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RESIST COLOR PRINTING

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This invention relates to the production of resist effects illuminated with vat dyestuffs.

According to the invention I apply to a fabric composed wholly or partly of cellulosic fibre, for instance, cotton or viscose rayon, a vat dyestuff printing paste comprising, together with other usual ingredients, an organic isocyanate of the formula R—N=C=O in which R is a normal or branched chain saturated or unsaturated aliphatic hydrocarbon radical containing at least eight carbon atoms; I then steam the fabric, preferably after drying it and dye it with any suitable dyestuff to give colored patterns on a differently colored ground. The ground color is preferably applied by padding.

An example of a suitable compound of formula R—N=C=O is heptadecylisocyanate. Alternatively there may be used, for example, octyl, nonyl, decyl, undecyl, dodecyl, tridecyl, tetradecyl, pentadecyl, cetyl, octadecyl, eikosyl, 2-ethylhexyl, 3-ethylnonyl or octadecenyl-isocyanate, likewise mixtures of isocyanates such as may be obtained from the mixed amines derived from the mixed acids obtained from coconut oil or stearin. These isocyanates may conveniently be prepared by the profess described in the specification of British Patent 485,761.

If desired, the said isocyanates may be used in conjunction with other known resist agents, for example, gelatine, glue size, or other proteins or albumenoids.

It is convenient to employ the isocyanates in the form of aqueous emulsions or suspensions which may be produced, if desired, with the aid of an emulsifying agent such, for example, as a sulphated fatty alcohol.

As dyestuffs for providing the ground color I use vat dyestuffs (applied either as such from reduction medium or in the soluble leuco ester form), azoic colors applied, for instance as ready-for-printing preparations of, e. g., diazoamino compound and coupling component, and mordant dyestuffs.

In carrying the invention into practical effect it is preferable to work as far as possible at low temperatures, as by using cold padding liquors and drying the fabric after padding by means of hot air rather than by passing it over heated cylinders. It is believed that the success of the process depends upon the production during the steaming operation (which also serves to fix the vat dyestuff on the fibre) of temporarily water-repellent areas on the fabric where the printing paste has been applied. Such water-repellency would be impaired or destroyed by working at elevated temperatures.

Padding is preferably done through the nip to minimise the time of contact of the fabric with the padding liquor.

As thickening agent there may be used, for example, British gum, starch-British gum, gum Senegal or gum Arabic.

The following examples, in which parts are by weight, serve to illustrate but do not limit the invention.

Example 1

A cellulosic fabric, for instance, cotton or viscose rayon, is printed in the usual way with one of the following vat dyestuff printing pastes:

	A	B
	Parts	*Parts*
Flavanthrone, 7% aqueous paste	10	
Dimethoxydibenzanthrone, 7% aqueous paste		10
Sodium formaldehyde sulphoxylate	8	8
Potassium carbonate	13	13
Starch—British gum thickening 1:1	40	45
Zinc oxide powder	10	
Heptadecylisocyanate	4	4
Sodium cetyl sulphate	0.2	0.2
Water	14.8	19.8
	100	100

After printing it is dried, steamed at 100° C. for 5–20 minutes and nip-padded with one of the following solutions of leuco esters of vat dyestuffs:

	A	B
	Parts	*Parts*
Sulphuric ester of leuco dimethoxy-dibenzanthrone 12% aqueous paste	3	
Sulphuric ester of leuco 6:6'-diethoxy-2:2'-bis-thionaphthenindigo		0.7
Tragacanth thickening 1:1	5	5
Sodium nitrite 30% aqueous solution	3	3
Water	89	91.3
	100	100

Solution A is employed with material which has been printed with the printing paste A, and solution B with material printed with the paste B.

After padding, the material is dried, developed by passage through a 2% aqueous solution of sulphuric acid (168° Tw.) at 70° C., thoroughly washed and soaped at the boil.

Treatment A gives a bright clear-cut yellow pattern on a green ground; treatment B a bright clear-cut green pattern on an orange ground.

Example 2

A cotton fabric is printed with one of the following vat dyestuff printing pastes:

	A	B
	Parts	*Parts*
Flavanthrone, 7% aqueous paste	10	
6:6'-diethoxy-2:2'-bis-thionaphthen indigo 10% paste		7
Sodium formaldehyde sulphoxylate	8	8
Potassium carbonate	13	13
Starch—British gum thickening 1:1	55	55
Heptadecylisocyanate	4	4
Sodium cetyl sulphate	0.2	0.2
Water	9.8	12.8
	100	100

The fabric is then dried, steamed at 100° C. for 5–20 minutes and padded in the following solution:

	Parts
Dimethoxydibenzanthrone 7% aqueous paste	1
Sodium formaldehyde sulphoxylate	5
Potassium carbonate	8
Tragacanth thickening 1:1	5
Water	81
	100

The fabric is then dried, steamed, oxidised and soaped at the boil.

There is thus obtained a bright clear-cut yellow (A) or orange (B) pattern on a green ground.

