

UNITED STATES PATENT OFFICE.

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EXPLOSIVE.

995,187. Specification of Letters Patent. Patented June 13, 1911.

No Drawing. Application filed November 15, 1910. Serial No. 592,535.

To all whom it may concern:

Be it known that we, JOSEPH SAYERS, WALTER ATKINSON WILSON, and JAMES THORBURN, subjects of the King of the United Kingdom of Great Britain and Ireland, and residing at Ardeer, Ayrshire, Scotland, have invented a certain new and useful Improvement in Explosives, of which the following is a specification.

It is well known that the freezing point of nitro-glycerin can be lowered within certain limits by dissolving therein one or more nitro-bodies such, for instance, as di-nitro-toluol, tri-nitro-toluol, &c., and various attempts have already been made to utilize this property in the production of explosives which will not be liable to freeze at low temperatures. As appears from patent literature, it has also been proposed, in preparing various explosive mixtures, to incorporate with these ingredients suitable oxidizing agents and in certain cases also suitable combustibles of which wood-meal is one of those recommended.

Starting from this standpoint, we have aimed at incorporating in a blasting explosive a sufficiently large proportion of nitro-bodies soluble in nitro-glycerin to secure the desired result without rendering the explosive too insensible to detonation, and have adjusted the proportions of the other ingredients present, particularly of the oxidizing agent, *e. g.*, perchlorate of potash, and of the combustible, *e. g.*, wood-meal, with the result that we have succeeded in producing compositions of high explosive power which remains substantially undiminished at low temperatures.

The said compositions consist of nitro-glycerin having dissolved therein a mixture of nitro-bodies, viz:— mono-nitro-naphthalene, di-nitro-toluol, tri-nitro-toluol, soluble in large proportions, constituting a solution which remains unfrozen at low temperatures; the solution being gelatinized or not in known manner by addition of nitro-cotton or nitro-starch, and the solution or jelly being mixed with an oxidizing agent such as perchlorate of potassium or of sodium or of ammonium or a mixture of such perchlorate, or in lieu of or as well as the perchlorate or perchlorates, one or more of the corresponding nitrates, or chlorates, and with a combustible which is also absorbent such for instance as wood-meal, flour, bran or the like, with or without the addition of graph-

ite, magnesium carbonate, chalk or the like. The proportions of the aforesaid ingredients which we have found to be most suitable are as follows:—

(1.)		
Nitro-glycerin	23.83	
Nitro-cotton	1.60	
Mono-nitro-naphthalene	1.09	
Di-nitro-toluol	3.27	65
Tri-nitro-toluol	5.83	
Potassium perchlorate	52.35	
Wood-meal (dry)	12.00	
	99.97	70

(2.)		
Nitro-glycerin	18.89	
Nitro-cotton	1.27	
Mono-nitro-naphthalene	0.87	
Di-nitro-toluol	2.60	75
Tri-nitro-toluol	4.62	
Potassium perchlorate	58.75	
Wood-meal	9.51	
Magnesium carbonate	0.50	
Graphite	2.99	80
	100.00	

(3.)		
Nitro-glycerin	17.20	
Nitro-cotton	1.34	85
Mono-nitro-naphthalene	1.20	
Di-nitro-toluol	3.59	
Tri-nitro-toluol	6.37	
Potassium chlorate	60.30	
Wood-meal	10.00	90
	100.00	

(4.)		
Nitro-glycerin	16.00	
Nitro-cotton	1.24	95
Mono-nitro-naphthalene	1.10	
Di-nitro-toluol	3.34	
Tri-nitro-toluol	5.92	
Ammonium nitrate	69.90	
Wood-meal	2.50	100
	100.00	

(5.)		
Nitro-glycerin	15.80	
Mono-nitro-naphthalene	1.10	105
Di-nitro-toluol	3.80	
Tri-nitro-toluol	5.80	
Potassium nitrate	41.00	
Wood-meal	32.00	
Chalk	0.50	110
	100.00	

The proportions given in the above examples should not be materially departed from, as the success obtained with our explosives is consequential upon the selection of the proper proportions.

To prevent misunderstanding it may be explained that the proportions of all the ingredients enumerated in the various examples given are applicable only for the particular example, *e. g.*, the proportion of wood-meal in example (4), viz:—2.50,—which approximates to the proportion of wood-meal used in known explosives of a different character—holds good only for that particular example.

We do not herein claim the proportions of the compositions set out under the headings (2), (3), (4) and (5) as the same form respectively the subject matter of applications, Serial Nos. 623,446, 623,447, 623,448, and 623,449, filed April 26, 1911.

Having now described our invention, what we claim and desire to secure by Letters Patent of the United States is:—

An explosive compound comprising nitro-glycerin 23.83 per cent., nitro cotton 1.60 per cent., mono-nitro-naphthalene 1.09 per cent., di-nitro-toluol 3.27 per cent., tri-nitro-toluol 5.83 per cent., potassium perchlorate 52.35 per cent. and wood-meal (dry) 12.00 per cent.

In testimony whereof we have signed our names to this specification in the presence of subscribing witnesses.

JOS. SAYERS:

WALTER ATKINSON WILSON.

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Witnesses:

MATHEW CLOND,

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