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FLASHLESS POWDER CHARGE

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This invention relates to a process of obtaining flashless results in guns.

U. S. Patent 1,838,347 was issued to me under date of December 29, 1931, covering the process of suppressing muzzle flash by incorporating in propellant powders a small quantity of an alkali metal salt, such as potassium sulphate, insufficient in itself to eliminate muzzle flash, and subsequently adding to the charge an increment of a flash suppressing salt in quantity sufficient in combination with that contained in the powder to suppress muzzle flash. In lines 57 to 58, page 4, of the aforementioned patent there was disclosed, among other ways of adding the increment of flash suppressing salt, the fact that: "The silk of the powder bag may be weighted with the potassium salt." However, since one of the objects of my invention is to obtain muzzle flash in the daytime, in order to keep the smoke at a minimum, I find it desirable to use silk powder bags which are not impregnated with a flash suppressing salt. I have now found that flashless results can be readily obtained by wrapping around the silk powder bag containing the propellant powder charge, a wrapper of similar silk ignition cloth impregnated with a flash suppressing salt, such as potassium sulphate. In this manner the regular powder charge may be used in daytime firings when flashless results are not desired and flashless results obtained at night and at will by the simple expediency of wrapping around the powder charge one or more layers of silk ignition cloth impregnated with a sufficient quantity of an alkali metal salt to suppress muzzle flash. This gives a very simple, efficient and economical method of obtaining flashless results.

The propellant powder may contain a small quantity of an alkali metal salt such as potassium sulphate, insufficient in itself to eliminate muzzle flash, but which in combination with that contained in the supplemental salt impregnated silk wrapper will be sufficient to suppress muzzle flash.

I have found that the salt impregnated silk wrapper gives such an efficient distribution of the flash suppressing salt that flashless results can be obtained in many guns even when the propellant powder itself contains no flash suppressing salt.

In addition to using the salt impregnated silk to wrap around the outside of the powder charge, I have found that flashless results can be obtained with powder containing no flash suppressing salt by rolling up a piece of salt impregnated

silk and using it as the core of the powder charge in much the same way as core igniters are used in bag loaded powder charges. When this procedure is used the impregnated silk core will preferably contain an insufficient quantity of flash suppressing salt such as potassium sulphate to suppress muzzle flash so that the powder charge can be used for daytime firings without giving flashless results. When flashless results are desired, either in day or night firings, this will be accomplished by wrapping around the powder charge contained in the usual silk bag a salt impregnated silk wrapper containing sufficient flash suppressing salt together with that contained in the salt impregnated silk used as the core of the powder charge to suppress muzzle flash.

While my process is particularly applicable to the larger guns using bag-loaded powder charges, it should be understood that it is also applicable to smaller guns using fixed ammunition by placing in a uniform manner within the powder charge silk ignition cloth impregnated with a sufficient quantity of an alkali metal salt to suppress muzzle flash.

The preparation of the salt impregnated cloth requires no particular skill. For example, silk cartridge or ignition cloth of suitable quality, such as grade E, is dipped in a nearly saturated solution of potassium sulphate several times until the cloth has taken up all of the dipping solution. The cloth is then dried to remove excess moisture. However, the salt will tend to dust away from the cloth unless a suitable binding material is used. Among other binding materials I have found starch to be very suitable. A suitable dipping solution for a piece of cartridge cloth about 20" long by 30" wide is as follows:—

Potassium sulphate.....	3 ounces
Potato starch.....	0.8 grams
Water at 95° C.....	16 ounces

The above dipping solution will impregnate the cloth with 3 ounces of potassium sulphate per 600 square inches of cloth or one-half an ounce of salt per 100 square inches.

The size of the cloth and the amount of impregnating salt may be varied to give more or less than one-half an ounce of salt per 100 square inches of cloth. I have found that impregnating the cloth with too much salt tends to make the cloth too stiff. I have therefore found it more desirable to use a larger piece of impregnated cloth and to maintain the ratio of salt to cloth in the neighborhood of one-half an ounce per 100 square inches. In general, the width of the

cloth, after shrinkage, will be equal to the length of the powder charge and the total length of the cloth, which may be in more than one piece, will be such that the entire length of cloth used will contain the requisite amount of alkali metal salt to suppress muzzle flash. The cloth may or may not be provided with tapes or ribbons to tie the material around the powder bag containing the powder charge.

10 While I prefer to use potassium sulphate as the flash suppressing salt, I may use any other suitable alkali metal salt, such as the chloride, nitrate, oxalate and bitartrate of potassium or the oxalate and bitartrate of sodium. I avoid, however, those salts which are too hygroscopic or
15 which decompose too readily or which might tender the cloth.

While I prefer to use silk ignition cloth of a

grade similar to that used for making powder bags it should be understood that other textile materials such as artificial silk, cotton, and like material, may be impregnated with the flash suppressing salt and used in the manner above described for obtaining flashless results in guns. 5

Since many variations of my invention may be made from the foregoing, I intend to be limited only as indicated in the following patent claims:

1. A propellant powder charge containing a central core of cloth impregnated with a flash suppressing alkali metal salt. 10

2. A propellant powder charge containing a central core of cloth together with an exterior removable wrapper of cloth both impregnated
15 with a flash suppressing alkali metal salt.

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