

UNITED STATES PATENT OFFICE

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EXPLOSIVE COMPOSITION

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3 Claims. (Cl. 52—16)

This invention relates to a process for the production of explosives.

As is known, objection is urged against the employment of sodium chlorate in the production of explosives on the grounds that, in the presence of combustible substances, it is sensitive to friction.

It has now been ascertained in accordance with the present invention that crystals consisting of solid solutions of sodium chlorate in sodium nitrate are insensitive to friction. Up to about 20 percent of sodium chlorate is taken up, in isomorphous admixture, by sodium nitrate on crystallization.

It has moreover been ascertained, that sodium nitrate removes the sensitivity to friction of sodium chlorate even in the case of a mere mechanical mixture of crystals of both substances, at least up to a certain percentage proportion of the chlorate, and that the sodium nitrate can be replaced by the insensitive crystals consisting of a solid solution containing, besides sodium nitrate, the chlorate, in which latter case, the limit of sensitivity to friction (which is about 20 percent of chlorate in mechanical mixtures of sodium chlorate and sodium nitrate) can be raised to such an extent that the resulting mixtures do not become sensitive to friction until the proportion of sodium chlorate attains 30 to 35 percent.

By using crystals consisting of the said solid solutions exclusively, the advantage is secured, by comparison with the use of mechanical mixtures, that no separation into the component parts can occur.

It has also been ascertained, as a particular advantage, that the addition of crystals consisting of solid solutions containing sodium chlorate to explosives containing sodium nitrate, increases the blasting power (brisance) of the latter to a quite exceptional and unforeseen degree.

Examples

1. A simultaneously crystallized mixture—chiefly consisting of crystals of a solid solution of 82.3 percent of sodium nitrate and 17.7 percent of sodium chlorate—was mechanically mixed, in the ratio of 3:1, with sulphur and charcoal. The resulting explosive, of the gun powder type, was found to be insensitive to friction under the usual trituration test in the mortar. In the Trauzl lead-block test, it gave an increase of 67 percent in blasting power by comparison with pure nitrate.

2. A similar mixture consisting of crystals of sodium chlorate and mixed crystals of sodium

nitrate and sodium chlorate which had been prepared by crystallization from a saturated solution of both components and contained sodium nitrate and sodium chlorate in the ratio of 67.5:32.5, gave an increase of 111 percent in disruptive power as compared with a mixture containing sodium nitrate alone. The mixture was also insensitive to friction on trituration in the mortar.

Other combustible substances than sulphur and charcoal can also be employed as components of explosives, in which event, for example by using liquid or plastic materials such as paraffin, nitrated hydro-carbons and other additions used in the preparation of chlorate explosives, the chlorate content can be further increased without the explosive becoming sensitive to friction.

The solid solutions of sodium nitrate and sodium chlorate are prepared, in an extremely simple manner, by cooling saturated solutions. For example, a solution containing 38 parts of NaClO_3 to 62 parts of NaNO_3 and saturated at 100°C ., furnished, on becoming cooled to 30°C ., practically pure, saturated mixed crystals with the approximate composition:—17 percent NaClO_3 , 83 percent NaNO_3 .

If the originating solution contains a higher proportion of sodium chlorate, pure sodium chlorate separates out, in addition to the saturated mixed crystals, on cooling. If, on the other hand, the proportion of chlorate is smaller, the deposited solid solutions are unsaturated with sodium chlorate. However, since, according to the present invention, mixtures are to be employed in which the pure sodium nitrate is replaced by the solid solutions, and in which therefore pure sodium chlorate is present in addition to the solid solutions, the only originating solutions coming under practical consideration for the direct preparation of said mixture are those in which an excess of sodium chlorate is present.

I claim:—

1. An explosive compound comprising mixed crystals consisting of a solid solution of sodium chlorate in sodium nitrate.

2. An explosive compound comprising mixed crystals consisting of a solid solution of about 20 percent of sodium chlorate in sodium nitrate.

3. An explosive compound comprising mixed crystals consisting of a solid solution of sodium chlorate in sodium nitrate and admixed therewith an amount of sodium chlorate crystals not exceeding about 20 percent by weight of said mixed crystals.

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