

1

3,314,835

SMOKE GENERATING COMPOSITIONS

George Thomas White and Lewis Robert Rothstein, Asheville, N.C., assignors, by mesne assignments, to Northrop Carolina, Inc., Swannanoa, N.C., a corporation of North Carolina

No Drawing. Filed Apr. 20, 1965, Ser. No. 449,625
4 Claims. (Cl. 149—23)

This invention relates to the dissemination of smoke, dyestuffs, insecticides, herbicides, physiological agents and other similar materials, and more particularly relates to a novel propellant composition for use in disseminating these materials.

Smoke and other similar types of materials have been disseminated in gasiform for many years. A common commercial composition of the propellant for such dissemination is potassium chlorate, sugar or sulfur and a coolant such as sodium bicarbonate. Other compositions have been suggested for this use, such as a mixture of lactose, potassium chlorate, ammonium nitrate and various guanidine derivatives.

It has now been found that a certain class of compounds can be used as the propellant for the dissemination of the above referred to materials in an extremely efficient manner.

The use of novel propellant according to this invention produces a total composition which is much less costly and less hazardous to prepare than those which have been used in the past. Further, these novel propellants have been found to be generally more compatible with the materials to be dispersed than those used in the past.

According to this invention, the novel propellant material consists essentially of one or more nitro-substituted aromatic and/or N-heterocyclic explosive compounds in the form of their metal salts or in combination with metal bases. Specific examples of those explosive compounds adapted to use in this invention include cyclotrimethylene trinitramine, 2,4,6-trinitro resorcinol, trinitrotoluene, cycloetramethylene tetranitramine and trinitrophenol.

Specific examples of metals which are useful in this invention include sodium, potassium, calcium, barium and magnesium. These may be introduced into the composition as a base, such as the hydroxide, acetate, etc., or may have been previously reacted with the cyclic nitro-substituted explosive referred to above to produce the metal salts thereof.

The materials which are carried by the combustion products of the explosive compounds defined above include volatile organic dyestuffs, insecticides, herbicides, physiological agents and similar materials. Exemplary of the volatile organic dyestuffs are auramine, rhodamine, chrysoidine, p-nitraniline red, yellow, and indigo.

Examples of the insecticides which can be used in this invention are 1,1,1-trichloro - 2,2 - bis(p-chlorophenyl) ethane and 1-naphthyl-N-methyl carbamate.

Examples of physiological agents useful in this invention are diphenylaminechloroarsine and orthochlorobenzalmonitrile.

According to this invention, compositions adapted to be used for the dissemination of the various materials set forth above are prepared by admixing the propellant, the material to be carried and, if desired, a lacquer. This mixture is pelletized by standard techniques, such as compression or casting, and the pellet ignited as such. The

2

mixture and pelletizing of the compositions useful in this invention can be carried out at room temperature, or higher, as the case may be, dependent upon the specific materials in the particular formulation desired. Where applicable, a solvent or suspending medium, such as water or lower primary alcohols can be used to facilitate mixing and/or pelletizing.

In the following examples, parts and percentages are by weight unless specifically expressed to the contrary.

Example 1

121.1 parts of trimethylene trinitramine, 121.1 parts of orthochlorobenzalmonitrile and 12.8 parts of nylon (hexamethylenediamine-adipic acid polymer) lacquer were mixed until beads were formed and 45 parts of sodium acetate were admixed at room temperature with the resulting beads. After thorough admixing, the composition was pelletized. Ignition of these pellets produced a gasiform composition containing orthochlorobenzalmonitrile in an active form.

Example 2

The procedure of Example 1 was repeated utilizing in place of the trimethylene trinitramine, trinitrotoluene, in place of the sodium acetate, sodium hydroxide and in place of the orthochlorobenzalmonitrile, a red dye (methylenaminoanthraquinone). Similar compositions were prepared using a combination of sodium acetate and trinitrotoluene; and sodium picrate, trinitrotoluene and red dye. In each case, ignition of the resulting pellets produced a large cloud of red smoke.

Example 3

50 parts of sodium picrate were admixed dry with 50 parts red dye and the resulting mixture pelletized. Ignition of these pellets produced a large volume of red smoke.

Example 4

About 50 parts of sodium picrate were admixed with about 50 parts of a violet dyestuff, a yellow dyestuff, a green dyestuff, methyl benzylate. Ignition of the pellets produced from these mixes gave respectively a violet smoke, a yellow smoke, a green smoke, a white smoke.

Example 5

About 50 parts of sodium picrate were mixed with about 50 parts of 1,1,1-trichloro-2,2-bis(p-chlorophenyl) ethane and 50 parts of 1-naphthyl-N-methyl carbamate, respectively, and pelletized. Ignition of the resulting pellets gave voluminous clouds of smoke presumed to contain a large percentage of finely divided particles of active insecticide in each case.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A composition adapted to be ignited to produce a disseminated gasiform material comprising a carried material selected from the group consisting of volatile dyestuffs, herbicides, insecticides, and physiological agents and a propellant consisting essentially of an explosive cyclic compound selected from the group consisting of cyclotrimethylene trinitramine, 2,4,6-trinitro resorcinol, trinitrotoluene, cycloetramethylene tetranitramine, and trinitrophenol, and a metal base selected from the group

3

consisting of hydroxides and salts of alkali and alkaline earth metals.

2. A composition as claimed in claim 1 wherein said propellant is sodium picrate.

3. A composition as claimed in claim 1 wherein said propellant consists essentially of an alkali or alkaline earth metal salt of 2,4,6-trinitro resorcinol.

4. A composition as claimed in claim 1 wherein said propellant consists essentially of an alkali or alkaline earth metal salt of trinitrophenol.

4**References Cited by the Examiner****UNITED STATES PATENTS**

2,682,461	6/1954	Hutchison	-----	149—92
3,042,580	7/1962	Jacobi et al.	-----	149—92

CARL D. QUARFORTH, *Primary Examiner.*

BENJAMIN R. PADGETT, *Examiner.*

S. J. LECHERT, JR., *Assistant Examiner.*