

UNITED STATES PATENT OFFICE.

HUDSON MAXIM AND ROBERT C. SCHÜPPHAUS, OF NEW YORK, N. Y.

PROCESS OF MAKING SMOKELESS POWDER.

SPECIFICATION forming part of Letters Patent No. 640,213, dated January 2, 1900.

Application filed November 29, 1893. Serial No. 492,403. (No specimens.)

To all whom it may concern:

Be it known that we, HUDSON MAXIM, of the city and county of New York, and ROBERT C. SCHÜPPHAUS, of the city of New York, (Brooklyn,) county of Kings, in the State of New York, citizens of the United States, have invented certain new and useful Improvements in the Manufacture of Smokeless Gunpowder, of which the following is a specification.

10 This invention relates generally to the manufacture of smokeless gunpowder more especially adapted for use in small-arms; and it has for its object to provide for its manufacture in a more simple and efficient manner than heretofore, to impart a structural character to an otherwise amorphous material, and to secure an explosive of any desired degree of density and sensitiveness to the primer.

15 In carrying out our invention we employ as the base of said powder pyroxylin, which may be, and preferably is, of varying degrees of nitration, and therefore of varying solubility, for reasons hereinafter explained, which pyroxylin or guncotton is pulped or reduced to a very fine state of division. We prefer to employ a mixture of tri-nitro-cellulose—that is, nitro-cellulose of the highest degree of nitration and that which is insoluble in ether and alcohol and in wood-alcohol—and 25 nitro-cellulose or pyroxylin of a lower grade of nitration—such, for instance, as collodion pyroxylin—and which is soluble in ether and alcohol or in wood-alcohol. We do not confine ourselves to any particular proportion of 30 these grades of pyroxylin, but have found in the light of present experience that about three parts of tri-nitro-cellulose to one part of collodion pyroxylin or di-nitro-cellulose give the best results.

40 In this specification tri-nitro-cellulose will be termed “insoluble pyroxylin” and di-nitro-cellulose or collodion cotton “soluble pyroxylin,” these terms being familiar to those in the trade as designating these respective grades of nitro-cellulose, although 45 of course the tri-nitro-cellulose is soluble in certain menstrua—as, for instance, acetone

or acetate of ethyl—but, as we have said, insoluble in ether and alcohol, in wood-alcohol, and in ordinary menstrua. 50

In practice we thoroughly incorporate the soluble and insoluble pyroxylin, preferably in a pulping-engine or a poaching-machine, to obtain a thorough mechanical intermixing of the two grades of pyroxylin. The pulped 55 and thoroughly-mixed material is then preferably run into a paper or paper-board making machine or other machine adapted to the manufacture of strawboard, cardboard, or pulped board, particularly the latter, which 60 process of paper-making need not be described here. The material, however, may be otherwise treated and brought to a condition to be shaped or molded. When the pyroxylin pulp is thus made into a paper or paper-board and of such thickness as will best 65 serve the purpose for which it is to be employed, as hereinafter explained, the sheets or rolls, as the case may be, are taken from the paper-making machine and cut into sheets 70 of a convenient size for handling. These sheets are then hung or placed in a receiver, from which the air is preferably exhausted. The solvent of the soluble pyroxylin is then 75 admitted into the receiver, preferably in the form of vapor or spray, so that the soluble pyroxylin is softened or reduced to a gelatinous or plastic mass. Heat is then admitted to the receiver and the vapors of the solvent drawn away and condensed for further use. 80 The paper or paper-board when taken from the paper-machine or afterward, before completely freed of the solvent, may be run through a calendering-machine or submitted to pressure and rendered more dense and 85 smooth, and a certain amount of sizing material may also be used, such as glue or the whites of eggs or similar substitutes and starch. In this case less solvent is necessary to reduce the pyroxylin paper to such density 90 as may be required. When the sheets of pyroxylin have become sufficiently dried or freed from the solvent, they are run through a granulating-machine, which cuts them into

preferably small parallelograms or grains of rectangular form. The powder is then ready to be packed and used.

Having thus described our invention, what
5 we claim is—

The herein-described process of making smokeless powder which consists in pulping or reducing a pyroxylin to a fine state of division, then treating it with a solvent, and
10 before it is completely freed from the solvent

treating it with a size, and then granulating and drying the same.

In witness whereof we have hereunto signed our names in the presence of two witnesses.

HUDSON MAXIM.

ROBERT C. SCHÜPPHAUS.

Witnesses:

GEO. H. GRAHAM;

E. L. TODD.