

UNITED STATES PATENT OFFICE.

JOSEPH W. WILLARD, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN EXPLOSIVE COMPOUNDS.

Specification forming part of Letters Patent No. 157,054, dated November 17, 1874; application filed July 9, 1874.

To all whom it may concern:

Be it known that I, JOSEPH W. WILLARD, of San Francisco city and county, State of California, have invented an Improved Explosive Compound; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention without further invention or experiment.

My invention relates to an improved compound to be used as an explosive for blasting and other purposes; and it consists in a mixture of nitro-glycerine with other elements, forming a compound having absorbing explosive and neutralizing qualities, as hereinafter more fully described and set forth.

Heretofore, in the use of nitro-glycerine, in order to avoid premature explosion, and other dangerous results, it has been mixed with certain absorbents which produce, to a limited extent, beneficial effects. These have all been objectionable in one or more features.

If the absorbent used be infusorial earth, or any of its equivalents, the absorbent has no explosive qualities, and the earth is left as a residuum; and experiment shows that some of the globules of the glycerine retained in the cells of the absorbent are not exploded, but remain intact, to the great danger of the miner.

Another objection to the use of nitro-glycerine compounds has been the generation of noxious vapors, from incomplete combustion, when the blast is exploded, which seriously affects the miners, and retards them in working.

My compound not only overcomes the difficulties above stated, but at the same time avoids the generation of gases deleterious to workmen, and leaves in the atmosphere harmless vapors.

In order that those skilled in the art may make and use my invention, I will proceed to describe the manner in which I have carried it out.

In order to make explosives under my invention of different grades, I mix the following ingredients as named, and in about the proportions specified:

GRADE 1.

	Parts.
Carbonate of magnesia.....	20.85
Nitrate of potash.....	2.10
Chlorate of potash.....	1.05
White sugar.....	1.00
Nitro-glycerine.....	75.00
	100.00

GRADE 2.

	Parts.
Carbonate of magnesia.....	10.00
Nitrate of potash.....	31.00
Chlorate of potash.....	3.34
Sugar.....	15.66
Nitro-glycerine.....	40.00
	100.00

The carbonate of magnesia, besides neutralizing the free acids in the nitro-glycerine, is converted, in part, into nitrate of magnesia, which is also explosive.

In order to make a thorough mixture, and insure a perfect explosion, all the dry materials must be reduced to a fine powder before incorporating them with the nitro-glycerine.

In these compositions of matter I succeed in combining with nitro-glycerine a combination of ingredients which absorbs the nitro-glycerine, neutralizes the free acids, prevents the formation of noxious gases, and in itself is an explosive, thus producing a new composition having an aggregation of new and useful properties and results hitherto unknown.

I do not claim, broadly, the combination of nitro-glycerine with pulverized solids, so as to absorb it, and render it more safe and efficient; but

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

An explosive compound composed of carbonate of magnesia, nitrate of potash, chlorate of potash, sugar, and nitro-glycerine, substantially in the manner specified.

In witness whereof I have hereunto set my hand and seal.

Witnesses: J. W. WILLARD. [L. S.]

JNO. L. BOONE,

J. M. RICHARDSON.