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DYEING OF TEXTILE MATERIALS

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13 Claims. (Cl. 8—5)

This invention relates to the dyeing of textile materials containing cellulose acetate or other organic derivative of cellulose, and relates more particularly to the provision of a method whereby fabrics containing cellulose acetate yarn may be dyed by a padding or other inexpensive method.

An object of my invention is to dye textile materials comprising cellulose acetate or other organic derivative of cellulose by an economical method involving padding. A further object of my invention is to dye cellulose acetate or other organic derivative of cellulose fabric by padding the fabric in the presence of a suitable material that has at least a softening action on the organic derivative of cellulose with a dyestuff that has little or no affinity for cellulose acetate or other organic derivative of cellulose material when applied in the ordinary manner. Other objects of this invention will appear from the following detailed description.

The padding method is one of the least expensive methods of dyeing fabrics and therefore its use is highly desirable from the point of view of economy. However heretofore it has not been possible to obtain satisfactory colorations on fabrics containing cellulose acetate material by a padding method, due to the fact, among other reasons, that the cellulose acetate material is not sufficiently absorbent to take up enough of the ordinary dye liquor to obtain the required depth and brilliancy of color.

I have found that if there is present in the dye bath a relatively large amount of volatile organic liquid of relatively high boiling point which has at least a softening action on the organic derivative of cellulose such dyebath may be applied to fabric containing organic derivative of cellulose yarn by a padding or analogous method, and after suitable fixation of the dyestuff, very satisfactory colorations are obtained. Moreover, by this process, many dyestuffs that have little or no affinity for the organic derivative of cellulose when applied by ordinary dyeing methods may be employed to obtain brilliant colors which are quite fast to soaping, rubbing, etc. This method presents many economies which are due not only to the low cost of manipulation involved in a padding method as compared with dyeing in jigs, winches, dye barks or the like, but also to the fact that dyestuffs of low cost may be used and the amount of dyestuff necessary to produce a given depth of color is considerably reduced.

In accordance with my invention, I dye or color fabrics containing organic derivatives of cellulose by applying thereto, preferably by a padding method, a dye liquor containing a suitable dyestuff and a volatile organic liquid having a boiling point above 100° C. and that has at least a softening action on the organic derivative of cellulose.

The textile material to be treated may be in the form of a fabric containing yarn of organic derivatives of cellulose or cellulose ethers. Examples of such organic derivatives of cellulose are cellulose acetate, cellulose formate, cellulose propionate and cellulose butyrate, while examples of cellulose ethers are ethyl cellulose, methyl cellulose and benzyl cellulose. The fabric may be a mixed fabric containing yarns of organic derivatives of cellulose and yarns of other fibres such as cotton, reconstituted cellulose, natural silk, wool, etc. Some of the dyestuffs that may be used have no affinity for the said other materials, and thus differential color effects may be obtained.

As stated, the dye liquor that is applied to the fabric contains a volatile organic liquid which has a relatively high boiling point, preferably above 100° C., and which is a solvent for or acts to soften the organic derivative of cellulose. While I prefer to employ ethyl lactate, other suitable organic liquids may be used examples of which are the acetate of mono ethyl ether or ethylene glycol, diacetone alcohol, benzyl alcohol, tetrachlorethane, etc. I prefer to employ organic liquids that are miscible with water. The amount of organic liquid used in the dye liquor will vary with the particular organic liquid employed, in the case of ethyl lactate the amount being from 160 to 400 cc. or more per litre of dye liquor.

Various kinds of dyestuff may be employed and they may be basic dyes, certain vat dyes, water insoluble coloring bodies which are ordinarily applied to cellulose acetate in a form dispersed or solubilized by means of soaps, fatty acids, etc. It is a surprising fact that by this invention some direct cotton dyes which have no affinity for cellulose acetate material when applied by other methods may be used. Also certain of the acid dyes which have no affinity for cellulose acetate material produce excellent dyeings when employed in this invention. The amount of dyestuff present in the dye liquor will vary in accordance with the particular dyestuff employed and the depth of color desired, the amount required being less than in ordinary dye methods and being as low as 0.5 to 3% of the dyebath.

The dye liquor may be applied to the fabric by any suitable padding mangle. Thus the fabric

may be passed between two rolls, the lower one of which dips in the dye liquor. If desired the fabric may be passed continuously through the dye liquor and then between rolls. The nip of the rolls is regulated so that the required amount of dye liquor is retained by the fabric to obtain the desired depth of color. If desired a small amount of thickening agent such as gum arabic, gum tragacanth or Colloresin (water soluble methyl cellulose) may be added to the dye liquor, and the material applied to the fabric by means of pin rolls or all-over rolls.

After application of the dye liquor, the fabric may be batched and then dried or it may be directly given a simple drying at temperatures below 100° C., say 60 to 90° C. by passing the fabric through chambers containing heated air, or over heated drums or cans. To obtain maximum fastness to soaping and for most successful results, it is important that the ethyl lactate or other volatile organic liquid employed should be completely removed by the drying process. The fabric may then be rinsed or given any other suitable after treatment.

In order further to illustrate my invention, the following specific example is given.

