

# UNITED STATES PATENT OFFICE.

OSWALD SILBERRAD, OF BLACKHEATH, ENGLAND.

## EXPLOSIVE.

No. 849,925.

Specification of Letters Patent.

Patented April 9, 1907.

Application filed September 27, 1906. Serial No. 336,460.

*To all whom it may concern:*

Be it known that I, OSWALD SILBERRAD, a subject of the King of Great Britain and Ireland, residing at 51 Shooter's Hill road, Blackheath, in the county of Kent, England, have invented certain new and useful Improvements in Explosives, of which the following is a specification.

My invention relates to nitroglycerin-nitrocellulose explosives for blasting purposes, and is especially applicable to explosives which are not sufficiently rapid in their detonation to be used with small detonators.

The object of the invention is to add to such explosives ingredients which will increase their quickness of detonation and render it possible to use the explosives with small detonators.

The invention consists in adding to a nitroglycerin-nitrocellulose explosive about five per cent. of a mixture containing ammonium perchlorate seventy-eight parts and sulfur twenty-two parts. In preparing the explosives according to my invention the nitroglycerin-nitrocellulose jelly is incorporated with the other constituents usually added for the purpose of moderating the explosive properties, and the mixture of sulfur and ammonium perchlorate is at the same time incorporated. The proportion of the mixture used will depend on the explosive properties of the nitroglycerin-nitrocellulose powder to which it is added.

I find that with explosives whose properties are suitable for blasting practically all qualities of rock about five per cent. of the sulfur and perchlorate mixture is a convenient quantity to use. With the explosive so manufactured I find that detonators containing about .5 gram of fulminate are sufficient to give excellent results.

As an example of an explosive according to my invention the following composition may be given:

(a)	Nitroglycerin .....	495 parts	
	Soluble nitrocellulose..	23 parts	
	Pitch .....	6 parts	
	Sodium nitrate.....	52 parts	95%
(b)	Sodium nitrate.....	140 parts	
	Woodmeal.....	60 parts	50
(c)	Sodium nitrate.....	352 parts	
	Pitch .....	48 parts	
(d)	Ammonium perchlorate	78 parts	5%
	Sulfur .....	22 parts	

In preparing the explosive according to my invention the nitroglycerin jelly is preferably prepared by standing nitroglycerin in troughs until it is heated to about 120° Fahrenheit. The nitrocellulose is then added, the mixture being continually stirred until thoroughly mixed, while the pitch and sodium nitrate required to make up the mixture *a* are stirred in at the same time. The mixtures *b*, *c*, and *d* are then separately added to the jelly and the whole incorporated in any known form of incorporating-machine.

The composition of explosive given above is one suitable for blasting rocks of medium toughness, and it will be found that the explosive can be detonated successfully by about 0.5 gram of fulminate.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

A nitroglycerin-nitrocellulose explosive, containing about five per cent. of a mixture of ammonium perchlorate seventy-eight parts, and sulfur twenty-two parts, as and for the purposes described.

In testimony whereof I affix my signature in presence of two witnesses.

OSWALD SILBERRAD.

Witnesses:

JOHN W. ADAMS,

BERTRAM H. MATTHEWS.