

UNITED STATES PATENT OFFICE.

HUDSON MAXIM, OF PITTSFIELD, MASSACHUSETTS.

METHOD OF PRODUCING HIGH EXPLOSIVES.

SPECIFICATION forming part of Letters Patent No. 411,127, dated September 17, 1889.

Application filed May 13, 1889. Serial No. 310,637. (No model.)

To all whom it may concern:

Be it known that I, HUDSON MAXIM, of Pittsfield, in the county of Berkshire and State of Massachusetts, have invented a certain new and useful Method of Producing High Explosives, of which the following is a full, clear, and exact description.

The object of the invention is to prepare a high explosive in a form so that, while still retaining all the explosive power of its constituents, it will be in such a compact, solid, and therefore stable condition as will permit it to be readily and safely handled and will adapt it to be projected from ordnance with gunpowder—that is to say, it is the purpose to prepare the explosive so that it may be packed in shells and other projectiles and safely fired from guns as shells charged with ordinary gunpowder are commonly fired.

To this end the invention consists in dissolving gun-cotton or nitro-cellulose in a proper solvent which is capable of being evaporated, adding to the dissolved nitro-cellulose nitro-glycerine, and then evaporating the volatile solvent from the mixture.

In carrying out my invention I first thoroughly dissolve gun-cotton in the solvent, which usually will be a liquid, such as acetone or ethylic acetate, or a mixture of sulphuric ether and alcohol. A sufficient quantity of the solvent will be employed to thoroughly reduce or dissolve all or practically all of the gun-cotton. The nitro-glycerine will then be added and thoroughly incorporated with the dissolved nitro-cellulose. The product thus produced is now to be spread out and the volatile solvent evaporated therefrom, the residue being a comparatively hard, dense, and rigid mass, the components of which are maintained in a stable and safe condition.

This explosive has all the high power of gun-cotton or nitro-cellulose and of nitro-glycerine, cannot readily be exploded by concussion, and may be worked and shaped for the purpose of charging shells or projectiles. The presence, however, of the nitro-glycerine in the explosive renders it capable of being exploded by ignition or by a detonating charge of fulminate of mercury, or by electricity. The quantity of nitro-glycerine, however, is not sufficient to make it suscep-

tible of exploding by any ordinary form of concussion, such as it would be subjected to in handling or in being discharged from a gun with gunpowder.

The quantity of nitro-glycerine in the explosive will of course depend upon the desired sensitiveness of the compound, and accordingly as the explosive contains more or less of nitro-glycerine will it be necessary to employ a detonator of less or greater energy. In practice the object will be to add only such quantity of nitro-glycerine as will insure the proper instantaneity of explosion.

I have hereinbefore described the solvents to be used as liquid, as these will usually be preferred; but other solvents may be employed—such as vapors of various liquid solvents or a partially dry solvent—or even a dry solvent may be used, such as camphor. I do not therefore limit myself to any special form or kind of solvent. So, also, the nitro-glycerine may be mixed with a solvent capable of dissolving the nitro-cellulose and the latter be dissolved in conjunction with the nitro-glycerine.

I am aware that gun-cotton has heretofore been reduced to a very tough, dense, and solid mass by solvents, and such process I do not claim, as the explosive thus produced has not the capacity of exploding with the certainty that my explosive has. It has not the proper degree of sensitiveness to the detonating charge, and the instantaneity of its explosion depends largely upon the conditions of its confinement. I am also aware that gun-cotton has been dissolved in nitro-glycerine, thus producing what is known as “nitro-gelatine;” but this is not my process, for the resulting explosive is an unstable jelly-like mass very susceptible of explosion by concussion.

My explosive has all the advantages of those last-named products with none of their disadvantages.

I do not herein claim the compound produced by the process described; the same being claimed in my application Serial No. 318,670, filed July 25, 1889. I desire to reserve my right to claim said compound.

What is claimed as new is—

1. The herein-described process of produc-

ing high explosives, consisting in dissolving gun-cotton or nitro-cellulose in a suitable solvent, adding to the dissolved nitro-cellulose nitro-glycerine, and then evaporating from the mixture the volatile solvent, substantially as set forth.

2. The process herein described for manufacturing explosives, which consists in dis-

solving nitro-cellulose in a volatile solvent, combining therewith nitro-glycerine, and evaporating the volatile solvent therefrom after the admixture of the nitro-glycerine.
HUDSON MAXIM.

Witnesses:

ROBT. F. GAYLORD,
FRANK E. HURTLEY.