

# UNITED STATES PATENT OFFICE

PRUDENCIO CASTELLANOS, OF SAN FRANCISCO, CALIFORNIA.

## IMPROVEMENT IN EXPLOSIVE COMPOUNDS.

Specification forming part of Letters Patent No. 164,263, dated June 8, 1875; application filed April 8, 1875.

*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 Explosive Compound; and I do hereby declare the following description is 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 certain improvements in that class of explosive compounds which have nitro-glycerine as a base; and it consists, first, in the combination, with this base, of a substance which will reduce the point of congelation of the nitro-glycerine somewhat. It also consists in the addition of some fibrous material, together with a certain proportion of earthy matter or certain salts, whereby the compound is rendered perfectly harmless and non-explosive under all ordinary circumstances. It can, however, be efficiently used under the proper condition for blasting and other purposes, and, from its composition, it can be exploded equally well whether congealed or not.

To more fully explain my invention I will proceed to describe the first part of the operation, which consists in mixing with the nitro-glycerine from four to ten per cent. of nitro-benzole or other analogous liquid, which must be soluble in it. This nitro-benzole or nitro-benzine must be completely free from acid, but it is not necessary that it be otherwise pure. The addition of this substance gives the nitro-glycerine the property of being easily inflamed, and the compound will burn rapidly, but without explosion; whereas the nitro-glycerine, in its usual form, is ignited with difficulty, and, if kept in contact with the flame, will have its temperature gradually elevated until it reaches the point of decomposition and consequent explosion. The new compound is, however, equally efficient as an explosive when ignited by means of an explosive capsule or by concussion, unless too much of the nitro-benzole be added. If the proportion amounts to as much as twenty or twenty-five per cent. nothing will explode it.

It is well known that nitro-glycerine congeals at a comparatively high temperature, and when in this condition the powder made with it cannot be used. The effect of the ni-

tro-benzole is to reduce the point of congelation somewhat.

When the mixture is prepared I proceed to the second part of the operation, which consists in taking a fibrous substance (as pulu, cotton, hemp, or any kind of old rags) and reducing it to small filaments by means of cutting instruments.

The third part of my process consists in mixing with the mass certain pulverized substances, either earthy or otherwise, which have a tendency to separate the fibers, and thus prevent the formation of lumps, which would render it impossible to charge the cartridges or drill-holes. These substances may be either earthy or partially chemical, as the carbonates of lime, baryta, magnesia, &c., or such substances as nitrate of soda, potash, baryta, or lead, or the chlorates may be used, in which case they will assist the explosion when it takes place.

The effect of the earthy carbonates is to neutralize any free acid which may be contained in the nitro-glycerine, and thus prevent spontaneous decomposition and consequent loss of force.

The fourth and last part of my process consists in mixing the nitro-glycerine (already made unexplosive by means of the nitro-benzole) with the fibrous substance prepared as already explained.

The principal advantages that the use of the fibrous substance has are the following: First, to still further protect it from explosion by contact with fire, as the fibrous substance will burn rapidly, and in consuming it never reaches a temperature sufficiently high to explode the nitro-glycerine; second, it gives the powder the property of exploding when congealed, because the fibers of the fibrous substance get intermixed, and form with the powder a solid elastic mass that has a great resistance against being segregated, and it is on this account that the powder is made to explode by means of concussion. In this it is different from the dynamite, because this, when congealed, breaks into pieces when submitted to a violent concussion, and consequently does not explode.

In order to explode my compound it must be placed in the blast-hole, either loosely or preferably within a paper cartridge, and then subjected to a sudden and violent concussion.

The proportions of my powder may be considerably varied, with a resulting variation in its strength; but the following formula is given as an illustration of the proportions:

Nitro-glycerine containing four or five parts of nitro-benzole .....	.80
Fibrous substance .....	.10
Carbonate of magnesia or zinc .....	.10
	—
	100

If the chlorates, nitrates, picrates, or picramates be added the proportions will be more or less varied from the above, as in the following:

Nitro-glycerine, containing eight per cent. of nitro-benzole .....	.50
Fibrous substance .....	.07
Nitrate of potash .....	.33
Picramate of potash .....	.05
Carbonate of zinc .....	.05
	—
	100

My explosive is rendered more effective in cracking the rock to greater depths, because it is crowded forcibly to the bottom of the hole at the moment of the explosion by the blow of the projectile from the pistol.

I am aware that nitro-glycerine and nitro-benzole have been used in explosive compounds, as shown in patent to C. W. Volney, March 5, 1872; but this is not my invention.

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

An explosive compound, consisting of nitro-glycerine, nitro-benzole or benzine, fibrous material, and pulverized earth, substantially as and for the purpose set forth.

PRUDENCIO CASTELLANOS.

Witnesses:

GEO. H. STRONG,  
JNO. L. BOONE.