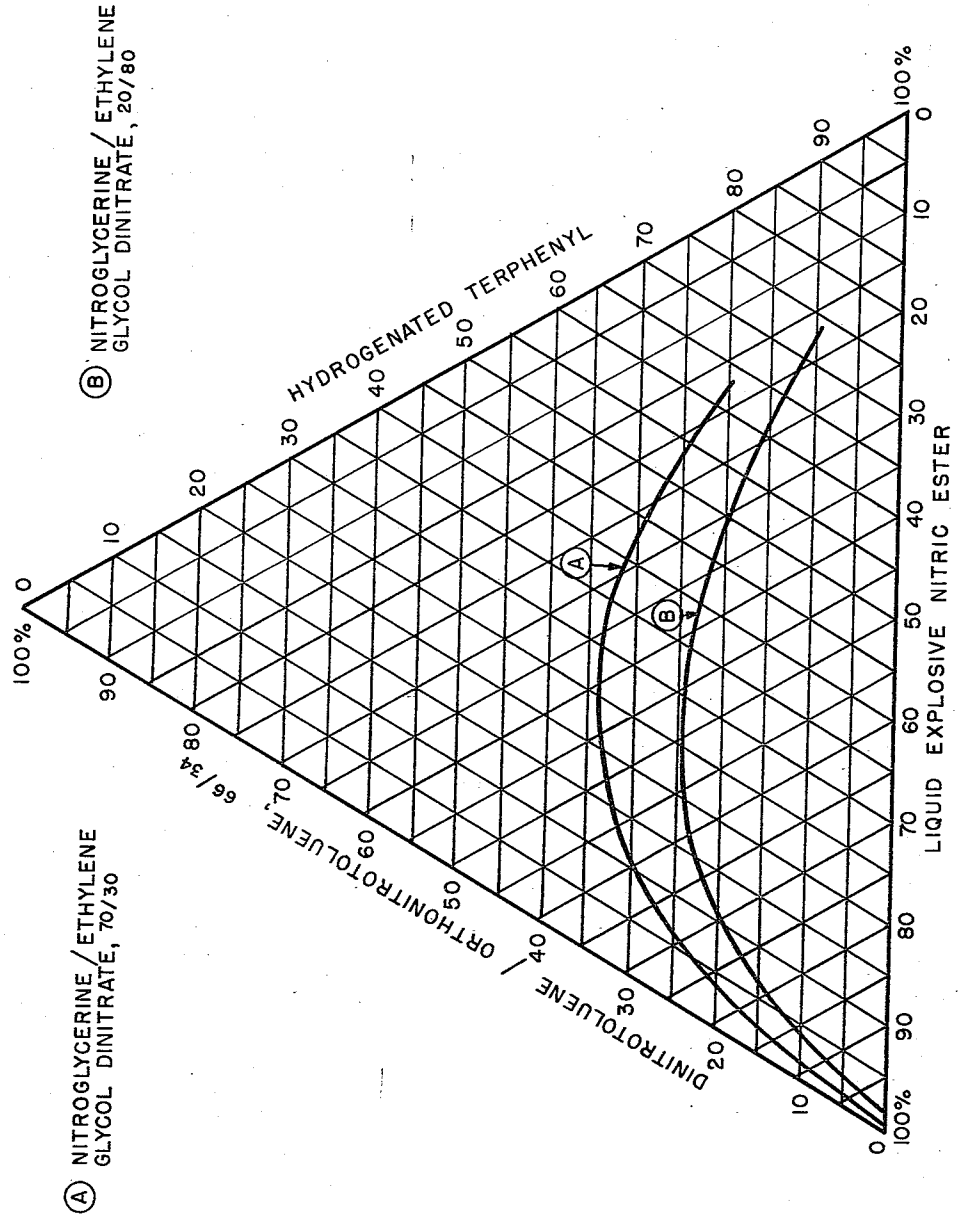
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GELATINOUS EXPLOSIVE COMPOSITIONS

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DELORE L. KOUBA
INVENTOR.

BY Ernest G. Peterson

AGENT.