Example 3

A cotton fabric is printed with one of the following vat dyestuff printing pastes:

	A	B
	Parts	*Parts*
Flavanthrone, 7% aqueous paste	10	
Dimethoxydibenzanthrone, 7% aqueous paste		10
Sodium formaldehyde sulphoxylate	8	8
Potassium carbonate	13	13
Starch—British gum thickening 1:1	45	45
Heptadecylisocyanate	4	4
Sodium cetyl sulphate	0.2	0.2
Water	19.8	19.8
	100	100

The material is then dried and steamed as in Example 1, padded with one of the following:

	A	B
	Parts	*Parts*
An ice colour preparation containing a diazoimino compound from 4-benzoylamino-2:5-diethoxyaniline and β-hydroxynaphthoic anilide, in the usual commercial form as 75% powder	2	
An ice colour preparation containing a diazoimino compound from 4-chloro-o-toluidine and β-hydroxynaphthoic-o-toluidide, in the usual commercial form as 65% powder		0.7
Sodium cetyl sulphate		0.2
Caustic soda solution 90° Tw	2	1
Tragacanth thickening 1:1	5	5
Water	91	93.1
	100	100

Solution A is used in conjunction with paste A; solution B with paste B.

The fabric is then dried and developed by steaming for ¼–½ hour in the presence of acetic and formic acid vapour and finally soaped at the boil.

Treatment A gives a bright clear-cut yellow pattern on a blue ground; treatment B a bright clear-cut green pattern on a pink ground.

Example 4

A cotton fabric is first prepared with the following coupling component solution:

	Parts
β-Hydroxynaphthoic anilide	1.5
Diacetone alcohol	1.5
Caustic soda solution 90° Tw	1.5
Sodium cetyl sulphate	0.2
Water	95.3
	100

The fabric is then dried, printed as in Example 2B, dried, steamed at 100° C. for 5–10 minutes and then padded with the following diazo solution:

	Parts
Stabilised tetrazo compound from dianisidine (in its usual commercial form as 20% powder)	3
Tragacanth thickening 1:1	5
Water	92
	100

The material is then dried, washed and soaped at the boil. There is thus obtained a bright clear-cut orange pattern on a blue ground.

Example 5

A cellulosic fabric (cotton or viscose rayon) is printed with a vat dyestuff paste in the following composition:

	Parts
6:6'-dichloro-2:2'-bis-thionaphthen-indigo 12% aqueous paste	8
Sodium formaldehyde sulphoxylate	8
Potassium carbonate	13
Starch-British gum thickening 1:1	45
Heptadecylisocyanate	2
Sodium cetyl sulphate	0.1
Water	23.9
	100

The fabric is dried, steamed at 100° C. for 10 minutes and nip-padded with the following solution:

	Parts
α-Nitroso-β-naphthol as 85% powder	2
Ferrous sulphate aqueous solution 21° Tw	4
Tragacanth thickening 1:1	5
Water	89
	100

It is then air-dried, immersed for 2 minutes in a boiling 2% solution of sodium carbonate, washed and soaped at the boil. There is thus obtained a bright clear-cut pink pattern on a green ground.

Example 6

A cotton fabric is printed with a dyestuff paste of the following composition:

	Parts
5:7:5':7'-tetrabromoindigo 38% aqueous paste	4
Sodium formaldehyde sulphoxylate	8
Potassium carbonate	13
Starch-British gum thickening 1:1	45
Heptadecylisocyanate	2
Sodium cetyl sulphate	0.1
Water	27.9
	100

The fabric is dried, steamed at 100° C. for 10 minutes and nip-padded with the following solution:

	Parts
3-nitroalizarine 15% aqueous paste	2
Acetate of chrome liquor 28° Tw.	8
Tragacanth thickening 1:1	5
Water	85
	100

It is then air-dried, steamed at 100° C. for ½-hour, washed and soaped at the boil. There is thus obtained a bright clear-cut blue pattern on a brown ground.

Example 7

A cotton fabric is prepared by padding with a 1% solution of sodium nitrite, dried and printed as in Example 2B. After steaming at 100° C. for 5–10 minutes it is padded with the following ester salt solution:

	Parts
Sulphuric ester of leuco 16:17-diethylene ether of dihydroxy-dibenzanthrone 20% aqueous paste	3
Tragacanth thickening 1:1	5
Water	92
	100

The fabric is then air-dried, developed by passage through a 2% aqueous solution of sulphuric acid (168° Tw.) at 70° C., thoroughly washed and soaped at the boil. There is thus obtained a bright clear-cut orange pattern on a blue ground.

Example 8

Cotton fabric is printed and steamed as in Example 2B and is then padded in a liquor of the following composition:

	Parts
Dimethoxydibenzanthrone 7% aqueous paste	2
Caustic soda aqueous solution 90° Tw.	2
Sodium hydrosulphite	2
Water	44
Tragacanth thickening 1:1	5
Water	45
	100

In making up the liquor the first four ingredients are heated together until the dyestuff is completely dissolved. The solution is then cooled and the tragacanth thickening and additional water (previously mixed) are added.

The fabric is exposed to the air for ½-minute and then oxidised in the manner usual for vat dyestuffs. It is finally soaped at the boil. There is thus obtained a bright clear-cut orange pattern on a green ground.

I claim:

1. A process for the production of resist effects illuminated with vat dyestuffs on fabrics composed wholly or partly of cellulosic fiber which comprises applying to the said fabric a vat dyestuff printing paste containing an organic isocyanate of the formula R—N=C=O wherein R stands for an aliphatic hydrocarbon radical having at least eight carbon atoms, steaming the fabric, and applying to it another dyestuff to produce a differently colored ground.

2. A process as claimed in claim 1 in which the dyestuff used to provide the ground shade is one selected from the group consisting of another vat dyestuff, an azoic color, and a mordant dyestuff.

3. A process as claimed in claim 1 in which the organic isocyanate which is employed is heptadecyl isocyanate.

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