UNITED STATES PATENT OFFICE.

HUDSON MAXIM OF NEW YORK, N. Y.

HIGH EXPLOSIVE.

SPECIFICATION forming part of Letters Patent No. 544,924, dated August 20, 1895.

Application filed July 7, 1894. Serial No. 516,858. (No specimens.)

To all whom it may concern:

Be it known that I, HUDSON MAXIM, a citizen of the United States of America, residing in the city, county, and State of New York, have invented certain new and useful Improvements in High Explosives, of which the following is a specification.

The object of my invention is to prepare an explosive compound particularly for use in shells or torpedoes to be thrown from ordnance with safety, using gunpowder as a propellant; also to produce an explosive which shall possess as much power as possible for the space occupied by it—that is, one whose specific gravity shall be as great as possible.

In carrying out my invention I first prepare a compound of nitroglycerin and soluble or gelatin pyroxylin. This may be done by dissolving the pyroxylin directly in the nitroglycerin; but I prefer to combine the pyroxylin with the nitroglycerin by means of a solvent in the manner well known in the manufacture of smokeless powder. I prefer to employ from seventy to eighty per cent. of nitroglycerin and from twenty to thirty per cent. of pyroxylin. The product is a colloid of pyroxylin and nitroglycerin having a yielding or elastic character. This I reduce to a fine state of division by cutting, rasping, or pulping. To this granular compound I then add, preferably, from twenty to twenty-five per cent. of military or insoluble pyroxylin in a fine state of division, and water equal to fifteen to twenty per cent. of the total weight, according to the insensitiveness that may be desired.

The object of the fibrous gun cotton is to lessen the sensitiveness of the colloid of nitroglycerin and pyroxylin and at the same time constitute a medium for carrying a larger percentage of water than the said granulated colloid would contain if employed without the fibrous gun cotton. The fibrous gun cotton also serves to preserve the granular structure and porosity of the compound, in that it separates the grains of the colloid and prevents them from sticking together in a solid mass, which would then not contain water, especially when a very large per cent. of nitroglycerin—say eighty per cent.—be employed in the colloid.

I am aware that it has been proposed to combine fibrous gun cotton with soluble pyroxylin and nitroglycerin by means of a common and volatile solvent of the soluble pyroxylin and nitroglycerin; but by such process the pores of the military or insoluble pyroxylin are filled with the solution of soluble pyroxylin and nitroglycerin, so that if the same be granulated or reduced to a fine state of division the pores of the fibrous gun cotton being filled would not absorb or hold water, as is accomplished in my invention by the employment of fibrous gun cotton in its original porous state. The grains of this mixture would also stick together in mass form, and thus defeat one of the objects of this improvement. I have found also that I obtain higher explosive results and without adding materially to the sensitiveness of the compound by soaking the compound in a solution of nitrate of ammonia, nitrate of sodium, or some other oxygen-bearing salt, so that its fibers or pores will hold such solution in suspension. This may be done in any acceptable manner; but I usually proceed as follows: The compound is taken from the pulping-machine, wrung as dry as practicable in a centrifugal machine, and is then placed in bags and immersed in a bath of a solution of nitrate of ammonia, preferably heated. When the compound is thoroughly saturated, the liquid may be extracted by a centrifugal machine while the material is yet hot; but I prefer to allow the compound to cool and a portion of the nitrate of ammonia or other salt to thereby crystallize within the pores and fibers of the explosive material before wringing.

What I claim is—

1. The herein described explosive compound, consisting of an intimate mechanical mixture, in a fine state of division, of an explosive colloid of gun cotton and nitro glycerin, and wet fibrous gun cotton.

2. The herein described explosive compound, consisting of an intimate mechanical mixture in a fine state of division, of an explosive colloid of gun cotton and nitro glycerin, and fibrous gun cotton holding in suspension in its pores a solution of an oxygen-bearing salt such as nitrate of ammonia.

In witness whereof I have hereunto signed my name in the presence of two witnesses.

HUDSON MAXIM.

Witnesses:
GEO. H. GRAHAM,
E. L. TODD.