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PRINTING OF ANIMAL FIBERS WITH MORDANT DYESTUFFS

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Acid mordant dyestuffs with chromium mordants can, up to the present, when used for printing wool, only be sufficiently fixed by a steaming operation of long duration, namely of one hour and even longer. For certain articles, however, a long steaming operation is a disadvantage, quite apart from the consumption of time and of steam, in that in overprinting on light ground shades, for example, the ground shade easily becomes yellow.

It has now been found that it is possible to fix acid mordant dyestuffs on wool completely by a short steaming operation, such as steaming for 8 minutes in a Mather-Platt apparatus. For this purpose it has been found necessary to use in the printing paste an increased or substantial proportion of a non-volatile organic acid, such as oxalic acid, tartaric acid, citric acid, adipic acid and the like, whereby the acid conditions which promote the fixation of the dyestuff on animal fibers are given throughout the whole steaming operation. The simplest way is to add a sufficient quantity of such an acid to the printing paste. Printing pastes containing such acid in free state are often insufficiently stable. The desired result can also be attained by producing the said acid in the printing pastes themselves by dissociation of salts thereof, for instance of ammonium salts of such acids or corresponding chromium salts like chromium oxalate, chromium tartrate, chromium citrate, during the steaming operation. The various ways of working may also be combined. Thus, for example, the addition of free acid to a printing paste containing already an ammonium salt or a chromium salt of such an acid, or both, is suitable for the purpose of the present invention.

Besides having the advantage that it shortens the duration of the steaming operation, the new process offers other advantages in so far as the prints obtained are much fuller and have an improved fastness to rubbing. In most cases these results can further be enhanced by the simultaneous use of urea or thio-urea in the printing paste.

The new process can not only be applied to wool, but also to silk, in general to animal fibers. It gives good results not only in proper printing, but also in the production of padded dyeings on the aforesaid fibers.

In hitherto known printing prescriptions, the use of oxalate of ammonia for example has already been indicated. This body, however, was evidently used in quantities insufficient for the purpose of the present invention, since for a complete fixation of the dyestuffs a steaming operation of 1–2 hours was always necessary. Contrarily to this, according to the present process, when an increased quantity of oxalate of ammonia—for instance at least 4 per cent of the said salt for 3 per cent dyestuff—is added to the printing paste, already by a short steaming—8 minutes—a complete fixation is attained. In this simple manner a problem set to the practice long ago has been solved.

The same result is obtained, when the other cited non-volatile organic acids, respectively their dissociable salts, like ammonium salts, chromium salts are used.

The improved process is illustrated by the following examples:

Example 1

	Parts
Dyestuff according to Example 1 of U. S. Patent No. 1,895,545 (sulphonated anilido compound of the gallocyanine dyestuff from nitrosodiethyl-meta-toluidine and gallic acid)	60
Urea	60
Hot water	190
Tragacanth thickening	550
Ammonium oxalate (solid)	50
these ingredients being mixed, heated up for dissolution and then cooled down, thereupon there is added	
Chromium acetate solution (20° Bé.)	90
	1000

Example 2

	Parts
Chromocitronine R (see Color Index No. 441)	60
Urea	90
Hot water	170
Tragacanth thickening	600
Ammonium oxalate (solid)	50
are heated up for dissolution and cooled down, whereupon there is added	
Chromium acetate solution (20° Bé.)	90
	1000

Example 3

	Parts
Chromorhodine BR (see Color Index No. 762)	30
Urea	60
Water	170
Tragacanth thickening	600

Ammonium oxalate (solid)	50
are heated up to dissolve and cooled down, whereupon there is added	
Chromium acetate solution (20° Bé.)	90
	1000

Example 4

	Parts
Chromocitronine R (see Color Index No. 441)	30
Water	260
Tragacanth thickening	570
Ammonium tartrate (solid)	50
are heated up to dissolve and cooled down, whereupon there is added	
Chromium acetate solution (20° Bé.)	90
	1000

Example 5

	Parts
Chromocitronine R (see Color Index No. 441)	30
Urea	60
Water	220
Tragacanth thickening	600
Ammonium oxalate (solid)	50
Chromium tartrate (solid)	40
	1000

The thus prepared printing colours are printed on wool, dried, steamed for 8 minutes, washed and dried. Intense blue, yellow or rose prints fast to rubbing are obtained. In a similar way prints on natural silk are produced.

What I claim is:—

1. A process for producing prints or dyeings on animal fibers with acid mordant dyestuffs by steaming, said prints or dyeings being fast to rubbing and of deep intensity, which consists in adding to the printing paste or padding solution, besides the usual ingredients, at least 4 per cent of a non-volatile acid for 3 per cent of dyestuff, so that the acid condition is maintained throughout steaming, printing or padding the fabric with the thus prepared printing paste or padding solution and fixing the dyestuff on the fiber by a steaming for about 8 minutes.

