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DISCHARGE PRINTING

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7 Claims. (Cl. 8—5)

This invention relates to the production of differential color effects on fabrics and relates more particularly to the discharge printing of fabrics containing yarns of cellulose acetate or other organic derivatives of cellulose.

An object of our invention is to produce discharge prints on fabrics, the designs of which prints have sharp outlines. Another object of our invention is to produce discharge prints on fabrics of cellulose acetate or other organic derivatives of cellulose while employing reducing agents which are insoluble or difficultly soluble in water. Further objects of our invention will appear from the following detailed description.

The production of discharge prints on fabrics made of cellulose acetate yarn wherein the outlines are sharp and well defined has presented serious difficulties, since the discharge pastes employed tends to "creep" or "flush". We have discovered that this is due to the fact that the discharging agents heretofore employed are soluble in the water of the printing paste and the solution of the discharging agent tends to creep beyond the borders of the design. We have found that if an insoluble or difficultly soluble discharging agent is employed, discharge prints of sharp outline may be produced.

In accordance with our invention we prepare discharge effects on fabrics by locally applying thereto a discharge paste containing an insoluble or difficultly soluble discharge agent. After application of the discharge printing paste the fabric is aged or steamed and is then given any desired after treatment.

This invention is of general application and may be applied to the treatment of fabric containing any kind of fibre. However, it is particularly applicable to the treatment of fabric containing yarns of organic derivatives of cellulose such as organic esters of cellulose and cellulose ethers. Examples of organic esters of cellulose are cellulose acetate, cellulose formate, cellulose propionate and cellulose butyrate while examples of ethers of cellulose are ethyl cellulose, methyl cellulose and benzyl cellulose. The fabric need not consist wholly of yarns of organic derivatives of cellulose but may also contain yarns of other fibres such as reconstituted cellulose, silk, cotton or wool.

The fabric prior to discharge printing is dyed with any suitable dischargeable dye, examples of which are 4-nitro-2-methoxybenzene azo-4'-dimethylaminobenzene (red): Dianisidine blue (Color Index No. 499); amido-azo-phenyl-dimethylaniline coupled with beta hydroxy naphthoic acid (black); para nitrobenzene azo 4-diphenylamine (orange); and benzene azo 1-naphthalene-4-azo-4'-hydroxy benzene (golden orange).

The discharging agent employed for the discharge printing is an insoluble or difficultly soluble material, which is preferably in finely divided form. Examples of suitable discharging agents are the sulfoxylate formaldehydes of calcium, barium, magnesium or strontium. These materials may be ground in a ball mill or colloid mill to obtain very fine size if desired. The discharge paste may also contain a quantity of more soluble discharging agents such as sodium hydrosulfite or sodium sulfoxylate formaldehyde.

For producing colored or illuminated discharges, the paste containing the discharging agent may contain any suitable dyestuff that is resistant to the action of the discharging agents. Examples of such are vat dyestuffs in the reduced form such as Ciba yellow G (Color Index No. 1196); Algol scarlet G (Color Index No. 1129); Ciba pink B (Color Index No. 1207); Helindone orange R (Color Index No. 1217); Anthrene jade green (Color Index No. 1101).

To produce best results, the discharge printing pastes also contain swelling agents or penetrating agents for the material, examples of such agents in the case of cellulose acetate being ethyl alcohol, diethylene glycol, the thiocyanates of sodium, potassium or ammonium, etc. Discharge assistants such as anthraquinone may also be added to the paste. The discharge paste of course contains suitable thickeners such as gum arabic, gum tragacanth, British gum, etc.

The discharge paste may be applied to the fabric by means of engraved or embossed rollers or plates, by stencilling or any other suitable means and the fabric is then dried, for example, by passing through a drying tower or over heating cams or drums. The printing pastes are then fixed by passing the fabric through an ager or a cottage steamer where it is subjected to steam under ordinary pressure or superatmospheric pressure of 2 to 10 lbs. per square inch. If vat colors are used in the discharging paste the fabric may be then subjected to an oxidizing bath, then scoured, rinsed and dried.

By this invention, fabrics having a colored or white design on colored backgrounds are produced, the outlines of which designs are sharp, clearly defined and free of flushing.

In order further to illustrate our invention, but without being limited thereto, the following specific examples are given.