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GELATINOUS EXPLOSIVE COMPOSITIONS

Delore L. Kouba, Newport, Del., assignor to Hercules Powder Company, Wilmington, Del., a corporation of Delaware

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This invention relates to explosive compositions and more particularly to gelatinous explosive compositions for various blasting purposes.

Since the invention of the gelatin dynamite by Nobel, the popularity of this type of explosive composition has continually increased. At the present time, gelatinous explosives are prepared for almost every purpose and vary in strength from blasting gelatin to semigelatinous dynamites, some types of which are relatively insensitive. Most of the gelatinous explosive compositions owe their gelatinous properties to the presence of a nitrocellulose-explosive oil gel in the composition. Explosive oil is the term employed by the explosives art to characterize the liquid components of an explosive, that is, liquid explosive nitric ester or esters with or without desensitizers and/or plasticizers. Blasting gelatin is almost a homogeneous gel containing an explosive oil comprising explosive liquid nitric ester, usually nitroglycerin or low freezing mixture of nitric esters, and up to about 10% nitrocellulose. In recent years, however, the entire explosives industry has shifted almost entirely from employing straight nitroglycerin in gelatin and semigelatinous dynamites to the use of mixtures of nitroglycerin with ethylene glycol dinitrate, with or without desensitizer, as the explosive oil.

A gelatinous dynamite is essentially a straight dynamite in which an initially prepared gel of explosive oil and nitrocellulose is employed in place of liquid nitroglycerin. Probably the most popular gelatinous dynamite at this time is the semigelatinous type where part of the nitroglycerin is replaced by ammonium nitrate. These compositions may be relatively insensitive as compared to other commercially available explosive compositions, especially when desensitizing ingredients are added. The more insensitive compositions are generally difficultly detonatable or incapable of detonation with conventional commercial blasting caps, such as the #6 cap. The semigelatinous dynamites are popular since they can replace the extra gelatin dynamites, yet are materially lower in price. They find extensive use in mining, quarrying and construction industries and contain from about 10 to about 40% of liquid nitric ester; desensitizing agents such as nitrated aromatic compounds and plasticizers; inorganic oxidizing salts, such as ammonium nitrate or sodium nitrate; a small amount of carbonaceous ingredients such as wood pulp; and a small amount of an antacid such as chalk. All of the solid ingredients of such compositions are known to the art as dope ingredients. In view of the relatively large amount of dope ingredients present in semigelatinous dynamites, it is quite difficult to obtain the desirable composition consistency in terms of plasticity, body (firmness), whiskers, and substantial absence of gel lumps. Whiskers, an indication of the degree of cohesiveness of the composition, are short, fine strings stretching between the particles of the composition when it is extended. The water resistance of this type of explosive varies with the consistency of the composition. Furthermore, the uniformity and consistency of the composition are important factors from the standpoint of packaging, particularly where either squeezing or vibration packing is employed.

In view of the demand for this relatively inexpensive semigelatinous type of explosive composition, there is a constant effort by the art to improve the performance of semigelatinous dynamites and at the same time keep its cost at the lowest possible level. One of the most expensive single items in the composition is the nitrocellulose, the presence of which is essential to form the gel. The consistency and general properties of some presently marketed semigelatins, while satisfactory, leave considerable to be desired. The compositions are generally quite lumpy as a result of improper dispersion of the nitrocellulose in the explosive oil prior to gelatinization. This is usually the result of too rapid an attack by the explosive oil on the nitrocellulose. The rapidity of this attack is increased still further when an increased amount of nitroaromatic modifying compounds are employed in the explosive oil. The art has attempted to overcome this difficulty by improved mixing techniques and by addition of various additive materials, but without any very substantial success.

Now, in accordance with this invention, it has been found possible to prepare gelatinous explosive compositions containing liquid explosive nitric ester—nitrocellulose gels which are characterized by greatly improved consistency. The improvement is particularly outstanding in the popular semigelatinous dynamites and it has been found that semigelatinous dynamites can be prepared which have greatly improved water resistance, whiskers, and plasticity and which contain very few of the highly undesirable gel lumps of the prior art compositions. Moreover, the gelatinous compositions of the invention are characterized by enhanced packagability, especially in the case of the semigelatinous dynamites.

