UNITED STATES PATENT OFFICE.

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PROCESS OF MAKING ALIZARIN.

No. 885,577. Specification of Letters Patent. Patented April 21, 1908.

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To all whom it may concern:

Be it known that I, JOHANN HEINRICH BONER, doctor of philosophy and chemist, citizen of the Swiss Republic, residing at Ludwigshafen-on-the-Rhine, Bavaria, in the German Empire, have invented new and useful Improvements in Processes of Making Alizarin, of which the following is a specification.

My invention consists in the manufacture and production of alizarin in a very pure condition by the direct oxidation of anthraquinone which has hitherto been considered impossible, the only process for the manufacture of alizarin hitherto practiced being to convert the anthraquinone into anthraquinone-mono-sulfo-acid and to purify this, and then melt it with caustic alkali in the presence of an oxidizing agent.

I have now discovered that anthraquinone can be directly converted into alizarin by direct oxidation, by heating it with a highly concentrated aqueous solution of caustic alkali in the presence of an oxidizing agent. As examples of substances which can be used as oxidizing agents, I mention alkaline chlorates, alkaline nitrates, sodium chromate, the superoxids of sodium, barium, manganese, and lead and further ferric oxid, lead oxid and mercury oxid or even atmospheric oxygen.

The improvements which my invention shows over the old method are twofold. In the first place, I have only to make use of one process to convert the anthraquinone into alizarin, whereas according to the old method it is necessary to produce and isolate an intermediate compound viz. anthraquinone monsulfoacid, and secondly, the alizarin obtained according to my invention is of a purer quality than that obtained by directly melting crude anthraquinone-mono-sulfo-acid, for when anthraquinone is sulfonated, small quantities of disulfoacids are always formed together with the monosulfoacid, and unless these disulfoacids be removed before melting with alkali and an oxidizing agent, they become converted into trihydroxy-anthraquinone, and, in consequence, the alizarin obtained does not yield such beautiful bluish tinted shades as does the alizarin free from by-products, which is obtained according to my invention.

Alazarin made according to my process differs from all other alizarin in being absolutely homogeneous. This property can easily be demonstrated by dissolving alizarin obtained according to my invention in hot caustic alkali and then saturating the solution while at a temperature of about forty-five degrees centigrade with carbon dioxid and then filtering. The alizarin which remains in the filtrate produces, on dyeing, the same shade as that which is precipitated. It can thus be distinguished from any of the alizarins hitherto known, since all of these latter when treated in the above manner yield in the filtrates coloring matters dyeing shades of red different from those obtained on dyeing with the precipitates. Alizarin, as differentiated from the product of the present invention is not herein claimed.

The following example illustrates the manner in which I prefer to carry out my invention, but I do not limit myself to this example. The parts are by weight.

Dissolve from twenty, to thirty, parts of potassium chlorate in one hundred parts of water, and add three hundred parts of mixed caustic soda and caustic potash and then stir into the mixture one hundred parts of anthraquinone. Heat and stir the whole (either in an open, or in a closed vessel, placed in an oilbath) at a temperature of about two hundred degrees centigrade, and continue the heating until the oxidizing material is used up. Dissolve the melt in water and blow air through the solution in order to reconvert to anthraquinone the oxanthranol formed. Precipitate the alazarin by the addition of milk of lime and filter it off. The filtrate contains small quantities of benzoic acid. Decompose the precipitate by means of hydrochloric acid, filter off the residue from the solution of calcium chlorid and then dissolve the alizarin by means of dilute caustic soda solution, which leaves any anthraquinone undissolved.

I claim:

1. The process of producing alizarin which consists in heating anthraquinone with caustic alkali in the presence of an oxidizing agent.

2. The process of producing alizarin, which consists in heating anthraquinone with caustic soda in the presence of an oxidizing agent.

3. The process of producing alizarin, which consists in heating anthraquinone with caustic soda in the presence of potassium chlorate.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHANN HEINRICH BONER.

Witnesses:

ERNEST F. EHRHARDT,

JOS. H. SEULE.