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PROPELLENT POWDER

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13 Claims. (Cl. 52—7)

This invention relates to the reduction of flash in propellent powder, and more particularly to an improved propellent powder having the characteristics of less smoke or more readily dissipated smoke than flashless powders known heretofore.

In my U. S. Patent 1,838,345, I have disclosed that potassium sulphate when incorporated in or used in connection with propellent powder of the nitrocellulose type produces flashless results. While potassium sulphate has proved to be very efficacious for the suppression of muzzle flash of guns, its use gives rise to the formation of a white cloud or fog of potassium salt of such minute particle size that it settles very slowly.

An object of this invention is to improve upon the flashless results obtained by the use of potassium sulphate in propellent powders. A further object is to reduce to a minimum the formation of a cloud or fog resulting from the use of potassium sulfate in propellent powder charges. Other objects will appear as the description of my invention proceeds.

I have found that these objects can be accomplished and the foregoing objections overcome to a considerable extent by the incorporation in the powder along with the potassium sulphate of a relatively small amount of stannic dioxide, SnO_2. Tin dioxide, as is well known, is an amorphous inert compound of very high melting point, 1127° C. and of relatively high specific gravity.

When tin dioxide is incorporated in the powder along with potassium sulphate, there is obtained a reduction in the amount of smoke which may be due, in part, to the condensing of the finer particles of potassium sulphate, melting at 1069° C., on the larger particles of tin dioxide or to some other reason. In any event, flashless results are obtainable with less objection to the amount and character of the smoke.

Since tin compounds are in themselves valuable for the suppression of muzzle flash but very much less efficient than salts of potassium, the use of tin or tin compounds in conjunction with potassium salts make it possible to decrease to some extent the amount of potassium salt which would ordinarily be required for the suppression of muzzle flash. This decrease in the amount of potassium salt required to suppress muzzle flash also assists in reducing the total amount of smoke producing materials.

While I prefer to use tin dioxide in conjunction with a potassium salt for obtaining flashless results with reduced smoke, other salts of tin, organic as well as inorganic, besides finely divided tin itself, may be used. However, I prefer to use tin dioxide because it is relatively inert and without objectionable action on the other ingredients of the powder. It is also preferred because of the low cost as compared with other tin compounds.

While I prefer to use potassium sulphate largely for the reasons set forth in my U. S. Patent 1,838,345, other potassium salts may be used such as the nitrate, bitartrate, etc. in conjunction with the tin compound. These are known as flash eliminating salts. By the term "inorganic salts", as used herein, I mean to include "bitartrate", as indicated in the foregoing.

In general, the amount of tin dioxide or its equivalent which I prefer to use will not exceed two per cent of the weight of the powder, and the amount of potassium sulphate or its equivalent in terms of potassium will not exceed one per cent. However, the optimum amount of each required to give flashless results with the minimum amount of smoke will vary with the ballistic requirements of different guns and can best be determined by trial. Usually the amount each of tin dioxide and potassium sulphate will not be less than 0.3% nor more than 2.0%.

While the invention is particularly applicable to small arms of all kinds such as revolvers, shotguns, rifles, and like arms, it is applicable similarly to powders for machine guns and ordnance of all calibers.

The invention is applicable to propellent powders of the nitrocellulose and also the nitroglycerine-nitrocellulose type simply by incorporating the finely divided potassium sulphate and tin dioxide in the composition during the mixing operation in order to thoroughly distribute the same throughout the powder.

While I have given specific embodiments of my invention in the foregoing it is to be understood that they are to be taken as illustrating and not limiting except as indicated in the following patent claim.

I claim:

1. The process of suppressing muzzle flash in propellent powder and reducing the amount of smoke or fog produced thereby which comprises incorporating a tin compound with an inorganic muzzle flash eliminating salt.

2. The process of suppressing muzzle flash in propellent powder and reducing the amount of smoke or fog produced thereby which comprises incorporating a mixture of a tin compound and a

salt of potassium with the propellent powder charge.

3. The process of claim 2, in which the tin compound is a tin salt.

4. The process of claim 2, in which the tin compound is a tin oxide.

5. The process of claim 2, in which the tin compound is stannic dioxide.

6. A propellent powder containing uniformly distributed therethru, in a finely subdivided condition, a mixture of a tin compound with a salt of potassium.

7. The propellent powder of claim 6, in which the tin compound is a tin salt.

8. The product of claim 6, in which the tin compound is an oxide of tin.

9. The propellent powder of claim 6, in which the salt of potassium is potassium sulfate.

10. A propellent powder containing uniformly distributed therethru in a finely divided condition a mixture of tin dioxide and potassium sulphate.

11. A propellent powder containing uniformly distributed therethru in a finely divided condition tin and a potassium salt.

12. The product of claim 11, in which the potassium salt is potassium sulfate.

13. A propellent powder containing uniformly distributed therethru in a finely divided condition 0.3 to 2.0% of tin dioxide and 0.3 to 2.0% of potassium sulphate.

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