UNITED STATES PATENT OFFICE.

GIOVANNI TAGLIANI, OF MILAN, ITALY.

PROCESS OF DYEING FABRICS.

SPECIFICATION forming part of Letters Patent No. 646,379, dated March 27, 1900.

Application filed March 15, 1899. Serial No. 709,188. (No specimens.)

To all whom it may concern:

Be it known that I, GIOVANNI TAGLIANI, a citizen of Switzerland, residing at Milan, in the Kingdom of Italy, have invented certain new and useful improvements in processes of deepening the shades of dyes upon the one side of fabrics by means of caustic lyes and oxids, (for which I have applied for a patent in Germany, dated April 17, 1897,) of which the following is a specification.

This invention relates to a process for dyeing raw or bleached cotton or other fabrics of vegetable fiber in such a manner that the two sides receive different shades—for example, by use of the same color the one side of the fabric may be dyed darker than the other. For some purposes it is desirable that the stuff be colored on the front side differently from the back side, by which means a considerable economy of coloring-matter may be obtained.

In carrying out this invention a caustic solution of an alkali or a salt exercising a strong alkaline reaction, such as aluminate of sodium, in a state of concentration depending upon the color in question and the character of the fabric, is transferred to the side of the fabric which it is desired should receive the deeper color by means of a roller or any other suitable means. This operation has the advantage, compared with all earlier processes for treating fabrics with mordants and the usual mercerizing process, that the shrinking of the fabric or any other physical alteration is avoided, as the contraction which might take place upon the one side is avoided by the fact that the greater part of the fabric is not touched by the mordant liquid. In this process it is unnecessary to use a stretching device, either before the treatment or afterward, as is necessary, to the great disadvantage of the fabric, for preventing shrinkage in some mercerizing processes. By the application of the concentrated alkaline solution to the one side of the fabric this side obtains the property of absorbing the dye more readily than the other side, which has not been so treated, so that even by using very little dye an exceptionally dark and brilliant color can be obtained.

According to the character of the color used the action of the alkalies can be assisted by the presence of metallic salts—such as those of iron, copper, or manganese—and in this manner also any desired shade can be obtained. Care must be taken that the salts be used in such a form that insoluble precipitations do not take place upon the fibers in consequence of the action of the alkalies, and it is therefore advisable to mix the metallic salts with a slight addition of glycerin, glucose, or alcohol to the alkaline solutions, and thus prevent the formation of an impermeable backing. As it is only of importance to obtain the metallic salts for obtaining the shades, or rather the oxids of same in a soluble form, it is not necessary that glycerin and the like be used for some purposes; but a solution of oxid of copper in a lye of soda or iron or manganese-saccharate may, for example, be adopted. Any oxids arising during the action upon the dyes, as well as the excess of the metallic salts in the solution of alkali, may be removed by passing the fabric after the treatment through sulfuric acid, muriatic acid, or the like. In order to obtain different shades of the same color upon both sides, the salts or alkalies, &c., can be transferred to each side, and the relative intensity of the colors then depends upon the relative strength of the solutions used. If the same amount of substance is applied to both sides, the same color is obtained, but with greater rapidity and brilliancy.

It is self-evident that this process can also be used in combination with the usual "reserve" methods, which do not require to be modified in any manner whatever. For this purpose the mordant solutions of alkali should, preferably, be used at a concentration of 30° Baumé or more, and they can, as already remarked, be replaced by solutions of aluminate of sodium with or without addition of lye of soda.

The present process, which is suitable for all kinds of dyes, can, for example, be carried out in the following manner: One-fourth liter of a solution of acetate of chromium at 10° Baumé can be used with two and three-fourths liters of lye of soda or potash at 40° Baumé, or instead of the above seventy-five grams of powdered ferro-cyanid of potash in about seventy-five cubic centimeters of water with one-fourth liter glycerin and two thousand six hundred cubic centimeters of lye of soda

can be used. Instead of ferro-cyanid of potash sulfate of iron or hydrate of iron can also be used. When manganese salts are used, the following proportions may, for example, be adopted: one hundred grams of chlorid of manganese in one hundred cubic centimeters glycerin and two thousand six hundred cubic centimeters lye of soda at 40° Baumé. The lye of soda or potash can vary between 26° and 40° Baumé.

Instead of the acetate of chromium in the first example freshly-precipitated hydroxid of chromium, with or without addition of glycerin and the like, may be used.

When copper salts are used, the following proportions have been found to be advantageous for the most purposes: fifty grams of acetate of copper or freshly-precipitated hydroxid of copper with one hundred cubic centimeters trade ammonia, one hundred cubic centimeters glycerin, and two thousand seven hundred cubic centimeters lye of soda. As an example of the use of aluminate of sodium the following example may be given: One hundred grams sulfate of aluminium or the equivalent quantity of freshly-precipitated hydroxid of aluminium are used mixed with two hundred cubic centimeters water and two thousand seven hundred cubic centimeters 40° Baumé lye of soda. These proportions may of course vary according to requirements. Also besides the salts of iron, manganese, chromium, and copper mentioned above salts of tin, zinc, uranium, and other metals may be used.

For the production of reserve work the following course is adopted: The reserve is pressed on, as usual, either with a cloth-printing machine or by means of rollers, and the caustic lye is applied over this surface of the fabric provided with the cards. The fabric is then dyed, as usual, and passed through sulfuric or muriatic acid.

With discharge work the caustic solution is applied to the entire surface of the fabric with rollers or in any other suitable manner. The fabric is then dyed and passed through acid—sulfuric or muriatic acid. These dyed pieces can be treated with mordants, such as bichromate of sodium, when passed through sulfurous oxalic acid, or with steam mordants (chlorates) when Mather & Platt's apparatus is used. The metallic oxids formed by the alkaline solutions act partially as oxygen-carriers and partially by direct formation of lake and are properly only used for regulating the shade as the dyeing is assisted and accelerated at the places so treated.

The process is applicable with equal advantage for all goods suitable for mordant colors whether dry or moist, raw or bleached, printed or not printed, and the fabrics can be perfectly evenly colored on one side only with the greatest ease and a considerable economy of material.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. The herein-described process of deepening the shade of color upon one side of fabrics of vegetable fiber, in dyeing said fabrics, which consists in applying a concentrated alkaline solution only to the side that is to take the deeper color, then dyeing the fabric, and finally subjecting said fabric to the washing action of an acid, substantially as described.

2. The herein-described process of deepening the shade of color upon one side of fabrics of vegetable fiber, in dyeing said fabrics, which consists in applying only to the side that is to take the deeper color a concentrated caustic solution containing metallic salts, then dyeing the fabric, and finally subjecting said fabric to the washing action of an acid to remove the excess of metallic salts and any oxids formed during the dyeing operation, substantially as specified.

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

GIOVANNI TAGLIANI.

Witnesses:

L. FRETTY,

MICHEL DE BRAY.