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PROPELLANT POWDER AND METHOD OF COLLOIDING SAME

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(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1883, 22 STAT. L., 625)

The invention described herein may be used by the Government, or any of its officers or employees in prosecution of work for the Government, or by any other person in the United States, without payment to me of any royalty thereon, in accordance with the act of March 3, 1883.

This invention relates to a propellant powder and a method of colloiding the same.

In some cases where nitro-aromatics are incorporated in nitrocellulose powders for the purpose of rendering them substantially flashless, smokeless and non-hygroscopic there occur certain disadvantages such as excessive warping, reduction in the specific rate of burning and exudation and segregation of the nitro-aromatic in the form of fine crystals.

I have discovered that these difficulties may be overcome by employing only a sufficient amount of solvent for the nitro-aromatic or nitro-aromatics to carry them completely into solution.

The solvent for the nitro-aromatics may or may not be a colloiding agent for the nitrocellulose. The liquid solution of nitro-aromatics is incorporated or introduced as by pouring or spraying into the nitrocellulose which is agitated in a mechanical mixer or by means of compressed air and the mixture colloided on the hot rolls in a well known manner. The heat of the rolls expels the moisture in the pyrocotton and also the major portion of the solvent used to dissolve the nitro-aromatics. The period during which the colloid is treated in the rolls is considerably reduced, the solvent recovery step in the usual process is eliminated and the drying period curtailed by one-half under that required for nitrocellulose powders of similar webs.

As examples of compound propellants manufactured according to the foregoing method those having the following compositions satisfied all requirements.

		Per cent
(1)	Nitrocellulose (12.6N to 13.5N)	73
	TNT	25
	Diethylphthalate	2
(2)	Nitrocellulose (11 to 12.8N)	74.5±5
	TNT	15 ±5
	Dinitroxylol	10 ±5
	Diphenylamine	.5

In order to render the strips more pliable when dry, powders were prepared by substituting for the diethylphthalate, oils, nitrated oils and non-volatile solvents.

Another powder was made in which mononitroxylol was substituted for the dinitroxylol, a further powder employed a mixture of dinitrobenzol and mononitroxylol and in still another trinitrotoluol alone was utilized. In each instance sufficient acetone was added to carry the nitro-aromatics into solution at ordinary temperatures.

Each of these powders gave satisfactory ballistics in the 75 M/M gun and were substantially smokeless, flashless and non-hygroscopic. The powders dried quickly and the strips were straight, tough and warped only to an extent which produced the maximum ignition effect. The nitrocellulose need not be dehydrated but may be used with as much as 20% moisture which is expelled by the heat of the rolls during the colloiding action.

I claim:

1. A method of colloiding nitro-cellulose which includes incorporating therewith a nitro-aromatic to which has been added only sufficient solvent to carry the nitro-aromatics into solution and then subjecting the mass to pressure and heat.

2. A method of preparing a propellant powder which consists in incorporating with nitrocellulose while agitated trinitrotoluene

to which has been added only sufficient solvent to form a solution, and then subjecting the mass to pressure and heat.

3. A method of preparing a propellant powder which consists in incorporating with nitrocellulose trinitrotoluene to which has been added only sufficient solvent to form a solution, and then subjecting the mass to pressure and heat.

4. A method of preparing a propellant powder which consists in incorporating with nitrocellulose a mixture including a nitroaromatic ingredient to which has been added only sufficient solvent to form a solution, and then subjecting the mass to pressure and heat.

5. A method of preparing a propellant powder which consists in incorporating with nitrocellulose a mixture of nitroaromatics to which has been added only sufficient solvent to form a solution, and then subjecting the mass to pressure and heat.

6. A method of preparing a propellant powder which consists in incorporating with nitrocellulose a nitroaromatic to which has been added only sufficient solvent to form a solution, and then subjecting the mass to pressure and heat.

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