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ALUMINIZED EXPLOSIVE COMPOSITION

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No Drawing. Filed June 6, 1947, Ser. No. 753,058

8 Claims. (Cl. 52—6)

This invention relates to improvements in explosive compositions and more particularly to an aluminized explosive composition which has a reduced tendency to spew or erupt during manufacture or storage.

It has been observed that aluminized compositions, for example, those of the "Minol" type comprising ammonium nitrate, trinitrotoluene, and aluminum powder, have a tendency to evolve gas during manufacture or storage. This is an undesirable property and is thought to be related to the amount of water present in or accumulated by the aluminized composition during manufacture. In order to reduce this evolution of gas it has been proposed to dry the composition carefully. However, the drying process is difficult and expensive.

In accordance with one embodiment of this invention it has been found that aluminized explosive compositions having a reduced tendency to spew or form gas may be prepared by the addition of certain fatty acids or fatty acid derivatives thereto. One compound that has been found particularly useful in this connection is stearoxyacetic acid. Only a small amount of this material is necessary. Compounds of this character in the explosive compositions of the Minol type, in addition to decreasing the tendency of the mixture to form gas, also increase the pourability of the composition, thus rendering it more easy to handle during the loading of bombs and mines.

The use of the fatty acid derivatives in aluminized explosives in accordance with this invention, is particularly useful when a hydrophilic or desiccating compound such as calcium chloride or magnesium nitrate is also added, in accordance with the teaching of our co-pending patent application, Serial No. 667,732 filed May 6, 1946. The desiccating compound and the fatty acid derivative in the final mixture cooperate to reduce further the tendency of the composition to gas. Additionally, the fatty acid derivative serves to prevent any segregation of the mixture which may occur in the presence of the desiccant.

In accordance with one embodiment of this invention, an improved Minol composition may be prepared containing 3% by weight of magnesium nitrate monohydrate and about .15% of stearoxyacetic acid, the basic Minol composition comprising ammonium nitrate, TNT and aluminum powder in the weight ratio 2:2:1 respectively. It was found that this mixture, although initially containing about .7% water, was as stable as a standard Minol composition which had been previously subjected to a careful drying operation. By the addition of the magnesium compound and the stearoxyacetic acid, satisfactorily stabilized Minol may be obtained even though the amount of water in the original Minol is initially as high as 1.2%.

In accordance with another embodiment of the invention, a Torpex-type explosive having the following composition was prepared:

	Parts
RDX	21
NH ₄ NO ₃	21
Al (finely divided)	18
TNT	40
Mg(NO ₃) ₂ (finely divided monohydrate)	0.5
Stearoxyacetic acid	.05

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where RDX denotes the compound cyclotrimethylene-trinitramine.

Other addition agents which have been found valuable in preventing gassing or spewing of aluminized explosives are stearic, palmitic and oleic acids, although these compounds are not as effective for this purpose as stearoxyacetic acid.

It will be apparent from the above that any desired concentrations of the magnesium compound or other desiccant and the fatty acid derivative may be employed to obtain the desired results. However, the preferred range of these materials is between about 0.2% to 4.0% by weight of the magnesium compound and between about .05% and .50% by weight of the fatty acid derivative, the relative proportions depending upon the amount of water originally present in the aluminized explosive composition.

We claim:

1. A cast composition consisting essentially of about 18 parts by weight of powdered aluminum, about 0.5 part by weight of hydrophilic magnesium nitrate, about 0.05 part by weight of stearoxyacetic acid, and about 82 parts by weight of an explosive containing approximately 40 parts of trinitrotoluene, 21 parts of ammonium nitrate and 21 parts of cyclotrimethylenetrinitramine.

2. A cast composition consisting essentially of about 18 parts by weight of powdered aluminum, about 0.5 part by weight of hydrophilic magnesium nitrate, about 0.05 part by weight of stearoxyacetic acid, and about 82 parts by weight of an explosive containing approximately 40 parts of trinitrotoluene.

3. A cast composition consisting essentially of about 18 parts by weight of powdered aluminum, about 0.2-4.0% by weight of hydrophilic magnesium nitrate, about 0.05 to 0.50% by weight of a member selected from the group consisting of stearoxyacetic acid, stearic acid, palmitic acid and oleic acid, and about 82 parts by weight of an explosive containing approximately 40 parts of trinitrotoluene.

4. A cast composition consisting essentially of about 18 parts by weight of powdered aluminum, about 0.2-4.0% by weight of hydrophilic magnesium nitrate, about 0.05 to 0.50% by weight of stearoxyacetic acid, and about 82 parts by weight of an explosive containing approximately 40 parts of trinitrotoluene.

5. A cast composition consisting essentially of ammonium nitrate, trinitrotoluene and powdered aluminum in the weight ratio 2:2:1, respectively, and containing about 0.2-4.0% by weight of magnesium nitrate and about 0.05-0.50% by weight of a member selected from the group consisting of stearoxyacetic acid, stearic acid, palmitic acid and oleic acid.

6. A cast composition consisting essentially of ammonium nitrate, trinitrotoluene and powdered aluminum in the weight ratio 2:2:1, respectively, and containing about 0.2-4.0% by weight of magnesium nitrate and about 0.05-0.50% by weight of stearoxyacetic acid.

7. A cast composition consisting essentially of ammonium nitrate, trinitrotoluene and powdered aluminum in the weight ratio 2:2:1, respectively, and containing about 3% by weight of magnesium nitrate monohydrate and about 0.15% stearoxyacetic acid.

8. A cast composition consisting essentially of about 18 parts by weight of powdered aluminum, about 0.2-4.0% by weight of a desiccant selected from the group consisting of magnesium nitrate and calcium chloride, about 0.05-0.50% by weight of a member selected from the group consisting of stearoxyacetic acid, stearic acid, palmitic acid, and oleic acid, and about 82 parts by weight

of an explosive containing approximately 40 parts of trinitrotoluene.

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