Example

A fabric consisting of cellulose acetate yarn is padded with a dye liquor of the following composition:

	Parts by weight
Dyestuff	0.5 to 2
Ethyl lactate	300 to 400
Water	700 to 400

The dyestuff used may be any one or more of the following: milling green (color index No. 667); chloramine black J (Sandoz) (color index No. 581); acridine red (color index No. 740); chromazurine H. B. (color index No. 879); palatin orange: palatin black (color index No. 241); benzyl violet (color index No. 683); cyanol blue; milling orange (color index No. 274); metanile yellow (color index No. 138); chomacetine blue S. (color index No. 884); acid blue N. V. S.; acridine orange (color index No. 788); astra violet; alkali blue (color index No. 704); rhoduline blue (color index No. 658); orange II (color index No. 151); neolane orange; chrysophenine (color index No. 365); rhoduline yellow 6 G. (color index No. 815); milling red (color index No. 344); induline (color index No. 861); acridine red P. S. (color index No. 740); induline brown; polar red (color index No. 430); benzyl green (color index No. 667); wool blue acid N; formyl violet 5 B. (color index No. 698) and rhodamine 3 G. O. (color index No. 749).

The nip of the roll is arranged so that an amount of dye liquor to obtain the desired depth of color is taken up by the fabric. The fabric is then dried at 70 to 80° C. for sufficient time to cause complete vaporization of the ethyl lactate. The fabric is then rinsed and then may be scoured or given any other desired treatment.

The colorations obtained are quite brilliant and are of great depth for the amount of dyestuff employed. Moreover the color is surprisingly fast to soaping.

The term "mechanical impregnation" as used hereinafter in the claims connotes any method of applying a reagent in which, as opposed to a bath treatment process, the whole quantity of reagent is applied to the goods in such an amount of vehicle as can be completely retained by the said goods.

The foregoing detailed description is given merely by way of illustration and many variations may be made therein without departing from the spirit of my invention.

Having described my invention, what I desire to secure by Letters Patent is:

1. Method of coloring textile materials containing organic derivatives of cellulose comprising applying to the whole surface thereof, by mechanical impregnation, a dye liquor containing a volatile liquid that has at least a softening action on the organic derivative of cellulose and a dyestuff that has relatively little or no affinity for the organic derivative of cellulose when applied in simple dyebaths, and then drying.

2. Method of coloring textile materials containing cellulose acetate comprising applying to the whole surface thereof, by mechanical impregnation, a dye liquor containing a volatile liquid that has at least a softening action on the cellulose acetate and a dyestuff that has relatively little or no affinity for the cellulose acetate when applied in simple dyebaths, and then drying.

3. Method of coloring textile materials containing organic derivatives of cellulose comprising applying to the whole surface thereof, by mechanical impregnation, a dye liquor containing a volatile liquid of a boiling point above 100° C. that has at least a softening action on the organic derivative of cellulose and a dyestuff that has relatively little or no affinity for the organic derivative of cellulose when applied in simple dyebaths, and then drying.

4. Method of coloring textile materials containing cellulose acetate comprising applying to the whole surface thereof, by mechanical impregnation, a dye liquor containing a volatile liquid of a boiling point above 100° C. that has at least a softening action on the cellulose acetate and a dyestuff that has relatively little or no affinity for the cellulose acetate when applied in simple dyebaths, and then drying.

5. Method of coloring textile materials containing cellulose acetate comprising applying to the whole surface thereof, by mechanical impregnation, a dye liquor containing ethyl lactate and a dyestuff that has relatively little or no affinity for the cellulose acetate when applied in simple dyebaths and then drying.

6. Method of coloring fabric containing organic derivative of cellulose yarn comprising padding the fabric with a dye liquor containing a suitable dyestuff and a volatile liquid having a boiling point above 100° C. that has at least a softening action on the organic derivative of cellulose and then drying the fabric.

7. Method of coloring fabric containing cellulose acetate yarn comprising padding the fabric with a dye liquor containing a suitable dyestuff and a volatile liquid having a boiling point above 100° C. that has at least a softening action on the cellulose acetate and then drying the fabric.

8. Method of coloring fabric containing cellulose acetate yarn comprising padding the fabric with a dye liquor containing a suitable dyestuff and a volatile liquid having a boiling point above 100° C. that has at least a softening action on the cellulose acetate and then drying the fabric at a temperature below 100° C.

9. Method of coloring fabric containing organic derivative of cellulose yarn comprising padding the fabric with a dye liquor containing a suitable dyestuff which has little or substantially no

affinity for the organic derivative of cellulose when applied in simple dyebaths and a large amount of a volatile liquid having a boiling point above 100° C. that has at least a softening action on the organic derivative of cellulose, and then drying the fabric.

10. Method of coloring fabric containing cellulose acetate yarn comprising padding the fabric with a dye liquor containing a suitable dyestuff which has little or substantially no affinity for the cellulose acetate when applied in simple dyebaths and a large amount of a volatile liquid having a boiling point above 100° C. that has at least a softening action on the cellulose acetate, and then drying the fabric.

11. Method of coloring fabric containing cellulose acetate yarn comprising padding the fabric with a dye liquor containing ethyl lactate and a suitable dyestuff and then drying the fabric.

12. Method of coloring fabric containing cellulose acetate yarn comprising padding the fabric with a dye liquor containing ethyl lactate and a suitable dyestuff that has substantially no affinity for the cellulose acetate when applied in simple dyebaths and then drying the fabric.

13. Method of coloring fabric containing cellulose acetate yarn comprising padding the fabric with a dye liquor containing ethyl lactate and a suitable dyestuff that has substantially no affinity for the cellulose acetate when applied in simple dyebaths and then drying the fabric at a temperature below 100° C.

CAMILLE DREYFUS.

CERTIFICATE OF CORRECTION.

Patent No. 1,968,819. August 7, 1934.

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, line 84, for "or" read of; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 11th day of September, A. D. 1934.

Leslie Frazer

(Seal) Acting Commissioner of Patents.

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