Example I

A fabric consisting wholly of cellulose acetate yarn is first dyed with any of the following dyes: 4-nitro-2-methoxybenzene azo 4'-dimethylamino benzene (red); Dianisidine blue (Color Index No. 499) or amino-azo-phenyl-dimethylaniline coupled with beta hydroxy naphthoic acid (black). To this dyed fabric there is locally applied a discharge paste made up as follows:

	Parts by weight
Gum arabic (1:1)	37
Anthraquinone (30%)	3
Diethylene glycol	15
Barium sulfoxylate formaldehyde	40
Potassium thiocyanate	5

The fabric is then steamed with water at ordinary pressure for 30 minutes and white or light colored discharges of sharp outline are obtained.

Example II

The fabric dyed as in Example I is printed with the following paste:

	Parts by weight
Gum arabic (1: 1)	42
Water	10
Anthraquinone (30%)	3
Diethylene glycol	15
Magnesium sulfoxylate formaldehyde	30

The fabric is then treated with steam at atmospheric pressure for ½ hour. White or light colored discharges of sharp outline are obtained.

Example III

The fabric dyed as in Example I is printed with the following paste:

	Parts by weight
Gum arabic (1: 1)	42
Water	10
Anthraquinone (30%)	3
Diethylene glycol	15
Calcium sulfoxylate formaldehyde	30

The fabric is steamed for ½ hour with steam under ordinary pressure with results similar as above.

Example IV

Fabric dyed as in Example I is printed with the following paste:

	Parts by weight
Indanthrene Golden yellow GK	10
Anthraquinone (30%)	3
Gum arabic (1: 1)	49
Water	5
Caustic soda	2
Sodium hydrosulfite	3

These ingredients are heated until they are vatted, and then there are added:

	Parts by weight
Sodium sulfoxylate formaldehyde	5
Barium sulfoxylate formaldehyde	5
Diethylene glycol	15
Potassium thiocyanate	3

After application of the paste the fabrics are steamed for 10 minutes with steam under ordinary pressure and then oxidized in a bath containing soap and sodium perborate. Sharp designs of yellow color against the background of the dyed material are obtained.

It is to be understood that the foregoing detailed description is given merely by way of illustration and that many variations may be made therein without departing from the spirit of this invention.

Having described our invention what we claim and desire to secure by Letters Patent is:

1. Method of producing differential color effects comprising applying to a fabric containing organic derivative of cellulose yarn which is dyed with a dischargeable dye, a paste containing in the undissolved state a formaldehyde sulfoxylate that is insoluble or difficulty soluble in the liquid of the paste.

2. Method of producing differential color effects comprising applying to a fabric containing cellulose acetate yarn which is dyed with a dischargeable dye, a paste containing in the undissolved state a formaldehyde sulfoxylate that is insoluble or difficulty soluble in the liquid of the paste.

3. Method of producing discharge print effects having sharp outlines comprising applying to a fabric containing organic derivative of cellulose yarn which is dyed with a dischargeable dye, a paste containing an insoluble or difficulty soluble formaldehyde sulfoxylate in the undissolved state.

4. Method of producing discharge print effects having sharp outlines comprising applying to a fabric containing cellulose acetate yarn which is dyed with a dischargeable dye, a paste containing an insoluble or difficulty soluble formaldehyde sulfoxylate in the undissolved state.

5. Method of producing discharge print effects having sharp outlines comprising applying to a fabric containing cellulose acetate yarn which is dyed with a dischargeable dye, a paste containing an alkali earth metal in sulfoxylate formaldehyde in the undissolved state.

6. Method of producing discharge print effects having sharp outlines comprising applying to a fabric containing cellulose acetate yarn which is dyed with a dischargeable dye, a paste containing barium sulfoxylate formaldehyde in the undissolved state.

7. Method of producing colored discharge printing effects having sharp outlines comprising applying to a fabric containing cellulose acetate yarn which is dyed with a reducible dye, a paste containing a dye and an insoluble or difficulty soluble reducing discharging agent.

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CERTIFICATE OF CORRECTION.

Patent No. 1,957,491. May 8, 1934.

CAMILLE DREYFUS, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 118, claim 5, strike out the word "in"; and line 131, claim 7, strike out the words "reducing discharge agent" and insert instead formaldehyde sulfoxylate in the undissolved state; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 19th day of June, A. D. 1934.

Bryan M. Battey

(Seal) Acting Commissioner of Patents.