UNITED STATES PATENT OFFICE.

STEPHEN H. EMMENS, OF LONDON, ENGLAND.

MANUFACTURE OF EXPLOSIVES.

SPECIFICATION forming part of Letters Patent No. 422,514, dated March 4, 1890.

Application filed March 23, 1889. Serial No. 304,551. (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, 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.

The object of my invention is to produce explosive compounds of a new type.

Explosives as hitherto prepared may be classed as follows:

First. Chemical compounds or bodies in which the combustible and oxidizing molecules are all in close chemical contact, and are all rendered simultaneously active when detonation takes place. Nitro-glycerine, gun-cotton, and picric acid are examples of this class.

Second. Mechanical aggregations or bodies in which the combustible and oxidizing molecules are in the close vicinity of each other without being in chemical contact, and in which, therefore, the act of combustion is progressive from layer to layer of adjacent molecules. Gunpowder is an example of this class.

Third. Detonating mixtures or bodies in which the combustible and oxidizing ingredients are mechanically aggregated, but are in themselves chemical compounds capable of detonation. The various picric powders, many dynamites, the roburites, and the bellites are of this class.

If, now, a chemically-compounded detonating combustible ingredient be brought into chemical contact with a chemically-compounded oxidizing ingredient, we shall have a fourth type of explosive bodies—that is to say, a chemical aggregation as distinguished from a chemical compound or from a mere mixture, whether simple or detonating. This fourth type, I have discovered, can be formed by operating under certain conditions upon certain materials.

The materials I employ are such hydrocarbon substitution derivatives as are capable of fusion by heat without decomposition, and as are also capable when fused of dissolving the nitrates of soda, potash, and ammonia, which are the preferred oxidants. The most suitable hydrocarbons for the purpose, so far as I have discovered, are the trinitro-phenols, the trinitro-cresols, and (if the working temperatures do not exceed 120° centigrade) the new acid patented to me January 10, 1888, (United States Patent No. 376,145.)

The conditions under which the new type of explosive is produced consist in the employment of a sufficient degree of heat and in continuing this heat until actual liquefaction of the mixture is attained.

The manner in which I carry out my new process of manufacturing explosives is as follows: I take two open vessels, both heated by steam-jackets or by any other convenient method to the same temperature. In one of these I place the trinitro-phenol or other combustible, and in the other I place the nitrate of soda or other oxidant in a finely-pulverized and dried condition. When the combustible is entirely fused, I add thereto the heated oxidant in small quantities at a time, and I stir the mixture thoroughly. I then gently raise the heat until the oxidant becomes fully liquefied, or so combined with the combustible as to form a semi-fluid homogeneous mass. The mixture is then removed from the vessel and allowed to cool for use.

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

The process of manufacturing explosives consisting in fusing a suitable hydrocarbon substitution derivative, as trinitro-phenol, adding thereto a suitable alkaline nitrate, as nitrate of soda, continuing a sufficient degree of heat until actual liquefaction of the mixture is attained, and then allowing the same to cool, substantially as hereinbefore specified.

STEPHEN H. EMMENS.

Witnesses:
NEWTON W. EMMENS,
SAMUEL B. HAMBURG.