

# UNITED STATES PATENT OFFICE.

HUDSON MAXIM, OF NEW YORK, N. Y.

EXPLOSIVE COMPOUND.

951,445.

Specification of Letters Patent.

Patented Mar. 8, 1910.

No Drawing.

Application filed October 7, 1904. Serial No. 227,555.

To all whom it may concern:

Be it known that I, HUDSON MAXIM, a citizen of the United States, residing at the borough of Brooklyn, city of New York, county of Kings, and State of New York, have invented a new and useful Improvement in Explosive Compounds, which invention is fully set forth in the following specification.

10 This invention relates to improvements in solvents of pyroxylin, and has especial reference to the manufacture of smokeless gunpowder.

The object of the invention is mainly to provide a non-volatile solvent of pyroxylin, solid at ordinary temperatures, by which its gelatinization may be readily effected and an amorphous colloid formed adapted to use as a smokeless powder without drying after granulation, and a solvent which shall contain within itself, in conjunction with the oxygen contained in the pyroxylin, sufficient oxygen for its own combustion into gaseous products when combined with pyroxylin in such a proportion as will be sufficient to effectually gelatinize the same. I have found tri-nitranisol, that is to say, tri-nitro-methyl-phenol, to be such a non-volatile solvent of pyroxylin, and which is a solid at ordinary temperatures.

In carrying out the invention the tri-nitranisol and the pyroxylin are commingled and thoroughly incorporated, preferably between incorporating rolls, the rolls being maintained at a slightly elevated temperature, to facilitate the incorporation of the ingredients and the gelatinization of the pyroxylin, the rolling process being continued until an amorphous colloid is produced, which then, while warm, is rolled into sheets of suitable thickness and cut into

grains of suitable size and shape for use in guns, and which are ready for use immediately without any further treatment. The percentages preferably used are from 40 to 50 per cent. of tri-nitranisol, to form 50 to 60 per cent. of pyroxylin. As tri-nitranisol is a powerful solvent of all grades of pyroxylin, it is not necessary to specify any particular variety although I prefer to use pyro-nitro-cellulose having the composition expressed by the chemical formula  $C_{30}H_{38}(NO_2)_{12}O_{25}$ .

What is claimed is:—

1. A smokeless powder of the character described containing nitro-cellulose and tri-nitroanisol.

2. An explosive consisting of a gelatinated compound of pyroxylin and trinitranisol.

3. The process of making smokeless gunpowder consisting in incorporating nitro-cellulose and tri-nitranisol while subjecting the materials to heat.

4. The process of making smokeless gunpowder consisting in incorporating pyro-nitro-cellulose and an ester of picric acid while subjecting the materials to heat.

5. An explosive consisting of an amorphous colloid of pyro-nitro-cellulose and tri-nitranisol.

6. An explosive of the character described, consisting of a colloid of nitro-cellulose and an ester of picric acid.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

HUDSON MAXIM.

Witnesses:

LILIAN MAXIM,  
J. FRANK BEST.