UNITED STATES PATENT OFFICE.

KARL REINKING AND ERICH DEHNEL, OF LUDWIGSHAFEN-ON-THE-RHINE, AND HANS LABHARDT, OF MANNHEIM, GERMANY, ASSIGNORS TO BADISCHE ANILIN & SODA FABRIK, OF LUDWIGSHAFEN-ON-THE-RHINE, GERMANY, A CORPORATION.

BLEACHING.

No. 837,730. Specification of Letters Patent. Patented Dec. 4, 1906.

Application filed July 12, 1906. Serial No. 325,941.

To all whom it may concern:

Be it known that we, KARL REINKING, a subject of the Prince Regent of Brunswick, and ERICH DEHNEL, a subject of the King of Prussia, German Emperor, residing at Ludwigshafen-on-the-Rhine, and HANS LABHARDT, a citizen of the Swiss Republic, residing at Mannheim, Germany, doctors of philosophy and chemists, have invented new and useful Improvements in Decolorizing, of which the following is a specification.

It is well known that the alkali salts of formaldehydesulfoxylic acid—rongalite C (B. A. S. F.)—either alone or in combination with formaldehyde-bisulfite (hydrosulfite NF, or hyraldite A) possess only very slight reducing properties in the cold, whereas when hot they are exceptionally strong reducing agents. In consequence of this property it has been attempted to make use of them for removing the coloring-matter from dyed rags which are to be used in the manufacture of shoddy. For this purpose, however, the said alkali salts possess certain disadvantages, since their neutral solutions, even when boiling, only exercise a moderate reducing action, and in consequence they have to be used in acid solution. Now the alkali salts of formaldehydesulfoxylic acid are extremely sensitive to acids, and upon warming an acidified solution of such a salt decomposition takes place and sulfur is generally precipitated and remains in the fiber as an impurity, the fiber acquiring a persistent disagreeable odor. Further, in consequence of the said decomposition a great part of the reducing power is lost, it not being used up for the purpose desired. We have discovered that these disadvantages can be avoided if instead of the alkali salts of formaldehydesulfoxylic acid the difficultly-soluble basic zinc salt be employed. (See Letters Patent No. 793,610, and application Serial No. 298,861.) This salt on account of its very slight solubility exercises in neutral solution scarcely any reducing action on dyed fiber even at boiling temperature, whereas on the addition of acid an energetic reduction of the coloring-matter takes place without the aforementioned objectionable decomposition taking place. Acids suitable to be employed for the purposes of our invention include acetic acid, sulfuric acid, and especially formic acid. When the aforesaid zinc salt is used in the presence of an acid, only very slight decomposition at the most takes place, so that a given quantity of difficultly-soluble basic zinc formaldehydesulfoxylate produces a considerably greater effect than the chemically equivalent quantity of the sodium salt. This property of the said basic zinc salt can also be applied in other cases where an acid reduction is desired—for instance, in removing the natural color from linen, hemp, or jute materials and the like.

The following examples will serve to illustrate how our invention can be carried into practical effect; but our invention is not confined to these examples. The parts are by weight:

Example 1: Prepare a bath containing three (3) parts of basic zinc formaldehydesulfoxylate and from three (3) to five (5) parts of formic acid for every one hundred (100) parts of the material to be treated, and then add woolen rags which have previously been treated in the usual manner. Heat the whole slowly to the boiling-point and continue boiling until a test portion of the liquid does not reduce indigo-carmin solution. This generally is the case after boiling for about ten (10) minutes.

If desired, the acid can be added to the boiling-bath slowly in small portions at a time, and instead of formic acid another acid—for instance, acetic acid or sulfuric acid—can be employed.

Example 2: Stir together five (5) parts of basic zinc formaldehydesulfoxylate and one hundred (100) parts of water and add sulfuric acid to the mixture until the salt is dissolved and the solution has a slight acid reaction. Then introduce into this bath the raw material—for instance, hemp or jute material which has previously been extracted with boiling water and which is still colored with natural coloring-matter—and leave the said material in the bath until the desired effect has been obtained.

The reducing property of the bath does not become entirely exhausted, but the bath can repeatedly be brought up to its original condition by the addition of correspondingly smaller quantities of the zinc formaldehydesulfoxylate and acid.

If desired, the bath can be heated even up to the boiling-point during the reaction, provided the nature of the material being treated allows this to be done.

Now what we claim is—

The process for the removal of coloring-matter from dyed, or naturally-colored, material by treating such material with basic zinc formaldehydesulfoxylate in the presence of an acid.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

KARL REINKING.
ERICH DEHNEL.
HANS LABHARDT.

Witnesses:
ERNEST F. EHRHARDT,
J. ALEC LLOYD.