

UNITED STATES PATENT OFFICE.

EDWARD A. L. ROBERTS, OF TITUSVILLE, PENNSYLVANIA.

IMPROVEMENT IN TREATING EXPLOSIVE COMPOUNDS TO RENDER THEM SAFE FOR BLASTING AND OTHER PURPOSES.

Specification forming part of Letters Patent No. 439,192, dated May 20, 1873; application filed May 7, 1873.

To all whom it may concern:

Be it known that I, EDWARD A. L. ROBERTS, of Titusville, in the county of Crawford, State of Pennsylvania, have made a new and useful Improvement in Treating Explosive Compounds to impart safety thereto for blasting and other purposes; and I hereby declare the following to be a full and exact description of the same.

There are two principal classes of explosive compounds—one igniting on application of heat or a spark, such as gunpowder, the other upon the sudden agitation of its particles, as by a blow, such as fulminating-gold, fulminating-silver, fulminating-mercury, compounds of chlorate of potash and tannin, besides many other mixtures and compounds. In the dry state these latter substances are very dangerous; but, according to my improvements, they can be rendered comparatively safe to handle by mixing them with water or other fluids, or hygroscopic and other salts or materials which attract or absorb and retain water or other fluids, some of which can, by their decomposition, assist the chemical change, and thus enhance the effects of the explosion when the compounds are exploded. The fluids thus introduced require much heat to volatilize them and absorb heat in their volatilization; they, in consequence, protect the otherwise dangerous explosives, and render it a matter of difficulty to explode them; whereas, under ordinary circumstances, these compounds explode most easily by friction or percussion, they will not do so when prepared and treated in the manner and after the mode herein specified in accordance with my invention. In making one of these preparations, I grind the following ingredients to fine powder, each separately, and then well mix one part of ferrocyanide of potassium and one part of lump-sugar; then take two parts of chlorate of potash and grind this separately to fine powder; then add from fifteen to twenty-five per cent. of water, or thereabout, and well mix the water with the chlorate-of-potash powder, so as to make a thin paste, which paste is to be well incorporated with the mixture of ferrocyanide of potassium and sugar, so as to form a homogeneous mixture or paste. In this manner all risk of danger is rendered

most remote, and large quantities of such hitherto dangerous materials may be manipulated with the greatest safety. Compared with liquid nitro-glycerine, it will represent, bulk for bulk, nearly as much if not more gaseous volume. Nitro-glycerine is notoriously uncertain and dangerous, easily exploded on percussion or even on agitation; but this improved mixture can hardly be exploded by ordinary percussion or friction, or even by firing a bullet into it, or by striking it with the heaviest blow with a sledge-hammer on an anvil; yet it can be readily and certainly fired by detonating a small quantity of the mixed materials in a dry condition on the top of a wet cartridge of the powders, or by using a small case of the dry powder as a detonating-charge. Nitro-glycerine or other fulminates may be used in place of the dry powder for a similar purpose. These improved explosive compounds, treated according to my invention, especially those mixed or combined with water, are rendered so completely harmless that they may be stored for any length of time without any decomposition occurring that would give rise to dangerous results. In this manner, and according to the way above specified, I can deal with many mixtures well known as of a fulminating and dangerous character, such as carbozotates, white gunpowder, mixtures of chlorate of potash, chlorates, perchlorates, or nitrates with sulphur, sulphides, cyanides, ferrocyanides, ferricyanides, and suitable compounds of carbon or carbon itself, and mixtures of sulphur and its compounds, with chlorate of potash, and render them not only safe to handle, but comparatively harmless until placed in the precise circumstances needed for their explosion. I also thus render them more safe for stowage. In consequence of these mixtures being semi-fluid, they easily fill the shell cases or cartridges of whatever form in which they are placed, and render them, when sealed, capable of resisting any uniform pressure from without, as when they are lowered to a considerable depth below the surfaces of water.

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

1. The process herein described for treating explosive compounds and composition, the same consisting in combining with them water or other liquid, or with a hygrometric salt, so as to form a paste, as and for the purpose specified.

2. The method described for exploding moist or wet compounds, such as described, by igniting near them or in contact a fulminating or detonating material, as described.

3. The combination, in the same charge, of moist or wet compounds, such as described,

with dry powder, capable of being exploded by a spark or with a percussion-powder, as set forth.

4. The explosive compounds herein described, made by combining dry powders with water or other liquid, so as to render them safe in handling and in use, as described.

EDWARD A. L. ROBERTS.

Witnesses:

THOMAS C. CONNOLLY,
HENRY H. BURTON.