Generally described, the present invention is a gelatinous explosive composition comprising explosive oil containing liquid explosive nitric ester, an amount of a hydrogenated terphenyl not substantially in excess of the amount miscible with the explosive oil and an amount of nitrocellulose sufficient to form a gel with the solution of explosive oil and hydrogenated terphenyl. Since the outstanding function of the hydrogenated terphenyl in the explosive compositions of the invention is to improve the consistency and uniformity of the explosive oil—nitrocellulose gel, the hydrogenated terphenyl may be employed in any type of gelatinous explosive composition in which such gels are present. Thus, if desired, the hydrogenated terphenyl may be employed in blasting gelatins to facilitate the formation of the gel and improve its consistency and may be employed in straight and extra gelatin dynamites for the same purpose. However, the hydrogenated terphenyl finds its greatest utility in semigelatinous dynamites where the presence of uniform gels of the desired consistency is the most critical.

Therefore, the conventional dope ingredients of straight and semigelatinous dynamites may be employed in the conventional manner known to the prior art. Such ingredients may include, without limitation, oxidizing salts such as ammonium nitrate, sodium nitrate, potassium nitrate, sodium chlorate, and sodium perchlorate; various carbonaceous ingredients such as meals, pulps, and starch; and antacids such as chalk. Additional fuels such as sulfur may also be included.

The explosive compositions in accordance with the invention are preferably prepared by initially forming a pregel of the liquid ingredients with nitrocellulose and then mixing in the dope ingredients to produce the final composition. As indicated, the liquid explosive nitric ester may be nitroglycerin, tetranitrodiglycerin, ethylene

glycol dinitrate, nitrated polyhydric alcohols generally and various mixtures thereof. The preferred liquid explosive from the standpoint of desired properties and economy is formed from mixtures of nitroglycerin with ethylene glycol dinitrate. In accordance with conventional practice in preparing the preferred semigelatinous dynamites, nitroaromatic compounds such as mononitrotoluene, dinitrotoluene, trinitrotoluene, nitrophenol, nitronaphthalene, nitrobenzene and nitroxylene are employed in the desired amounts to desensitize the explosive liquid nitric esters and/or to lower the freezing point of the finished mixture. Since it is necessary that the liquid explosive nitric ester—aromatic nitrocompound system be fluid, suitable aromatic compounds or combinations of aromatic nitrocompounds should be chosen to give pourable solutions with the liquid explosive nitric ester or mixture thereof employed.

Preferably the hydrogenated terphenyl will be employed in an amount that is miscible with the explosive oil, that is, the liquid explosive nitric ester or the mixture comprising liquid explosive nitric ester and aromatic nitrocompounds. It has been found that such systems produce the best gels and require the lowest amounts of nitrocellulose to obtain gels of the desired consistency. Lesser amounts may be employed as desired. It is undesirable to employ amounts of hydrogenated terphenyl greatly in excess of the amount miscible with the liquid explosive nitric ester or the mixture of such esters with aromatic nitro bodies and other desired liquid ingredients. When greater amounts than those miscible with the liquid system are employed, small excesses are soaked up by the carbonaceous ingredients of the mixture. If the excess is greater than that which can be absorbed in this manner, leaky compositions will be obtained. Thus, it is desirable not to substantially exceed amounts of hydrogenated terphenyl which are miscible with the liquid system employed. In the accompanying drawing miscibility curves are shown for mixtures (at 70° F.) of hydrogenated terphenyl, dinitrotoluene/orthonitrotoluene, 66/34, and two preferred explosive liquid nitric ester mixtures. The upper curve represents an explosive oil containing 70% nitroglycerin and 30% ethylene glycol dinitrate, while the lower curve represents mixtures containing 20% nitroglycerin and 80% ethylene glycol dinitrate. All compositions above the curve are miscible. As indicated, best results are obtained with compositions either directly on the curve or slightly above. Hydrogenated terphenyl actually has only a limited solubility in pure explosive liquid nitric esters. The degree of solubility varies with the particular ester or mixture of esters. As shown in the drawing, hydrogenated terphenyl is soluble in nitroglycerin/ethylene glycol dinitrate—70/30 to the extent of about 0.8% and in nitroglycerin/ethylene glycol dinitrate—20/80 to the extent of about 2%. Also at 70° F. about 0.28% of hydrogenated terphenyl is soluble in straight nitroglycerin and about 3.36% in straight ethylene glycol dinitrate. As indicated by the drawing, however, the solubility of hydrogenated terphenyl is increased by addition to the explosive liquid nitric ester of nitrated aromatic compounds such as dinitrotoluene, mononitrotoluene and the like.

