of nitrous gas. To the combustible thus formed, I add nine pounds of nitrate of soda in a finely-pulverized condition and heated to 105° degrees centigrade, or thereabout. The mixture is well stirred and then allowed to cool, when it forms a hard homogeneous mass, which may be powdered or granulated, and may be loaded into cartridges for use as a "high explosive," in combination with suitable detonating caps or primers, as is customary with all such bodies.

Having thus described the said process, I claim as my invention and desire to patent under this specification—

1. The within-described process of making explosive compounds, having as a base the new crystalline acid patented to me January 10, 1888, which process consists in fusing said new crystalline acid by heat in the presence of an allied nitro-hydrocarbon, as dinitrobenzine, incorporating a pulverized oxidant with

the liquid combustible so produced, and then permitting the mixture to cool, substantially as hereinbefore specified.

2. In the within-described process of making explosive compounds, having as a base the new crystalline acid patented to me January 10, 1888, the method of reducing the fusion-point of such acid, which consists in the admixture therewith of an allied nitro-hydrocarbon as dinitrobenzine, substantially as hereinbefore specified.

STEPHEN H. EMMENS.

Witnesses:
SAMUEL B. HAMBURG,
HUGH HENRY.