# UNITED STATES PATENT OFFICE.

HERMANN ALT, OF WIESBADEN, AND EDUARD CULMANN, OF MÜLHAUSEN, GERMANY, ASSIGNORS TO KALLE & CO., OF BIEBRICH, GERMANY.

## PROCESS OF DYEING WITH QUINONOXIM COLORS.

SPECIFICATION forming part of Letters Patent No. 615,232, dated December 6, 1898.

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*To all whom it may concern:*

Be it known that we, HERMANN ALT, a subject of the Emperor of Germany, residing at Wiesbaden, and EDUARD CULMANN, a citizen of Switzerland, residing at Mülhausen-Elsass, Germany, (assignors to KALLE & Co., of Biebrich-on-the-Rhine, Germany,) have invented a certain new and useful Improvement in Producing and Fixing Quinonoxim Coloring-Matters on Textile Fibers, of which the following is a specification.

The application of quinonoxim coloring-matters (nitrosophenols) in cloth-printing has up to now been a limited one on account of various difficulties in their employment—for instance, in the steaming process—which arise from the peculiar nature of this class of coloring-matters. Still it was looked upon as desirable to overcome these difficulties, because these dyestuffs are distinguished by an excellent fastness, especially against light.

We have now succeeded in overcoming the difficulties above referred to by proceeding in the following manner: Contrary to the old process of printing the finished dyestuff and fixing it upon the fiber by steaming the printed fabric we produce the quinonoxims, or, rather, lakes of the same, directly on the fiber without applying the steaming process at all. If a fabric is impregnated with a mixture consisting of a phenol—like, for instance, the naphthols, dioxynaphthalenes, resorcin, and the like—a mordant suitable for quinonoxim coloring-matters, such as copperas, and an acid like tartaric acid, and if this fabric is dried and passed through a neutral and preferably boiling-hot nitrite solution, the dyestuff is at once developed and at the same time fixed on the fiber. Of course the same result is obtained, if a previously-mordanted fabric is impregnated with a mixture of a phenol and an acid and passed through a nitrite solution. The various ingredients necessary for the color-lake intended to be formed can also be applied to the fiber in different order or different mixture. The fabric can, for instance, be impregnated with a mixture of a phenolate and nitrite and can be introduced afterward into an acidulated mordant-bath, or it can be impregnated with nitrite and a mordant and passed through an acid or neutral solution of a phenol, &c. All these variations are, however, less suitable and of no practical importance.

In carrying out our invention we proceed, for instance, as follows:

*Example* 1.—The goods are printed with a mixture consisting of two hundred and twenty grams resorcin, one hundred and sixty grams copperas, one hundred and twenty grams tartaric acid, and four thousand grams of a suitable thickening. They are then dried by passing them between hot plates and introduced into a boiling-hot sodium-nitrite solution of, for instance, five per cent. In this manner green shades are obtained. Instead of printing the mixture with the aid of a thickening we can also pad the cloth with an aqueous solution of the mixture, dry it, and develop the color in the described manner.

*Example* 2.—The cloth is padded or printed with a mixture of two hundred and twenty-eight grams alpha-naphthol, eight hundred grams acetin, two hundred and eighty grams copperas, one hundred and fifty grams tartaric acid, four hundred grams water or thickening, respectively, and the color is then developed, after drying the goods, in a boiling nitrite-bath. In this manner also green shades are obtained.

We have further found that caustic soda-lye and other substances which mechanically or chemically prevent the formation or fixation of the coloring-matters may be employed with good result as discharges in the above-described printing or padding processes.

Now what we claim is—

The process of producing and at the same time fixing quinonoxim coloring-matters also known as nitrosophenols on the textile fiber by impregnating the goods with a mixture consisting of a phenol, a suitable acid or acid salt and a mordant adapted for the fixation of quinonoxim coloring-matters, and by passing said fabrics subsequently through a hot nitrite solution.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

HERMANN ALT. [L. S.]
EDUARD CULMANN. [L. S.]

Witnesses:
W. HANSING,
HEINRICH MISCHLER.