

UNITED STATES PATENT OFFICE.

ALCIDE FRANCOIS POIRRIER, OF PARIS, FRANCE.

PROCESS OF MORDANTING.

SPECIFICATION forming part of Letters Patent No. 646,760, dated April 3, 1900.

Application filed May 16, 1899. Serial No. 717,038. (No specimens.)

To all whom it may concern:

Be it known that I, ALCIDE FRANCOIS POIRRIER, a citizen of the Republic of France, residing at Paris, France, have invented Improvements in Processes of Mordanting, of which the following is a specification.

This invention relates to improved methods in the application of substantive sulfur coloring-matters to dyeing purposes, whereby the disadvantages to which the existing modes of application of such dyestuffs are subject are obviated.

In particular, the present improvements effect, first, a greater resistance of the dyed materials to the action of soap or of a wash of soap and carbonate of soda; secondly, a greater strength of the fiber after dyeing, steaming, &c., and, thirdly, a greater uniformity of the tints on cotton fabrics.

I have previously recommended as fixing agent for these coloring-matters a solution containing five per cent. of sulfate of copper and five per cent. of sulfuric acid or a solution containing five per cent. of bichromate of potash and five per cent. of sulfuric acid, these percentages being calculated on the weight of the cotton to be dyed. In both cases there are obtained slightly-different tints—namely, greener in the case of sulfate of copper and bluer with bichromate of potash. In both cases the tints are very resisting to soap. When fixing by means of sulfate of copper and sulfuric acid, the tints obtained are sufficiently resistant to carbonate of soda of one per cent. or even of ten per cent. strength as also to carbonate of soda and soap, (one per cent. and five per cent;) but the fiber is considerably affected by the steaming or when the fabrics after dyeing are exposed for some time in a hot and moist atmosphere. In the case of fixing by means of bichromate and sulfuric acid the resistance to carbonate of soda is very weak and the fiber is also affected by the steaming. Thus these two processes are subject to greater or less disadvantages, which are entirely obviated by the improved methods forming the subject of the present invention, whereby the tints are rendered very resistant to soap, quite resistant to boiling carbonate of soda, whether weak (one per cent.) or strong, (ten per cent.,) as also to a wash of carbonate of

soda and soap, while the fiber thus treated does not appreciably lose strength during the steaming, whether with saturated or superheated steam. This result is obtained, first, by entirely doing away with the use of free sulfuric acid in either one or the other of the above processes; secondly, in the sulfate of copper process, substituting for the sulfate any other salt of copper—such as the chlorid acetate, &c.—or any cupric combination—such, for instance, as the oxid of copper in ammoniacal solution; thirdly, in substituting in the bichromate process for the greater portion of the bichromate a salt of copper other than the sulfate.

The compositions of the fixing-baths would be, for example—

Formula No. 1: Three per cent. chlorid of copper or the corresponding quantity of a cupric combination other than sulfate of copper. The cotton is maintained during from one-half to one hour at 90° centigrade.

Formula No. 2: Two to three per cent. of chlorid of copper and one to two per cent. of bichromate of potash. The cotton is maintained at from 90° to 95° centigrade during from one-half to one hour.

The chlorid of copper can be very simply prepared by employing the corresponding quantity of commercial sulfate of copper in the presence of an excess of common salt.

The first formula is employed, by preference, for obtaining greenish tints and the second for obtaining bluish-black tints.

The diminution in the strength of the fiber, which, as already stated, is considerably less than with the previous processes, can be further prevented by using the said coloring-matters not in the crude state, but after having freed them from the greater part of the products accompanying them, such as the polysulfides, sulfides, sulfites, hyposulfites, &c. The application of the above-improved processes with these purified coloring-matters therefore satisfies all the requirements both as regards the strength of the fiber and as regards the resistance of the tints to the usual agents, (soap, carbonate of soda, or both combined.) Lastly, a perfectly-uniform tint may be obtained on piece-cotton by the improved process.

The discolorations which are sometimes ob-

served with the existing methods are caused
 by the extreme oxidizability of the coloring-
 matter and are only produced when the fab-
 ric is subject to contact with the atmosphere
 5 while the dyeing process is being carried on.
 Dyeing in black is a process having two
 phases. In one the coloring agent is fixed on
 the fiber in a state of undetermined reduc-
 tion. In the second phase after the washing
 10 of the fiber in order to eliminate what is me-
 chanically retained the oxidation of the color-
 ing agent transforms it (the coloring agent)
 into an intense black; but if in the first phase
 the wet fiber is allowed to remain in contact
 15 with the air that portion of the reduced color-
 ing agent which impregnated the tissue
 without being fixed upon the same oxidizes
 very rapidly and becomes insoluble. The
 coloring agent thus oxidized is not fixed upon
 20 the fiber and may be removed by frictional
 contact. Hence the colorings thus obtained
 rub off and soil greatly white tissues with
 which they come in contact. It suffices, there-
 fore, in order to avoid such defects to keep
 25 the fabric completely immersed during the
 whole of the dyeing process. The bath being
 of a reducing nature, the surface thereof con-
 stitutes a screen which protects the interior
 against all access of air and which conse-
 30 quently avoids all accidental local oxidation.
 The process should therefore be carried on in

an ordinary fulling-machine, all the rollers
 of which are completely immersed in the bath.
 The surface of the latter will become slightly
 oxidized; but this will cause no inconven- 35
 ience.

While in the following claims chlorid of
 copper is designated as the "fixing" agent or
 as forming a part of the fixing agent, its
 equivalents for the purpose stated, such as 40
 any salt of copper or cupric combination other
 than the sulfate of copper or the oxid of cop-
 per in ammoniacal solution, may be employed
 with the same or analogous results.

I claim— 45

1. The process of fixing the colors obtained
 from substantive sulfur coloring-matters con-
 sisting in subjecting the dyed material to the
 action of a bath of chlorid of copper.

2. The process of fixing the colors obtained 50
 from substantive sulfur coloring-matters con-
 sisting in subjecting the dyed material to the
 action of a bath of chlorid of copper and bi-
 chromate of potash.

In witness whereof I have hereunto signed 55
 my name in the presence of two subscribing
 witnesses.

ALCIDE FRANÇOIS POIRRIER.

Witnesses:

JULES ARMENGAUD, Jeune,
 J. ALLISON BOWEN.