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TREATMENT OF ARTIFICIAL MATERIALS

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FIG. 1

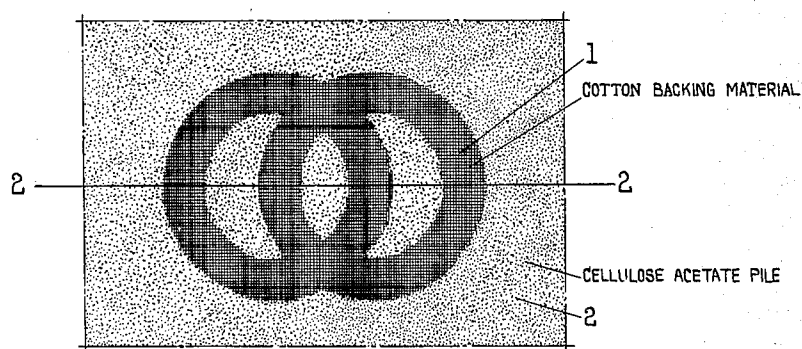
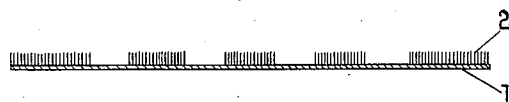


FIG. 2



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TREATMENT OF ARTIFICIAL MATERIALS

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14 Claims. (Cl. 41—41)

This invention relates to the treatment of artificial materials made from or containing organic derivatives of cellulose.

It is well known to apply to textile materials a treatment which results in removal of part of the material while leaving the remainder intact. Thus for example materials containing wool and cellulose may be treated with sulphuric acid or other suitable reagent so as to convert the cellulose into hydrocellulose without affecting the wool. After a suitable heat treatment the hydrocellulose may then be removed by mechanical means, for example by brushing. Again mixed materials containing wool and silk may be treated with steam at high temperatures in such a way that after drying the wool can be rubbed to a fine powder and so removed, the silk being unaffected. Processes such as these are known by the general term of "carbonizing processes". The method of carbonization has found many useful applications in the textile art. Thus, for example, it provides a method of removing cotton from admixture with wool or wool from admixture with silk in shoddy or other waste materials. Further it provides a valuable means of obtaining pattern effects. A pile fabric, for example, may be treated so as to remove selected portions of the pile while leaving the backing material and the remainder of the pile unaffected. Again embroidery may be worked upon a suitable backing material which may subsequently be removed by a process of carbonization which does not affect the embroidery itself. By treating fabrics woven from mixed yarns with a carbonizing agent capable of removing one constituent of the mixture without affecting the other, gauzes may be obtained. Moreover the production of these effects is not confined to the treatment of mixed materials; the effects may be produced upon materials, the fibres of which are all of the same chemical nature by the application of suitable resists to selected portions thereof.

According to the present invention we treat materials consisting of or containing organic derivatives of cellulose and in particular cellulose acetate with a treating agent comprising an organic liquid and an inorganic salt having a solvent or latent solvent action on the cellulose derivative, so as to attack at least part of the cellulose derivative without affecting the remainder of the material, and subsequently drying the material and removing the cellulose derivative attacked by suitable means.

The invention is particularly applicable to materials consisting of or containing cellulose ace-

tate but it may also be applied with valuable results to materials comprising other organic derivatives of cellulose, for example cellulose formate, propionate or butyrate and ethyl, methyl or benzyl cellulose.

The best results appear to be obtained when the organic liquid is itself a solvent for the cellulose derivative. Thus in the case of materials comprising cellulose acetate the best results appear to be obtained when an organic liquid consisting of or containing acetone is employed. Excellent results may however be obtained by the use of methyl or ethyl alcohol or other swelling agents for the cellulose acetate. Among the solvents or swelling agents with which good results have been obtained mention may be made of: diacetone alcohol, acetic acid, phenol, benzyl alcohol or cyclohexanol. When a low boiling liquid is employed it may be of advantage to add thereto a high boiling substance having solvent or latent solvent properties for the cellulose derivative, e. g. triacetin, in order to reduce the rate of evaporation. The organic liquid employed will naturally be selected having due regard to the particular inorganic solvent or swelling agent to be used and should be capable of dissolving the latter.

The inorganic swelling agent or solvent is preferably a metallic thiocyanate. Calcium thiocyanate has been found particularly suitable and excellent results are obtained by the application to the material of a solution of this salt in acetone or methylated spirit. Other inorganic salts which may also be employed with advantage include sodium thiocyanate, potassium thiocyanate and zinc chloride.

