

UNITED STATES PATENT OFFICE.

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EXPLOSIVE.

1,021,882.

Specification of Letters Patent.

Patented Apr. 2, 1912.

No Drawing.

Application filed September 5, 1911. Serial No. 647,473.

To all whom it may concern:

Be it known that I, JAMES F. O'BRIEN, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented new and useful Improvements in Explosives, of which the following is a specification.

This invention relates to an explosive in powder form; and the prime object thereof is the production of a relatively simple substance which will give the desired re-action and which is comparatively inexpensive to manufacture; and particularly, to provide means for regulating the speed of combustion in a simple and efficient manner.

Broadly considered, my explosive is based on a combination of a chlorate of an alkali metal with a carbo-hydrate or with a number of carbo-hydrates; and in further combination with a cyanogen compound which is used as an accelerator to increase the speed of combustion. I have found by repeated experiments that the best proportion, as between the chlorate and the carbo-hydrate, is about three to one; but these proportions may be changed to some extent without materially impairing the efficiency of the explosive. The proportion of cyanogen compound is normally kept comparatively small, approximately two per cent. or less. With a maximum of two per cent. of this cyanogen compound the explosive is as quick as is desired for all ordinary work; while, with a minimum amount of the cyanogen compound, the explosive is sufficiently slow for such work as blasting in soft coal. In practice, I use a mixture of potassium chlorate, about seventy-five per cent., and sugar or sugar and starch about twenty-five per cent. To these I add the desired amount of cyanogen compound in the form of ferric ferro-cyanid, or Prussian blue.

The most preferred form of this explosive—the form giving the most powerful results—is comprised of potassium chlorate seventy-five per cent. and of sugar twenty-five per cent. with the desired amount of Prussian blue. This is the specific form which I wish to cover in the following claims, although I also wish to cover the general combination of a chlorate of an alkali metal, a carbo-hydrate or carbo-hydrates, and the Prussian blue or a cyanogen compound.

The explosive as above described has many distinct advantages. It is extremely simple in its composition and manufacture and can be made very inexpensively. In practice, I add sufficient water to the sugar or other carbo-hydrate to form a solution and then apply heat to melt or dissolve the carbo-hydrate. The chlorate is powdered and is then mixed with the carbo-hydrate. The cyanogen compound may either be placed directly in the carbo-hydrate before mixing or it may be placed in the mixture of the chlorate and the carbo-hydrate. The resultant mass is pasty and is granulated and dried for commercial use. With a minimum amount of the cyanogen compound, or with none at all, the powder is comparatively slow in combustion and is suitable for such work as blasting in soft coal and the like where it is not desired to break the blast up into fine particles. With the maximum amount of cyanogen compound the explosive is rendered sufficiently quick in combustion to have an action somewhat resembling dynamite and nitro-glycerin. The explosive is thus suited for universal use. It has been determined by repeated tests to be stronger in explosive action than eighty per cent. dynamite. Lastly, the explosive leaves no residue whatever after combustion, it is entirely smokeless, and it creates no poisonous gases by its combustion.

Having described my invention, I claim:

1. An explosive, consisting of potassium chlorate and sugar in proportions approximately three to one and containing a relatively small amount of Prussian blue.

2. An explosive, consisting of KClO_3 seventy five parts, $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ twenty five parts, and a relatively small amount of $\text{Fe}_4(\text{Fe}(\text{CN})_6)_3$.

3. An explosive, consisting of KClO_3 seventy five parts, $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ twenty five parts, and a maximum of approximately two per cent. of the total of the said ingredients of $\text{Fe}_4(\text{Fe}(\text{CN})_6)_3$.

In witness that I claim the foregoing I have hereunto subscribed my name this 30th day of August 1911.

JAMES F. O'BRIEN.

Witnesses:

JAS. H. BALLAGH,

JAMES T. BARKELEW.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."