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TREATMENT OF CELLULOSE ACETATE OR PRODUCTS MADE THEREWITH

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This invention relates to the production of effects or patterns on woven, knitted or other textile fabrics made from or containing cellulose acetate threads or yarns.

It is known that when cellulose acetate artificial silk and particularly "dry spun" cellulose acetate artificial silk made from cellulose acetate solutions of relatively low concentrations, is subjected to the action of hot aqueous media, such for instance as hot or boiling water or soap solutions or solutions of acids or acid salts or other aqueous solutions, or of moist steam, but particularly of water, soap solutions or solutions of acids or acid salts between about 90° C. and the boiling point, or of moist steam, the cellulose acetate artificial silk can lose its natural high lustre to a greater or less extent and become converted to a more or less delustred condition.

In the present invention I utilize this property to produce locally, on fabrics made with or containing such threads or yarns, partial or entire loss of lustre in such form that the difference in lustre between the various portions of the fabrics constitutes a pattern or novel effect. Such patterns or effects may in some cases closely approach to the optical effect secured by production of patterns by weaving.

According to the present invention I produce the aforesaid patterns or novel effects on woven, knitted or other textile fabrics made from or containing cellulose acetate threads or yarns by the local application to said fabrics by any suitable means of one or more substances which modify, that is to say, accentuate, diminish, or prevent the delustring action of hot aqueous media or moist steam, and by subsequently subjecting the fabrics to the action of hot or boiling aqueous media or moist steam.

The said local application may be performed by any suitable means such for instance as printing, stencilling and the like, and may be applied to form any suitable or desired pattern for instance a figured design or pattern, or a ground or "blotch" which leaves a figured design or pattern in relief.

In performing the invention I may use any substances which accentuate, diminish or prevent the delustring action of hot or boiling aqueous media or moist steam.

Thus for instance I may use substances which mechanically resist the aforesaid delustring action, such for instance as waxes, resins, gums, pigments, or other substances capable of mechanically resisting the delustring action, for instance inorganic salts which are inert towards cellulose acetate. In employing such substances it will be understood that if the pattern is to remain definite the substance will be of an insoluble nature, particularly where delustring is to be achieved by use of liquors.

Further I may employ for the purpose of the invention substances which are solvents for cellulose acetate or which are soluble therein; such substances comprise very many varied classes of bodies, the following being given by way of illustration only; aromatic amines and substituted amines such as aniline, chloroanilines, alkylanilines, toluidines, anisidines and the like; hydroxy bodies of the aromatic series, for instance phenol, cresols, resorcine, catechole, naphthols, chlorphenols, chlor naphthols and the like; arylhalides and alkylhalides, for instance chlorbenzene, chlornaphthalenes, tetrachlorethane, trichlorethylene, and the like; hydroxy bodies of the aliphatic series, for instance gylcerine, alcohols, or chlorinated derivatives such as epichlorhydrin; esters, for instance aceto acetic ester; aldehydes for instance benzaldehyde; ketones for instance acetone; cyclic bases, for instance pyridine or quinoline; hydrogenated hydrocarbons and hydrogenated phenols for example hexa-hydrophenol, hexahydrobenzene, tetrahydronaphthalene and the like.

Many of such solvents or solutes of cellulose acetate tend to conserve the lustre in the portions of the cellulose acetate where they are applied, whilst others accelerate the delustring action of the aqueous media or moist steam. The behaviour of the solvents or solutes is however influenced by the conditions under which the aqueous media or moist steam are applied. Thus with only slightly moist steam the solvents or solutes generally cause a retarding of the delustring action at

the portions where they are applied, whereas with very moist steam or with hot aqueous treatments (as distinct from steaming) the solvents or solutes generally cause an acceleration of the delustring action at the portions where they are applied. For instance the following substances show a protective action on steaming, the operation being done by admitting steam at about 17 lbs. per square inch into a chamber, allowing free exit of the steam so that no pressure is allowed to accumulate, the temperature registering about 90°–100° C.: Aniline, parachloraniline, dimethylaniline, paratoluidine, paraanisidine, phenol, resorcine 10%, parachlorphenol, alphachlornaphthalene, tetrachlorethane, alcohol, glycerol, acetoacetic ester, acetone, pyridine, hexaline, nitrobenzene, whereas the following substances cause acceleration of the delustring action of steaming at 50°–60° C. i. e. steaming under conditions approximateing a warm damp atmosphere: Betanaphthol, parachlorphenol, alphachlornaphthalene, glycerol, benzaledehyde, pyridine. In employing such solvents or solules of cellulose acetate they may when soluble in water be applied in form of aqueous solutions or pastes; or when insoluble or insufficiently soluble in water they may be applied in solution in solvents which are nonsolvents for cellulose acetate, such for example as benzene or xylene, or dispersed in aqueous media by any of the methods known in the colloid arts.