Gelatinous compositions in accordance with the invention may contain from about 5% to 85% dope ingredients, depending on the particular type of explosive desired. A semigelatinous dynamite in accordance with the invention will probably have the following general formula:

	Percent
Liquid explosive nitric ester	10–40
Aromatic nitrocompound	5–30
Hydrogenated terphenyl	0.1–5
Nitrocellulose	50–80
Inorganic oxidizing salt	50–80
Carbonaceous	1–12
Antacid	0.3–1

Having generally described the invention, the following examples are given for the purpose of more specific illustration of compositions in accordance with the invention.

EXAMPLE 1

Formula:	
Nitroglycerin/ethylene glycol dinitrate—20/80	15.0
Dinitrotoluene/orthonitrotoluene—66/34	8.5
Hydrogenated terphenyl	1.5
Nitrocellulose (Dynamite grade)	0.5
Ammonium nitrate, ctd. 1½%, 1–D	59.0
Sodium nitrate	11.0
Pulp	2.5
Starch	1.5
Chalk	0.5
Pregel (Schrader bowl)	½ min.
Final mix	1 min.
Oxygen balance	—7.8
Type packing, 2 x 8 in. shell	Vibrator
Density, 2 x 8 in. cartridge	1.36
Type packing, 1¼ x 8 in. shell	Hand
Count, 1¼ x 8 in. cartridge	103
Consistency	Very good
Water resistance 2 x 8 in. cartridge, 5 hrs. a 45 p. s. i	90%

EXAMPLE 2

Formula:	
Nitroglycerin/ethylene glycol dinitrate—20/80	15.0
Dinitrotoluene/orthonitrotoluene—66/34	8.5
Hydrogenated terphenyl	1.5
Nitrocellulose (Dynamite grade)	0.5
Ammonium nitrate, ctd. 1½%, 1–D	59.0
Sodium nitrate	11.0
Starch	1.5
Pulp	2.5
Chalk	0.5
Pregel (Schrader bowl)	½ min.
Final Mix	1 min.
Oxygen balance	—7.8
Type packing	Hand
Density, 1¼ x 8 in. cartridge	1.48
Count, 1¼ x 8 in. shell	99
Consistency	Very good
Water resistance, 2 x 8 in. cartridge, 5 hrs. at 45 p. s. i	95%

EXAMPLE 3

Formula:	
Nitroglycerin/ethylene glycol dinitrate—70/30	15.0
Dinitrotoluene/orthonitrotoluene—66/34	7.5
Hydrogenated terphenyl	2.5
Nitrocellulose (Dynamite grade)	0.375
Ammonium nitrate, ctd. 1½%, 1–D	58.75
Sodium nitrate	11.375
Pulp	2.5
Starch	1.5
Chalk	0.5
Pregel (Schrader bowl)	½ min.
Final Mix	1 min.
Oxygen balance	—9.1
Type packing	Vibrator
Density, 2 x 8 in. cartridge	1.45
Count, 1¼ x 8 in. cartridge	98
Consistency	Very good
Water Resistance, 2 x 8 in. cartridge 5 hrs. at 45 p. s. i	90%

EXAMPLE 4

Formula:

