

UNITED STATES PATENT OFFICE.

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PROCESS OF DYEING WOOL.

941,399.

Specification of Letters Patent.

Patented Nov. 30, 1909.

No Drawing.

Application filed December 19, 1908. Serial No. 468,347.

To all whom it may concern:

Be it known that I, HOMER WINSLOW, a citizen of the United States, residing at 37 Messer street, Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Process of Dyeing Wool, according to the following specification.

As is well known, the dyeing of wool with adjective, mordant, or lake forming dyes, consists, essentially, in forming upon and within the fiber color lakes of the dyestuffs with metallic oxids. Several methods for producing color lakes upon the fiber are in general use, of which may be mentioned: the impregnating of the material with a solution of the salts of chromic acid or chromic oxid, aluminum or iron salts, usually in the presence of certain organic or inorganic acids, from which solutions hydroxids of the metal are deposited upon and within the fiber. The material thus treated is then passed into the solution of a suitable dye, when a color lake is formed by the union of the dye with the metallic oxid previously fixed upon the fiber. A modification of this method is to first impregnate the material with the dye, which is withdrawn from its solution, and absorbed by the fiber, in the presence of acids, or acid salts. The metallic salt is then added, usually to the same bath,—but sometimes to a subsequent one,—when the color lake is formed as before. Potassium and sodium bichromate are the most important metallic salts used for this purpose, and may be taken as typical ones for the reactions stated.

Certain of the adjective dyes do not immediately form color lakes in the presence of metallic salts. This fact has been taken advantage of to still further modify and to greatly simplify the process of dyeing, in that the metallic salt and the dyestuff may now be added together to the same bath, when in the presence of organic acids, or their acid salts, or neutral salts of ammonium which are easily dissociated by boiling. It is to this latter method of dyeing that my invention is applied.

I have now discovered that when the salts of magnesium or those of the calcium group of metals, calcium, barium and strontium, are added to the dyebath, together with suitable dyes, and a chromate or chromium salt, the dyeing of wool and other animal fibers is

greatly facilitated; the material is very evenly and uniformly dyed; and the resulting color is fuller, richer in tone, and, with many dyes, more permanent.

The reaction which takes place in the dye bath between the magnesium salt,—or a salt of the calcium group of metals,—the dyestuff, and the chromate or chromium salt is not fully determined, but is probably as follows: Weak color lakes are formed by the salts of magnesium and by those of the calcium group of metals—with the dyestuff, which combine with and build up those formed by the principal metallic salt, greatly enhancing its value. The acid liberated from the base of the salt is made available to accelerate the dyeing.

The dyeing operation may be demonstrated by making up a dyebath with a suitable dyestuff, potassium or sodium bichromate, and a quantity of magnesium sulfate, equal to about twice the quantity of dyestuff used. The material is entered, the bath heated, and boiling continued until the dyeing is completed. Besides magnesium sulfate other magnesium salts and the salts of calcium, barium and strontium act more or less favorably.

Example I: To the dyebath containing about 400 gallons of water add 2 lbs. anthracene chromate brown EB, $\frac{1}{2}$ lb. bichromate of potassium (or sodium), 4 lbs. magnesium sulfate. 100 lbs. of wool, yarn, or pieces are entered into the bath at 80 to 100 deg. F., the bath is heated, and boiling continued one to two hours.

Example II: To the dyebath of 400 gallons water add: 2 lbs. anthracene chromate green B, 4 lbs. magnesium sulfate. Enter into the bath 100 lbs. wool at 80 to 100 deg. F., heat, and boil one half hour, then add 1 lb. bichromate of potassium or sodium, and boil one half to one hour longer. Additions of dye for the purpose of shading may be made to the dyebath at any time.

By acid chrome dyes as herein mentioned, are meant dyes such as are referred to, for instance, in the "Textile World Record" of December, 1907, page 420, or in the "Textile Colorist" for May 1909 and October 1908.

Claims.

1. The process of dyeing animal fibers which consists in preparing a solution of an acid chrome dye, salts of chromic acid, and

salts of alkaline earths, entering the goods to be dyed into the solution, and boiling the liquor until the color is fixed upon the fiber.

- 5 2. The process of dyeing animal fibers which consists in preparing a solution of an acid chrome dye, salts of chromic acid, and salts of magnesium, entering the goods to be dyed into the solution, and boiling the liquor until the color is fixed upon the fiber.

In witness whereof I have hereunto signed 10 my name this seventh day of December 1908, in the presence of two subscribing witnesses.

HOMER WINSLOW.

Witnesses:

GILMAN E. JOPP,
GEORGE S. LINCOLN.