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PRIMING MIXTURE

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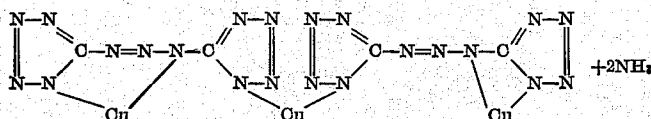
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This invention relates to ammunition priming compositions, and contemplates the use therein of a novel highly sensitive combustion initiator or sensitizer. The present application is a continuation-in-part of the inventor's prior application, Serial No. 569,839, filed October 19, 1931.

It has been the common practice for a great many years to compound ammunition priming compositions from an oxidizer, a fuel substance, and a suitable proportion of mercury fulminate. The mercury fulminate is exploded or decomposed by the blow of the firing pin and the flame and heat thus produced serve to initiate the reaction between the fuel and the oxidizing ingredient, which reaction is productive of a flame of sufficient heat and intensity to ignite the propellant powder. Mercury fulminate, however, is undesirable by reason of its high cost, its poisonous character, and the facility with which it enters into slow reaction with otherwise very desirable oxidizers and fuels, and with mixture container metals. For these reasons, certain priming compositions of current manufacture have wholly or in part replaced mercury fulminate with organic nitro compounds, such as normal lead styphnate. However, mixtures containing this salt may, under certain circumstances, require the addition of a reduced amount of mercury fulminate or a small percentage of a highly sensitive organic nitrogen compound, such as guanyl-nitrosaminoguanyltetrazene.

The present invention comprises the discovery of an organic nitrogen compound which is eminently suited for use as the sensitizing ingredient of priming compositions, particularly non-mercuric compositions. This compound is a derivative of diazo-amino-tetrazole, particularly the copper-ammonium-salt of diazo-amino-tetrazole of the composition $C_4N_{12}Cu_3(NH_3)_2$, and the probable structural formula



This compound may be prepared as follows:

The primary sodium salt of diazo-amino-tetrazole is first prepared by the reaction of a solution of sodium nitrite on a cold solution of

amino-guanidine-nitrate and sodium acetate containing glacial acetic acid. To a neutralized solution of this sodium salt is added an excess of cupric acetate. This causes the precipitation of the copper salt, which is filtered and washed with dilute acetic acid. The addition of ammonia changes this amorphous copper salt to a crystalline copper ammonium salt.

This copper ammonium salt has been found a highly useful sensitizer for priming mixtures generally, and particularly for mixtures of the non-corrosive type. Its use in conjunction with a lead styphnate is illustrated by the following:

Normal or basic lead styphnate.....	30% to 50% preferred 40%
Copper ammonium salt of diazo-amino-tetrazole.....	1% to 5% preferred 2%
Lead nitrate.....	25% to 40% preferred 30%
Lead sulphocyanate...	5% to 15% preferred 8%
Abrasive.....	10% to 20% preferred 20%

The above formulas are merely illustrative. The copper-ammonium-salt of diazo-amino-tetrazole may be used in conjunction with a wide variety of explosives, oxidizers and explosive and in explosive fuels. Prominent among suitable explosives is basic lead styphnate, particularly the recently discovered red crystalline modification thereof, which may partially or entirely replace the normal lead styphnate in the above and other formulas. Other explosives which may be used singly or in various combinations among themselves and with the lead styphnates include diazodinitrophenol, mono-basic and di-basic lead picrate, lead azide, basic lead azide, and lead methylene di-iso-nitroamine. Special mention is made of mercury fulminate, since by its use it becomes possible to eliminate the abrasive, such

as glass, ordinarily required in mixtures not containing abrasive fuels.

Suitable fuels include, in addition to the well-known lead sulphocyanate, antimony sulphide

and calcium silicide, such explosive fuels as the mono-basic and di-basic lead salts of 2-4 and 3-5 dinitro-benzoic acid, the mono-basic and di-basic lead salts of 3-5 dinitro-ortho-cresol, the mono-
 5 basic and di-basic lead salts of 3-nitro-phthalic acid, and the normal and basic lead salts of dinitro-salicylic acid, as well as the powders of metals such as zirconium.

Suitable oxidizers include both normal and
 10 basic lead and other nitrates such as barium nitrate, as well as chromates, permanganates, oxides and peroxides.

Typical mixtures are as follows:

15	Copper-ammonium-salt of diazo-amino-tetrazole	2	2	2	2	2	6	3	3	3
	Lead styphnate	30	30	10	40	30			37	27
	Basic lead styphnate									
	Diazodinitrophenol						33			
20	Basic lead picrate							45		
	Lead peroxide								5	
	Lead nitrate	30	30	30	30	30	30	26		40
	Barium nitrate								39	
	Lead dinitrosalicylate	13								
	Basic lead dinitrobenzoate					8				
	Lead sulphocyanate		8	8	4		8	8		
25	Antimony sulphide								5	14
	Calcium silicide								11	7
	Zirconium				4					
	Abrasive	25	20	20	20	25	20	18		

The use of the copper-ammonium salt of diazo-amino-tetrazole in priming mixtures being broadly
 30 new, the appended claims are to be broadly construed.

What is claimed is:

1. An ammunition priming composition containing a copper-ammonium salt of diazo-amino-tetrazole; and an explosive or explosive fuel
 35 selected from the class consisting of mercury fulminate, lead styphnate, basic lead styphnate, diazodinitrophenol, mono-basic and di-basic lead

picrate, lead azide, basic lead azide, lead methylene di-iso-nitroamine, a lead dinitro-salicylate, a lead dinitro-benzoate, a lead dinitro-ortho-cresylate, and a lead nitro-phthalate.

2. An ammunition priming composition containing a copper-ammonium salt of diazo-amino-tetrazole, and a lead styphnate.

3. An ammunition priming composition containing a copper ammonium salt of diazo-amino-tetrazole, a lead styphnate, and a suitable oxidizer.

4. An ammunition priming composition containing a copper-ammonium salt of diazo-amino-tetrazole, a lead styphnate, lead nitrate, and lead sulphocyanate.

5. An ammunition priming composition comprising substantially

Copper ammonium salt of diazo-amino-tetrazole	1% to 5%	
Normal or basic lead styphnate	30% to 50%	20
Lead nitrate	25% to 40%	
Lead sulphocyanate	5% to 15%	
Abrasive	10% to 20%	

6. An ammunition priming composition comprising substantially

Copper ammonium salt of diazo-amino-tetrazole	2%	
Normal or basic lead styphnate	40%	
Lead nitrate	30%	30
Lead sulphocyanate	8%	
Abrasive	20%	

7. An ammunition priming composition containing a combustion initiator, and a copper ammonium salt of diazo-amino-tetrazole, said
 35 copper ammonium salt being present in an amount not greater than 6%.

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