2. A process for producing prints or dyeings on animal fibers with acid mordant dyestuffs by steaming, said prints or dyeings being fast to rubbing and of deep intensity, which consists in adding to the printing paste or padding solution, besides the usual ingredients, at least 4 per cent of a non-volatile organic acid for 3 per cent of dyestuff, so that the acid condition is maintained throughout steaming, in combination with an urea compound, printing or padding the fabric with the thus prepared printing paste or padding solution and fixing the dyestuff on the fiber by a steaming for about 8 minutes.

3. A process for producing prints or dyeings on animal fibers with acid mordant dyestuffs by steaming, said prints or dyeings being fast to rubbing and of deep intensity, which consists in adding to the printing paste or padding solution, besides the usual ingredients, a dissociable salt of a non-volatile organic acid in a quantity capable of yielding at least 4 per cent of acid for 3 per cent of dyestuff, when heated, so that the acid condition is maintained throughout steaming, printing or padding the fabric with the thus prepared printing paste or padding solution and fixing the dyestuff on the fiber by a steaming for about 8 minutes.

4. A process for producing prints or dyeings on animal fibers with acid mordant dyestuffs by steaming, said prints or dyeings being fast to rubbing and of deep intensity, which consists in adding to the printing paste or padding solution, besides the usual ingredients, a dissociable salt of a non-volatile organic acid, in a quantity, capable of yielding at least 4 per cent of acid for 3 per cent of dyestuff, when heated, so that the acid condition is maintained throughout steaming, in combination with an urea compound, printing or padding the fabric with the thus prepared printing paste or padding solution and fixing the dyestuff on the fiber by a steaming for about 8 minutes.

5. A process for producing prints or dyeings on animal fibers with acid mordant dyestuffs by steaming, said prints or dyeings being fast to rubbing and of deep intensity, which consists in adding to the printing paste or padding solution, besides the usual ingredients, an ammonium salt of a non-volatile organic acid in a quantity capable of yielding at least 4 per cent of acid for 3 per cent of dyestuff, when heated, so that the acid condition is maintained throughout steaming, printing or padding the fabric with the thus prepared printing paste or padding solution and fixing the dyestuff on the fiber by a steaming for about 8 minutes.

6. A process for producing prints or dyeings on animal fibers with acid mordant dyestuffs by steaming, said prints or dyeings being fast to rubbing and of deep intensity, which consists in adding to the printing paste or padding solution, besides the usual ingredients, ammonium oxalate in a quantity capable of yielding at least 4 per cent of acid for 3 per cent of dyestuff, when heated, so that the acid condition is maintained throughout steaming, printing or padding the fabric with the thus prepared printing paste or padding solution and fixing the dyestuff on the fiber by a steaming for about 8 minutes.

7. A process for producing prints or dyeings on animal fibers with acid mordant dyestuffs by steaming, said prints or dyeings being fast to rubbing and of deep intensity, which consists in adding to the printing paste or padding solution, besides the usual ingredients, a chromium salt of a non-volatile organic acid in a quantity capable of yielding at least 4 per cent of acid for 3 per cent of dyestuff, when heated, so that the acid condition is maintained throughout steaming, printing or padding the fabric with the thus prepared printing paste or padding solution and fixing the dyestuff on the fiber by a steaming for about 8 minutes.

8. A process for producing prints or dyeings on animal fibers with acid mordant dyestuffs by steaming, said prints or dyeings being fast to rubbing and of deep intensity, which consists in adding to the printing paste or padding solution, besides the usual ingredients, chromium tartrate in a quantity capable of yielding at least 4 per cent of acid for 3 per cent of dyestuff, when heated, so that the acid condition is maintained throughout steaming, printing or padding the fabric with the thus prepared printing paste or padding solution and fixing the dyestuff on the fiber by a steaming for about 8 minutes.

9. A process for producing prints or dyeings on animal fibers with acid mordant dyestuffs by steaming, said prints or dyeings being fast to rubbing and of deep intensity, which consists in adding to the printing paste or padding solution, besides the usual ingredients, an ammonium salt

of a non-volatile organic acid in a quantity capable of yielding at least 4 per cent of acid for 3 per cent of dyestuff, when heated, so that the acid condition is maintained throughout steaming, in combination with an urea compound, printing or padding the fabric with the thus prepared printing paste or padding solution and fixing the dyestuff on the fiber by a steaming for about 8 minutes.

10. A process for producing prints or dyeings on animal fibers with acid mordant dyestuffs by steaming, said prints or dyeings being fast to rubbing and of deep intensity, which consists in adding to the printing paste or padding solution, besides the usual ingredients, ammonium oxalate in a quantity capable of yielding at least 4 per cent of acid for 3 per cent of dyestuff, when heated, so that the acid condition is maintained throughout steaming, in combination with urea, printing or padding the fabric with the thus prepared printing paste or padding solution and fixing the dyestuff on the fiber by a steaming for about 8 minutes.

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