After the local application of the substance or substances employed as hereinbefore explained for locally preventing, diminishing, or accentuating the delustring action on fabrics I subject the goods to the delustring action of any suitable hot or boiling aqueous media or moist steam. For instance I may employ water or soap solutions or solutions of acids or acid salts at about 90° C. to the boiling point or moist steam. When however, the substance applied locally is a solvent for cellulose acetate or is soluble therein and also when the substance applied locally is soluble in water, I preferably use humid steam for delustring, especially when it is desired to preserve the clarity of the pattern. With humid steam it is found in practice that the effect is greatly influenced by the humidity of the steam, the loss in lustre being generally proportional to the degree of humidity of the steam and length of treatment.

The steaming or hot aqueous treatments may be given in any suitable manner or with any suitable machines; for instance the steaming may be effected with the continuous steamer, the "ager" or the "cottage" steamer such as ordinarily employed in textile printing, and the hot aqueous treatments may be effected with the dipping frame, the "jigger"; the "winch" or "reel" or other machine such as ordinarily employed in the dyeing arts.

After subjecting the goods to the delustring action of the hot or boiling aqueous media or moist steam they may be subjected to any suitable treatment for removing the substance or substances employed for the local prevention, accentuating or diminishing of the delustring action, and the goods finished as desired.

According to the substance or substances chosen for the aforesaid local application and to the nature and duration of the aqueous or moist steam treatments an extremely wide variety of effects may be obtained, and these effects have the advantage of being produceable without deleteriously affecting the quality of the goods. The patterns or effects are moreover capable of resisting the effects of ordinary usage, such as light, laundering etc.

The process of the present invention may be applied to undyed or dyed goods, and if desired, undyed goods may be dyed subsequently to treatment by the process of the present invention.

When the goods are dyed subsequently the effects may, if desired be further enhanced by suitable choice of dyestuffs. Thus, delustred cellulose acetate artificial silk shows considerably altered affinity towards or rate of dyeing with many water soluble dyestuffs e. g. Capri blue, whereas delustring does not materially affect the rate of dyeing when employing dyeing methods such as described in British Patents Nos. 219,349, 224,925, 242,393 and 242,711 or in U. S. Patents 1,618,413 and 1,618,414 granted Feb. 22, 1927 and U. S. applications Ser. No. 48,666 filed Aug. 6, 1925 and 50,525 filed Aug. 15, 1925. Thus by suitable choice of dyestuffs the goods may if desired be dyed to yield varying or contrasting colour or tone effects as between the portions of the fabric showing varied lustre effects.

Furthermore suitable dyestuffs may be chosen according to properties and incorporated with the printing pastes so that besides differential lustre effects there are also differential colour effects thus adding to the variety of results achievable.

Again mixed goods containing cellulose acetate may render further effects possible since most other textile fibres do not tend in any considerable degree to lose lustre by the delustring methods herein described. In such mixed goods the cellulose acetate component only will respond to the processes described so that by using such combinations of fibres, for example, a warp of cotton and a weft of cellulose acetate in a woven fabric, very delicate and novel effects are possible; this may be further enhanced by taking advantage of the varied colour possibilities well known in the dyeing arts for cellulose acetate with other textile materials.

The following examples serve to illustrate how the present invention may be performed,

it being understood that they are in no way limitative.

Example I

The following printing paste is made up:—

	Parts
Betanaphthol	20
This is dispersed by heating with Turkey red oil (50%)	26
Gum tragon (6% solution)	54
	100

The whole paste is heated until as homogeneous as possible. The paste is printed in a suitable pattern by any customary means of application to a woven fabric composed of cellulose acetate yarns. The print is dried, steamed ½ hour in saturated steam at 212° F., rinsed, soaped and finished as desired. The printed portions lose lustre more rapidly than the unprinted and novel differential effects result.

Example II

The following paste is made:—

	Parts
Aceto acetic ester	10
dissolved in	
Turkey red oil 50%	5
and added to	
Gum tragon (6% solution)	35
Water	50
	100

The paste is heated until as homogeneous as possible. It is then printed by any suitable means on to a cellulose acetate fabric as in Example 1. The print is then dried, steamed ½ hour in saturated steam at 208° F., rinsed, soaped and finished as desired. The portions printed lose lustre less rapidly than the unprinted with resultant differential effects.