Nitroglycerin/ethylene glycol dinitrate—70/30	13.0%
Dinitrotoluene/orthonitrotoluene—66/34	9.5
Hydrogenated terphenyl	2.5
Nitrocellulose (Dynamite grade)	0.375
Ammonium nitrate, cdt. ½%, 1–D	59.125
Sodium nitrate	11.0
Pulp	2.5
Starch	1.5
Chalk	0.5

Pregel (Schrader bowl)	½ min.
Final Mix	1 min.
Oxygen balance	—9.8
Type packing	Vibrator
Density, 2 x 8 in. cartridge	1.40
Consistency	Very good
Water Resistance, 2 x 8 in. cartridge 5 hrs. at 45 p. s. i	85%

Pulp	1.0
Starch	3.0
Chalk	0.5
Pregel (Schrader bowl)	½ min.
Final Mix	1 min.
Oxygen balance	—5.24
Type packing	Hand
Density, 2 x 8 in. cartridge	1.54
Consistency	Very good
Water Resistance, 2 x 8 in. cartridge 5 hrs. at 45 p. s. i	95%

In Table I are recorded data comparing the properties of semigelatinous dynamites prepared in accordance with the invention with similar dynamites in which dibutyl phthalate has been employed in place of the hydrogenated terphenyl. It will be noted that in all cases similar amounts of hydrogenated terphenyl gave improved water resistance and consistency as compared to dibutyl phthalate which has previously been considered as one of the best desensitizing plasticizers for such use. In all cases the formulas were prepared by 2½ min. pregelling of the liquid ingredients with nitrocellulose and a final mixing period of 2½ min.

Table I

Example	Formula	2.5% Desensitizer	Percent NC	Powder Density (av.)	Water Resistance, 2 x 8 in. Cartridge, 45 p. s. i. for 5 hrs. 35–60° F.		Consistency (average)			
					Loss or Gain in Wt., g. (av.)	Apparent Percent Good Powder (av.)	Plasticity	Body	Whiskers	Gel Lumps
6	I (See Note 1)	[1] DBP	0.75	1.51	−104	55	Good	Excellent	Some	Many.
7		[1] DBP	0.50				do	Good	None	Do.
8		[2] HT	0.75	1.51	−83	75	do	Excellent	Very many	None.
9		[2] HT	0.50	1.50	+10	99	do	Very good	Many	Some.
10	II (See Note 2)	DBP	0.50	1.50	−27	80	do	do	Some	Do.
11		DBP	0.43	1.53	−7	81	do	Good	do	Many.
12		HT	1.00	1.50	−17	90	Satisfactory	Excellent	Very many	None.
13		HT	0.75	1.51	+17	99	do	Very good	do	Do.
14		HT	0.50	1.50	−13	85	do	do	Many	Do.
15		HT	0.43	1.50	+15	99	Good	do	do	Do.
16		HT	0.375	1.47	−4	89	Satisfactory	Satisfactory	Some	Do.

[1] DBP—dibutyl phthalate.
[2] HT—hydrogenated terphenyl.

Formulas	(Note 1) I	(Note 2) II
Nitroglycerin/ethylene glycol dinitrate—20/80	13.0	
Nitroglycerin/ethylene glycol dinitrate—70/30		15.0
Dinitrotoluene/orthonitrotoluene—66/34	9.5	8.5
Desensitizer	2.5	1.5
Ammonium nitrate	59.0–58.75	59.125–58.50
Sodium nitrate	11.0	11.0
Starch	2.0	1.5
Pulp	2.0	2.5
Chalk	0.5	0.5
Nitrocellulose	0.50–0.75	0.375–1.00

EXAMPLE 5

Formula:

Nitroglycerin/ethylene glycol dinitrate—30/70	15.0%
Dinitrotoluene/orthonitrotoluene—66/34	8.5
Hydrogenated terphenyl	1.5
Nitrocellulose (Dynamite grade)	0.4
Ammonium nitrate 1–D, ctd. ½%, 1–D	59.1
Sodium nitrate	11.0

In Table II compositions containing dibutyl phthalate are again compared with similar compositions containing hydrogenated terphenyl to illustrate the superiority of the powders of the invention in terms of adaptability to packing by vibration. Higher packing densities and better water resistance were obtained in each case with the composition of the invention. Pregel times of one-half minute and final mixing times of one minute were employed.

