

UNITED STATES PATENT OFFICE.

G. DESIGNOBLE AND JOHN CASTHELAZ, OF FRANCE.

IMPROVEMENT IN EXPLOSIVE-POWDERS.

Specification forming part of Letters Patent No. 76,173, dated March 31, 1868.

To all whom it may concern:

Be it known that we, G. DESIGNOBLE and JOHN CASTHELAZ, of France, have invented certain new and useful Improvements in Explosive Powders; and we do hereby declare that the following is a full, clear, and exact description thereof.

To enable others skilled in the art to make and use our invention, we will proceed to describe it.

Our invention relates to the composition of matter for the manufacture of powder of different qualities, as may be desired for different purposes. The object of our invention is to apply the ready and prompt combustion of picrates of potassa, or of the salts formed by picric acid, or of the derivatives of picric acid and their salts, and even of carbazotic or trine-trophenic picric acid, as well as the volume or quantity of useful gases which is developed during such combustion, to the manufacture of powder of different qualities, so that we can increase, diminish, or vary its effects at will, and which, therefore, possesses special advantages over the powder now in use. Our invention consists in uniting the above-mentioned substances with various oxidating substances, and in certain cases with other suitable substances, for the purpose of regulating and varying the effect of the product, when desired, for different purposes, as for mining, sporting, war, pyrotechnics, fulminating, or other similar purposes.

In practice we give the preference to the carbazotate of potassa, and, as an oxidating agent, to the azotate of potassa, to which charcoal, sometimes even sulphur, may be added. Nevertheless, analogous substances may in some cases be preferred; and we therefore reserve the right, in this respect, of modifying our compositions by selecting from among the salts generated by picric or carbazotic acid the derivatives of that acid and their salts, and the acid itself. We likewise reserve the right to select from among the oxidating agents, and from all substances suitable for regulating the action of the powder, its intensity, and the nature of its effects, whatever experience shall prove best in every particular case, without affecting or departing from the principles as substantially stated in the accompanying description.

We have found, from the experiments made by us thus far, that the greatest effect is regularly obtained by a mixture of—

56.908 parts of carbazotate of potassa with
43.092 parts of azotate of potassa.

100

That is, in practice—

About 55 parts of carbazotate of potassa with
45 parts of azotate of potassa.

100

This mixture is suitable both for mining-powder and for loading hollow exploding projectiles.

To make a powder suitable for sporting purposes and for portable arms we use, according to the purpose or effect desired, mixtures composed of—

About 12 to 28 parts of carbazotate of potassa,
20 to 10 parts of charcoal, and
68 to 62 parts of azotate of potassa.

100 100

For gunpowder it is preferable to use—

About 8 to 12 parts of carbazotate of potassa,
22 to 10 parts of charcoal, and
70 to 80 parts of azotate of potassa.

For fulminating-powder we establish two kinds or classes: those for quick matches, exploding projectiles, torpedoes, grenades, &c., and those for fulminating-primers. This distinction is required on account of the oxidating action of the products of the decomposition of the chlorate of potassa, which must be contended with for fulminating-primers. This takes place by means of salts of lead—that is, chromate, chlorate, or the sulphocyanide, or any other salt of lead, but especially by the chromate of lead.

The fulminating-powder of the first class may, according to circumstances, be composed of—

About 55 parts of carbazotate of potassa, and
45 parts of chlorate of potassa.

100 Or—

About 35 parts of carbazotate of potassa,
5 parts of charcoal,
27 parts of azotate of potassa, and
33 parts of chlorate of potassa.

100 Or—

About 35 parts of carbazotate of potassa,
18 parts of ferrocyanide of potassium,
47 parts of chlorate of potassa.

100

This last powder is nearly three times as powerful as the fulminate of mercury.

For the fulminating-powder of the second class we make our mixtures of—

About 37 parts of carbazotate of potassa,
45 parts of chromate of lead, and
18 parts of chlorate of potassa.

100

Or, again, of—

About 20 parts of carbazotate of potassa,
49 parts of chromate of lead,
28 parts of chlorate of potassa, and
3 parts of charcoal.

100

Or still again, by making use of carbazotate of lead, we mix—

About 43 parts of carbazotate of lead,
41 parts of chromate of lead, and
16 parts of chlorate of potassa.

100

Or, again, we mix—

About 37 parts of carbazotate of lead,
35 parts of chromate of lead,
26 parts of chlorate of potassa,
2 parts of charcoal.

100

We deem it important to observe that in all these compositions the carbazotates of lead and potassa can be substituted by salts the acids of which are derivatives from the carbazotic acid; such as, for instance, the picramates, tropurpurates, the salts proceeding from the direct action of certain metals, as antimony, arsenic, bismuth, iron, zinc, &c., on carbazotic acid. We claim the use of these different substances, as well as all the varieties of which said compositions are susceptible, according to the wants or necessity for their use.

For pyrotechnics we combine the carbazotates of different bases, according to the various colorations and effects which are to be produced, as of potassa, soda, ammonia, baryta, strontia, magnesia, manganese, iron, zinc, cobalt, copper, &c., with the oxidating and other substances which are the most suitable to secure the results desired, according to the directions and statements above given.

In preparing these compositions we form the mixtures by means of trituration, maloxation, pressure, granulation, &c., generally used in manufacturing black powder and pyrotechnics.

This new powder has over the powder now in

use the following advantages: A greater variety in the effects or purposes to be accomplished by it; the entire absence of acid arising from it, or other substance injurious to fire-arms; the almost entire absence of smoke and dirt during and after combustion; the actual economy in its use, on account of the smaller quantity required for any given purpose, as a certain quantity by weight of the new powder has from six to eight times the force of a quantity of the black powder of the same weight; the considerable increase it gives to the initial force imparted to projectiles, without any increase of its bursting or breaking power; its easier preservation in damp places, on account of the inconsiderable solubility of the picrate of potassa. Moreover, this powder will resist a much greater heat, as it is only accendible at from 250° to 300°, while the powder now in use may melt when subjected to 120°, on account of the sulphur it contains.

The fulminating-mixtures given above have over the fulminate of mercury the advantage of diminishing the danger of explosion while in process of being manufactured, without considering the mercurial vapors, which are so unhealthy or injurious to the workman engaged in its manufacture.

And now, since the elements of this powder admit of storage or warehousing, on account of its resistance to heat and its compactness, and since there is a great and marked economy in its cost, and since it produces, with equal weight, effects greatly superior to those produced by the ordinary black powder now in use,

What we claim as our invention is—

The application and use, substantially as described, of picrate or carbazotate of potassa, as well as the salts formed from picric or carbazotic acid, and also the derivatives from such acid, and the acid itself, in and to the manufacture of powder, under the reservations set forth.

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Witnesses:

T. BASSET,
JAMES HAND.