Example III

The following printing paste is made up:—

	Parts
Phenol	5
Turkey red oil (50%)	3
Gum tragon (6% solution)	45
Water	47
	100

The paste is warmed and stirred until as homogeneous as possible and printed by any suitable means on to a woven or knitted fabric made of cellulose acetate yarn. The print is then dried and steamed ½ hour with saturated steam at 200° F. The printed portions of the fabric lose their lustre more slowly and therefore become delustred to a lesser extent than the unprinted portions.

Example IV

A printing paste precisely similar to that in Example III is printed by any suitable means to woven or knitted fabric made from cellulose acetate yarn. The print is dried and steamed ½ hour with saturated steam at 208° F. The printed portions lose their lustre very rapidly and become delustred to a greater extent than the unprinted portions and to a greater extent than do the printed portions in Example III.

Example V

A fabric composed of cellulose acetate yarns is printed in a suitable manner with molten resin or colophony in the desired pattern or effect. The print is cooled to allow the resin to solidify and is then treated in water at 90–95° C. The print is then rinsed and the resin removed, preferably by treatment in a suitable solvent such as xylene. The printed portions are reserved against the hot aqueous treatment which causes the unprinted portions to suffer progressive loss of lustre resulting in the desired differential lustre effect.

The term "substances which are mutually soluble with cellulose acetate" as used hereinafter in the claims is to be understood to include both solvents for cellulose acetate and solutes, that is to say, substances which dissolve in cellulose acetate.

What I claim and desire to secure by Letters Patent is:—

1. Process for the production of effects on fabrics comprising cellulose acetate, comprising locally applying to the fabrics substances which are mutually soluble with cellulose acetate and thereafter subjecting the fabrics to the action of delustring agents.

2. Process for the production of effects on fabrics comprising cellulose acetate, comprising locally applying to the fabrics substances which are mutually soluble with cellulose acetate and thereafter subjecting the fabrics to the action of moist steam.

3. Process for the production of effects on fabrics comprising cellulose acetate, comprising locally applying to the fabrics dispersions of substances which are mutually soluble with cellulose acetate and thereafter subjecting the fabrics to the action of moist steam.

4. Process for the production of effects on fabrics comprising cellulose acetate, comprising locally applying to the fabrics preparations comprising dyestuffs for cellulose acetate and substances which are mutually soluble with cellulose acetate and thereafter subjecting the fabrics to the action of delustring agents.

5. Process for the production of effects on fabrics comprising cellulose acetate, comprising locally applying to the fabrics preparations comprising dyestuffs, for cellulose acetate and substances which are mutually solu-

ble with cellulose acetate and thereafter subjecting the fabrics to the action of moist steam.

6. Process for the production of effects on fabrics comprising cellulose acetate, comprising locally applying to the fabrics solvents for cellulose acetate and thereafter subjecting the fabric to the action of delustering agents.

7. Process for the production of effects on fabrics comprising cellulose acetate, comprising locally applying to the fabrics solvents for cellulose acetate and thereafter subjecting the fabric to the action of moist steam.

8. Process for the production of effects on fabrics comprising cellulose acetate, comprising locally applying to the fabrics dispersions of solvents for cellulose acetate and thereafter subjecting the fabric to the action of moist steam.

9. Process for the production of effects on fabrics comprising cellulose acetate, comprising locally applying to the fabrics preparations comprising dyestuffs for cellulose acetate and solvents for cellulose acetate and thereafter subjecting the fabrics to the action of delustering agents.

10. Process for the production of effects on fabrics comprising cellulose acetate, comprising locally applying to the fabrics preparations comprising dyestuffs for cellulose acetate and solvents for cellulose acetate and thereafter subjecting the fabrics to the action of moist steam.

11. Process for the production of effects on fabrics comprising cellulose acetate, comprising locally applying to the fabrics ester solvents for cellulose acetate and thereafter subjecting the fabrics to the action of delustering agents.

12. Process for the production of effects on fabrics comprising cellulose acetate, comprising locally applying to the fabrics ester solvents for cellulose acetate, and thereafter subjecting the fabrics to the action of moist steam.

13. Process for the production of effects on fabrics comprising cellulose acetate, comprising locally applying to the fabrics dispersions of ester solvents for cellulose acetate and thereafter subjecting the fabric to the action of moist steam.

14. Process for the production of effects on fabrics comprising cellulose acetate, comprising locally applying to the fabrics preparations comprising dyestuffs for cellulose acetate and ester solvents for cellulose acetate and thereafter subjecting the fabrics to the action of delustering agents.

15. Process for the production of effects on fabrics comprising cellulose acetate, comprising locally applying to the fabrics preparations comprising dyestuffs for cellulose acetate and ester solvents for cellulose acetate and thereafter subjecting the fabrics to the action of moist steam.

In testimony whereof I have hereunto subscribed my name.

GEORGE HOLLAND ELLIS.