Table II

Example	Powder Formula	Desensitizer	Percent NC	Powder Density	Water Resistance, 2 x 8 in. Cartridge, 45 p. s. i. for 5 hrs., 35–60° F.	
					Loss or Gain in wt., g.	Apparent Percent Good Powder
17	I (See Note 1).	[1] DBP	0.50	1.23	−84	5
18		[1] DBP	0.375	1.38	−95	75
19		[2] HT	0.50	1.35	−4	85
20		[2] HT	0.375	1.42	−56	75
21	II (See Note 2).	DBP	0.50	1.28	−144	25
22		DBP	0.375	1.37	−120	50
23		DBP	0.125	1.46	−20	80
24		HT	0.50	1.38	−14	80
25		HT	0.375	1.44	−33	85
26		HT	0.125	1.50	−22	80

[1] DBP—dibutyl phthalate.
[2] HT—hydrogenated terphenyl.

Powder Formulas	(Note 1) I	(Note 2) II
Nitroglycerin, 30% A	15.0	13.0
Dinitrotoluene/orthonitrotoluene—66/34	8.5	9.5
Desensitizer ([1] DBP or [2] HT)	1.5	2.5
Nitrocellulose	0.25–0.5	0.0–0.5
Ammonium nitrate	59.25–59.0	59.5–59.0
Sodium nitrate	11.0	11.0
Starch	1.5	1.5
Pulp	2.5	2.5
Chalk	0.5	0.5
Oxygen Balance:		
DBP	−4.0	−7.7
HT	−5.4	−9.0

Since the undesirable gel lumps are formed in the pregel period when the explosive oil and nitrocellulose are admixed, the improvement wrought by addition of hydrogenated terphenyl can readily be demonstrated prior to addition of the dope ingredients. In Table III, the properties of such gels, with and without addition of hydrogenated terphenyl, are compared. In preparing the gels, wet nitrocellulose (2% dry basis) was added to 30 grams of pure explosive liquid nitric ester, or mixtures of esters (or ester to which the indicated amount of hydrogenated terphenyl had been added) in a 30-ml. beaker with stirring being continued for 5 minutes after addition of the nitrocellulose. After mixing, the gel was allowed to stand at 70–75° F. for one hour. A flow test was then made by tipping the beaker to a horizontal position and measuring the time taken by the gel to reach the lip of the beaker.

Further examples of gelatinous dynamite compositions in accordance with the invention are given in Table IV.

Table IV

	Example 35	Example 36
Formula:		
Nitroglycerin/ethylene glycol dinitrate—20/80.	11.0	11.0.
Dinitrotoluene/orthonitrotoluene—66/34	7.5	7.5.
Hydrogenated Terphenyl	1.5	1.5.
Nitrocellulose	0.5	0.5.
Ammonium nitrate	36.0	63.0.
Sodium nitrate	40.0	13.5.
Starch	3.0	2.5.
Chalk	0.5	0.5.
Pregel (Schrader bowl)	2 min.	2 min.
Final Mix	3 min.	3 min.
Oxygen Balance	+6.6	−0.3.
Type Packing	Vibrator	Vibrator.
Density, 4 x 10 in. Cartridge	1.4	1.4.
Consistency	Very good	Very good.
Water Resistance, 4 x 10 in. Cartridge—24 hrs. at 45 p. s. i.	95%	95%.

In the foregoing examples the water resistance of the various compositions as recorded was tested by loading the compositions in similar paper cartridges of the sizes indicated. These cartridges were placed in an autoclave for the indicated periods under a water pressure of 45 p. s. i. After removal from the autoclave, the cartridges were cut lengthwise and the powder examined for the per cent remaining which was not leached or wet. Each cartridge, after opening, was drained for a few seconds, then weighed in order to determine loss in weight.

In order to test for consistency in Examples 1–26, the powders were allowed to stand several days under outdoor storage conditions. The powders were then allowed to come to room temperature and examined for plasticity, body, whiskers, and gel lumps.

