

# UNITED STATES PATENT OFFICE.

JOSEPH HAFENEGGER, OF SAN FRANCISCO, CALIFORNIA.

## IMPROVEMENT IN EXPLOSIVE COMPOUNDS.

Specification forming part of Letters Patent No. 110,355, dated December 20, 1870.

*To all whom it may concern:-*

Be it known that I, JOSEPH HAFENEGGER, of the city and county of San Francisco, State of California, have invented an Improved 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 or improvements without further invention or experiment.

My invention relates to improvements in explosive compounds, and more particularly in such explosive compounds or mixtures as contain chlorate of potash or other highly-explosive chemical ingredient which is liable, when exposed to the atmosphere or to friction, to produce a premature explosion; and it consists in adding to or combining with the mixture or compound which contains this highly-explosive agent certain chemical substances, which will to a certain degree prevent or destroy this natural tendency to explode spontaneously, so as to render the compound safe to handle, while its practical explosive qualities, under certain conditions, are in no degree impaired.

Various combinations have been originated in which chlorate of potash forms the chief explosive agent; but all of these compounds are more or less dangerous, especially when phosphorus, with bisulphide of carbon or excess of sulphur, enter into or are used in conjunction with the compound.

To obviate this difficulty and remove the liability to explode spontaneously or prematurely, I add to the explosive compound either one or more of the fatty substances known to chemists, among which may be mentioned butter, tallow, lard, oils of all kinds, turpentine, and glycerine.

Any one of the above-mentioned ingredients can be mixed with the explosive compound in varying proportions, according to the nature and quantity of the compound, and

the time when and the circumstances under which the explosive material is to be used.

In my experiments I have obtained more satisfactory results by using the Venice turpentine, which, when mixed with the compound, forms a stiff paste—an entirely safe explosive, without detracting from its ultimate value.

By the use of fatty or oily substances in the mixture the previously dangerous compound is rendered damp, and in a pasty condition not liable to become dry, in which condition either percussion or the direct application of fire will be required to ignite it; besides, it solidifies the explosive compound, so that it cannot form a dust, thus rendering it safe to handle and store, more particularly when used in cartridges or as a blasting agent.

By this process the great liability to explode on the compound becoming dry or being confined in large quantities (now a common occurrence) is avoided. Especially does it protect against explosion from slight friction.

I am aware of the patent to Thomas Taylor, dated December 7, 1869, for a mixture of ferrocyanide of potash, chlorate of potash, and paraffine, to prevent a waste of powder and secure a regularity of burning; but this I do not claim.

What I claim as my invention, and desire to secure by Letters Patent, is—

Fatty or oily substances in intermixture with explosive compounds, to prevent spontaneous or premature explosion, substantially as set forth.

In witness that the above-described invention is claimed by me I have hereunto set my hand and seal.

JOSEPH HAFENEGGER. [L. S.]

Witnesses:

J. L. BOONE,

CHARLIE BROWN.