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AMMUNITION PRIMING MIXTURE

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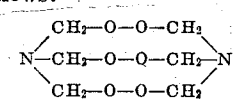
12 Claims. (Cl. 52—3)

This invention relates to priming mixtures for ammunition and particularly to the use of hexamethylenetriperoxydiamine. The purpose of an ammunition priming mixture is to ignite the powder of the ammunition after the primer cavity or receptacle containing the priming mixture is struck by a blow. The function of the priming composition is to deliver intensely hot flaming gases and solids so as to properly ignite the powder, and it is not required nor desirable that the composition detonate or produce high brisant effects. In blasting caps and other forms of detonators, the igniting mixture is fired by a fuse or contact with a resistance heated by the electric current so that the sensitiveness to a blow or friction is not a requirement for such use. Priming mixtures may consist of a combustion initiator, a fuel and an oxidizer. The combustion initiator has the function of starting the reaction between the fuel and oxidizer. In ammunition priming components, the mixture must be sensitive to the blow of the firing pin, and, for this reason, the initiator must be sensitive in this respect, because usually the fuel and oxidizer are not sufficiently responsive to shock to cause the mixture to ignite properly. It is also necessary to use a sensitizer for many of the combustion initiators, the action of the sensitizer being initiated by the blow of the firing pin. The action of the sensitizer in turn is sufficient to set off the combustion initiator. The mixture must also be stable and must not be so sensitive that it will be ignited upon being subjected to a small shock. It must ignite only when the priming mixture container is struck by the blow of the firing pin of a weapon.

Other objects of the invention will be apparent from the following description.

The present invention is directed to the use of hexamethylenetriperoxydiamine in a priming mixture. Hexamethylenetriperoxydiamine may be prepared in different manners and, as an example thereof, the method used in the German patent, No. 263,459 to Girsewald, may be used. In general, it can be prepared by the oxidation of hexamethylenetetramine in weakly acid solution. The action of hydrogen peroxide upon salts of hexamethylenetetramine in concentrated solutions results in the formation of hexamethylenetriperoxydiamine. The yield may be increased by any means which reduces the hydrolysis of hydrogen peroxide, such as organic or inorganic acids or other steady source of low concentration of hydrogen ions. As an example of the latter, citric acid or potassium acid sulphate may be used.

One formula for hexamethylenetriperoxydiamine is as follows:



Hexamethylenetriperoxydiamine by itself is extremely sensitive to a blow or friction, which makes it not entirely satisfactory for use in blasting caps or alone as an explosive or combustion initiator. It is necessary, therefore, that the proper limited amount of hexamethylenetriperoxydiamine be used in a priming composition, as otherwise the composition will be unduly sensitive or will have other serious objections.

One example of the use of hexamethylenetriperoxydiamine, which is the preferred one in a priming composition, is as follows:

Example I

	Per cent
Hexamethylenetriperoxydiamine	5
Lead styphnate	37
Barium nitrate	30
Lead sulphocyanate	8
Glass	20

This composition was found to have the required sensitiveness and yet not be too sensitive.

Another example of the use of hexamethylenetriperoxydiamine is as follows:

Example II

	Per cent
Hexamethylenetriperoxydiamine	5
Lead styphnate	35
Barium nitrate	39
Lead peroxide	5
Antimony sulphide	5
Calcium silicide	11

This mixture was entirely satisfactory and was used in the conventional centerfire cartridges and shot shells.

Another example is:

Example III

	Per cent
Hexamethylenetriperoxydiamine	5
Mercury fulminate	37
Barium nitrate	30
Lead sulphocyanate	8
Glass	20

In the above composition, the normal lead salt

of trinitro-m-cresol may be substituted for the mercury fulminate.

A composition using 10% of hexamethylenetriperoxydiamine and 32% of normal lead styphnate was tried, and it was found that this was not entirely satisfactory because it could not be loaded even when in wet form into the shells due to excessive burning under the conventional spinning punches used to place the primer into the shell. 2% was tried with 40% of normal lead styphnate, which gave a satisfactory mixture. It was also found that as little as .5% of the hexamethylenetriperoxydiamine could be used as a sensitizer in a priming composition and still obtain satisfactory results. A mixture containing hexamethylenetriperoxydiamine as the combustion initiator is not satisfactory because it cannot be successfully loaded into the shells and does not give the proper sensitivity. In the above compositions, lead nitrate may also be used as the oxidizer in place of barium nitrate.

The present invention constitutes the first discovery of the use of hexamethylenetriperoxydiamine as a sensitizer in ammunition priming compositions, and therefore the appended claims are to be broadly construed.

What is claimed is:

1. An ammunition priming mixture comprising an oxidizer, a fuel, a combustion initiator, and hexamethylenetriperoxydiamine as a sensitizer.

2. An ammunition priming mixture containing at least .5% hexamethylenetriperoxydiamine as a sensitizer.

3. An ammunition priming mixture containing between about .5–10% hexamethylenetriperoxydiamine as a sensitizer.

4. An ammunition priming mixture containing hexamethylenetriperoxydiamine and lead styphnate.

5. An ammunition priming mixture containing hexamethylenetriperoxydiamine and mercury fulminate.

6. An ammunition priming mixture containing hexamethylenetriperoxydiamine as a sensitizer and a combustion initiator selected from the group consisting of trinitro-m-cresol, lead styphnate and mercury fulminate.

7. An ammunition priming mixture containing hexamethylenetriperoxydiamine, lead styphnate and barium nitrate.

8. An ammunition priming mixture containing hexamethylenetriperoxydiamine as a sensitizer, mercury fulminate and barium nitrate.

9. An ammunition priming mixture comprising substantially:

	Per cent
Hexamethylenetriperoxydiamine	5
Lead styphnate	37
Barium nitrate	30
Lead sulphocyanate	8
Glass	20

10. An ammunition priming mixture comprising substantially:

	Per cent
Hexamethylenetriperoxydiamine	5
Lead styphnate	35
Barium nitrate	39
Lead peroxide	5
Antimony sulphide	5
Calcium silicide	11

11. An ammunition priming mixture comprising substantially:

	Per cent
Hexamethylenetriperoxydiamine	5
Mercury fulminate	37
Barium nitrate	30
Lead sulphocyanate	8
Glass	20

12. An ammunition priming mixture containing hexamethylenetriperoxydiamine as a sensitizer, and an oxidizer from the group consisting of lead peroxide, lead nitrate and barium nitrate.

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