The hydrogenated terphenyl in accordance with the invention may be obtained from any desired source. Except in small quantities it is difficult, if not impossible, to obtain a single pure hydrogenated isomer. However, hydrogenated mixtures of the various terphenyl isomers are available commercially and such a mixture has been employed in illustrating the invention. The particular mixture employed is marketed under the trade name "HB–40" oil which is a practically colorless, oily liquid having a faint and pleasant odor, and the following characteristics:

Distillation range	340–396° C.
Freezing point	0 to −5° C. (supercools).
Specific gravity	1.004 at $\frac{25}{15.6}$ ° C.
Refractive index	1.5675±0.0075 at 25° C.
Heat of combustion	10,200 cal./g. (2).
Flash point	174° C. ± 6.

Table III

Example	Explosive Ester	Percent Hydrogenated Terphenyl	Mixing (5 min.)			Time, minutes	Appearance of Gel After Two Days of Spreading Out
			Initial Gel	Medium Gel	Stiff Gel		
27	NG		No initial gel in 5 min.			<1	Smooth thin gel—medium hard lumps of nitrocellulose.
28	NG	0.28	No initial gel in 5 min.			<1	Smooth thin gel—nitrocellulose lumps much smaller and better consistency than in Ex. 27.
29	NG/EGDN—70/30		3 min.	No medium gel in 5 min.		>90	Stiff gel—quite a few large lumps.
30	NG/EGDN—70/30	0.93	3 min.	No medium gel in 5 min.		40	Stiff gel—few small lumps—better consistency than Ex. 29.
31	NG/EGDN—20/80		1 min.	2 min.	4 min.	>90	Smooth gel—several large soft lumps.
32	NG/EGDN—20/80	1.47	1 min.	2 min.	4 min.	>90	Smooth gel—several medium lumps better consistency than Ex. 31.
33	EGDN		½ min.	1½ min.	3 min.	>90	Smooth gel—numerous large soft lumps.
34	EGDN	3.36	½ min.	1½ min.	3 min.	>90	Smooth gel—no lumps—excellent consistency.

NG—nitroglycerin.
EGDN—ethylene glycol dinitrate.

Vapor pressure—

Temperature, ° C.	mm. Hg
150	2
200	15
250	69

Evaporation Loss at 100° C. for 6 hours..... 0.0337.

"HB–40" is prepared by hydrogenating to 40% by weight the normally solid hydrocarbon boiling above 350° C. at 760 mm. pressure which is formed in the synthesis of biphenyl by pyrolysis of benzene at elevated temperatures. The process for preparing this product is disclosed in U. S. 2,364,719 to Jenkins.

As will be seen from the foregoing examples, the semigelatinous dynamites employed to illustrate the invention have several outstanding advantages over currently employed semigelatins. Better consistencies and water resistance have been obtained with smaller amounts of nitrocellulose, thus allowing the production of a superior product at a lower cost. The undesirable lumps of currently produced semigelatinous dynamites have been greatly reduced or eliminated by the presence of hydrogenated terphenyl in the gel. While it is not desired to be bound by any particular theory of operation, it is believed that this result is due to a controlled deceleration of attack of the explosive oil on the nitrocellulose, thus allowing thorough dispersion of the nitrocellulose through the explosive oil mixture before substantial gelation occurs. However, it will be seen that this advantage is obtained without any way slowing down the process of production since conventional pregel and final mix times have been employed. Additionally, the semigelatinous compositions containing hydrogenated terphenyl, despite their being gelatins, will readily pack on a vibrator, thus greatly facilitating the packaging of such compositions. This packing is achieved without undesirable sacrifice in density, water resistance, or sensitivity. Furthermore, straight gelatin and extra gelatin dynamites containing hydrogenated terphenyl may be prepared which are readily extrudable in a gelatin squeezer.

