

UNITED STATES PATENT OFFICE.

PRUDENCIO CASTELLANOS, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN EXPLOSIVE COMPOUNDS.

Specification forming part of Letters Patent No. 164,264, dated June 8, 1875; application filed October 27, 1874.

CASE 4.

To all whom it may concern:

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

My invention relates to certain improvements in the manufacture of explosive compounds, in which nitro-glycerine is employed, in combination with some absorbent material; and it consists in the solidifying of the nitro-glycerine by mixing it with one or more artificial salts having the property of being incombustible and insoluble in nitro-glycerine, and also in mixing it with other combustible or explosive salts which are soluble in nitro-glycerine, the effect of the first being to produce a compound with no tendency to form explosive solutions in the nitro-glycerine, nor masses, which will hinder the complete explosion at the proper time by reason of extraneous matter, and this will be evident from the fact of the salt being artificially prepared, and consequently homogeneous. The powder will thus never become more dangerous by a lapse of time after its manufacture, and can always be transported safely.

The effect of the peculiar explosive and soluble salts which I employ is to give a more forcible explosion, and particularly a more sustained and continuous combustion of the mass, which will result in the complete explosion of the whole charge; and a further advantage, that I am enabled to dispense with the dangerous fulminating-capsule now employed to explode this class of powders, and substitute for it a comparatively mild and positively harmless exploder, which can only be discharged by ignition.

This exploder is fully described in another application for Letters Patent made in this connection.

In the compounds now manufactured from nitro-glycerine, in which an inferior earth forms the absorbent, these compounds are lia-

ble to deterioration in two ways, for the reason that the absorbent is not entirely homogeneous.

The first deterioration arises from the fact that some of the component parts of this earth will dissolve in the nitro-glycerine, and thus form in the midst of the mass an explosive compound as liable to be decomposed or exploded as the nitro-glycerine itself, and it would thus form a detonator having the same effect upon the whole mass, if accidentally discharged, as the fulminating-capsule which is used when it is desired to explode a charge. This renders the compound more or less unsafe, and its composition always uncertain.

The other form of deterioration causes a difficulty in exploding the entire mass of a charge; and this arises from a certain amount of foreign matter contained within the absorbent, which interferes considerably with the percussive and inflammatory effect of the detonator, thus causing a portion of the charge to be thrown out unexploded, and reducing the efficiency proportionately.

My powder is, on the contrary, composed of an incombustible salt, formed artificially, with the object of obtaining a perfectly homogeneous composition, with which the nitro-glycerine is mixed, and thus rendered inert and safe until it is desired to explode it, and with this composition is also mixed an inflammable and explosive salt, which is soluble in nitro-glycerine. This latter salt, although explosive when fired, is not easily susceptible of such effect under ordinary circumstances, and does not make the nitro-glycerine of the compound dangerous by reason of its solubility. Its office is to so permeate the mass and occupy every part of it that, when the charge is ignited by the detonator, a complete and sustained combustion of the whole mass will take place, resulting in its total explosion, thus obtaining the full benefit of it.

The insoluble and incombustible salts which I have thus far tried and found useful for the purpose are silicates of zinc, magnesia, and lime, the oxalate of lime, the carbonate of zinc, and some others which are similar in their nature, and all of these are prepared artificially

by the processes proper to them, with a view to making them chemically pure.

The soluble and explosive salts which I employ are all the mineral and organic picrates.

I have found the addition of certain proportions of nitrate of potash, chlorate of potash, carbon, sulphur, and other substances, to be useful, although not absolutely essential, taking care not to use sulphur and chlorate of potash in any one compound.

The following is the composition of some of my powders, the proportion of nitro-glycerine being varied, and in some instances it is less than would be effective in any of the present nitro-glycerine compounds: Nitro-glycerine, forty parts; nitrate of potash or soda, twenty-five parts; a picrate, ten parts; sulphur, five parts; a salt insoluble and incombustible in nitro-glycerine, as described, ten parts; carbon, ten parts. Total, one hundred parts.

It will be seen that the proportions can be varied as occasion may require, and that obvious substitutes may be had for portions of the compound, and the compound may also be limited to the three elements which I make the basis of the powder, as at first described.

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

An explosive compound or powder consisting of nitro-glycerine, nitrate of potash or soda, picrate, sulphur, a salt insoluble and incombustible in nitro-glycerine, and carbon, in about the proportions herein described.

In witness whereof I hereunto set my hand and seal.

PRUDENCIO CASTELLANOS. [L. S.]

Witnesses:

GEO. H. STRONG,

C. M. RICHARDSON.