It is apparent that many variations may be made in gelatinous explosive compositions in accordance with the invention without departure from its scope. Although the invention has been principally illustrated with the highly popular semigelatinous dynamite compositions, it is to be understood that these illustrative compositions are not limiting and that the invention is equally operable in any other gelatinous dynamite containing liquid explosive nitric ester-nitrocellulose gels. It is therefore intended that the scope of the invention shall be limited only by the scope of the appended claims.

What I claim and desire to protect by Letters Patent is:

1. A gelatinous explosive composition comprising a liquid explosive component containing in major proportion at least one liquid explosive nitric ester, an amount of a hydrogenated terphenyl not substantially in excess of the amount miscible with the said liquid explosive component, and an amount of nitrocellulose sufficient to form a gel with the resulting solution of liquid explosive and hydrogenated terphenyl.

2. A gelatinous dynamite composition comprising a liquid explosive component containing at least one liquid explosive nitric ester in major proportion and an aromatic nitrocompound as a desensitizer for the said liquid explosive nitric ester, dope ingredients, a hydrogenated terphenyl not substantially in excess of that amount miscible with said liquid explosive component, and an amount of nitrocellulose sufficient to form a gel with the resulting solution of the said liquid explosive component and hydrogenated terphenyl.

3. A gelatinous dynamite composition comprising from about 5 to about 85% dope ingredients, a liquid explosive component containing liquid explosive nitric ester in major proportion and an aromatic nitrocompound as a desensitizer for the liquid explosive nitric ester, an amount of a hydrogenated terphenyl not substantially in excess of the amount miscible with the said liquid explosive component, and an amount of nitrocellulose sufficient to form a gel with the resulting solution of liquid explosive and hydrogenated terphenyl.

4. A gelatinous dynamite composition in accordance with claim 3 in which the dope ingredients comprise inorganic oxidizing salt, carbonaceous ingredients, and an antacid.

5. A gelatinous explosive composition comprising a liquid explosive component containing, based on said composition, from about 10 to about 40% liquid explosive nitric ester and from about 5 to about 30% of aromatic nitrocompound, an amount of hydrogenated terphenyl not substantially in excess of the amount miscible with the said liquid explosive component, an amount of nitrocellulose sufficient to form a gel with the said explosive component and hydrogenated terphenyl, from about 50 to about 80% of inorganic oxidizing salt, from about 1 to about 12% carbonaceous material, and about 1% chalk.

6. A gelatinous explosive composition comprising from about 10 to about 40% liquid explosive nitric ester, from about 0 to about 30% of aromatic nitrocompound, from about 0.1 to about 5% of hydrogenated terphenyl, from about 0.20 to 2% nitrocellulose, from about 50 to about 80% of inorganic oxidizing salt, from about 1 to about 12% carbonaceous material, and about 1% chalk.

7. A composition of claim 1 wherein said liquid explosive component is a mixture of nitroglycerin with ethylene glycol dinitrate.

8. A composition of claim 2 wherein said aromatic nitro compound is at least one nitrotoluene.

9. A composition of claim 8 wherein said aromatic nitro compound is a dinitrotoluene, in major proportion, and orthonitrotoluene.

10. In the preparation of a gelatinous explosive composition comprising a liquid explosive component containing a liquid nitric ester in major proportion, and wherein nitrocellulose is added to the said ester-containing liquid component to form a gel, the improvement comprising admixing at least a portion of the amount of a hydrogenated terphenyl described hereinafter with said nitric ester and then adding said nitrocellulose to the resulting admixture to form said gel, the total amount of said hydrogenated terphenyl being not substantially in excess of that miscible with said liquid explosive component, whereby a gel of substantially lump-free consistency is formed.

11. The improvement of claim 10 wherein dope ingredients are mixed with the gel thus formed.

12. The improvement of claim 10 wherein said nitric ester is a mixture of nitroglycerin and ethylene glycol dinitrate.

13. The improvement of claim 10 wherein a liquid aromatic nitro compound is employed in said liquid explosive component as a desensitizer for the said ester.

14. The improvement of claim 13 wherein said aromatic nitro compound is at least one nitrotoluene.

15. The improvement of claim 14 wherein said nitrotoluene is dinitrotoluene, in major proportion, and orthonitrotoluene.

No references cited.