The treating liquid may be applied to the material by any suitable means, for example by printing, stencilling, padding, or immersion of the material in a bath containing the solvent liquid, as may be most convenient to obtain the particular effect required. A part of the material may if so desired be treated in such a way as to resist the action of the treating liquid, e. g. by the application of a suitable resist.

The treating agent may be applied in any suitable form, for example in the form of a liquid which may or may not contain suitable thickening agents, or in paste form.

After subjection to the action of the treating agent, the material is preferably dried, for example in an air oven or stove at a temperature of about 100 to 110° C. When thoroughly dry the part of the material affected by the treating agent is removed by suitable means, for example

by brushing. When the solution contains a thiocyanate the removal of the material attacked is best effected immediately after drying, otherwise on account of the deliquescent nature of thiocyanates, difficulty may be experienced in removing the material cleanly in the places required without affecting the remaining portions of the material.

The process of the invention may be applied to produce a large number of valuable effects among which may be mentioned, the removal of fibres of organic derivatives of cellulose from admixture with other fibres in waste materials, the production of gauzes by the treatment of fabrics woven from mixed yarns of organic derivatives of cellulose and other fibres whether of animal, vegetable or artificial origin, the removal of a backing consisting of an organic derivative of cellulose from an embroidery, and in particular, the production of pattern effects, especially upon pile or other fabrics.

Such pattern effects may be obtained by local application of the treating agent by any suitable means. We may instance the application by means of suitably engraved printing rolls or stencils, of a 50% solution of calcium thiocyanate in methylated spirits containing 5% of olive oil soap to a velvet having a pile of cellulose acetate upon a backing of non-cellulose derivative material, for example cotton, regenerated cellulose or silk. The swelling solution is preferably applied to the back of the fabric which is then heated in a stove at 100 to 110° C. until quite dry, when the affected portions of the cellulose acetate may be removed by brushing. Instead of applying a swelling solution to the back of the fabric it may be applied to the pile, which may if so desired be treated locally with suitable resists.

Coloured effects may be produced by the application of suitable dyestuffs or colouring agents in conjunction with the carbonizing process. For instance, when treating a cellulose acetate pile fabric having a backing of cotton or regenerated cellulose, the pile may at any stage in the process be printed or otherwise coloured by the application of a suitable colouring agent therefor, for example an S. R. A. dyestuff, while the backing may be printed or otherwise coloured by the application of a colouring agent having an affinity for cellulose, for example a direct cotton dye.

After the material has been dried and treated so as to remove the greater part of the affected material, it is preferably subjected to a scouring treatment in order to remove any of the swelling solution remaining together with any of the affected material which has not been removed by the mechanical treatment. It is also of advantage to scour the materials thoroughly before the application of the swelling solution in order to remove any grease present which might interfere with the process. When the solvent liquid contains a thiocyanate it is advisable to prevent contamination of the material with iron, but should a red colouration result owing to such contamination it may readily be removed by means of sulphur dioxide.

The effects produced in cellulose acetate pile fabrics treated according to the present invention are illustrated in the accompanying drawing, wherein

Fig. 1 represents a pile fabric woven with a cotton backing 1 and a cellulose acetate pile 2, from which fabric portions of the pile have been removed in the shaded areas, and

Fig. 2 shows a sectional view along the line 2—2 of Fig. 1.

The following examples illustrate without in any way limiting the invention.

Example 1

A solution is made by dissolving 50 parts by weight of calcium thiocyanate in 50 parts by weight of acetone. This solution is then applied by means of a printing block of the requisite design or in any other suitable manner, to the back of the fabric. The fabric may have a cotton back and a pile of cellulose acetate yarn or any other similar cellulose derivative, and should be scoured before treatment to remove any dirt or grease that may prevent the solution coming in contact with the material. The treated fabric is then placed in an oven or stove maintained at a uniform temperature between 100 and 110° C. until thoroughly dry. The treated pile is then removed by lightly brushing the fabric. This operation should be performed either in the stove or immediately on removal owing to the deliquescent nature of calcium thiocyanate which renders removal of the pile difficult after exposure to the air for any time. The fabric is then rescoured. Any discolouration produced by contact with iron may be removed by treatment with sulphur dioxide or other suitable bleaching agent.

Example 2

A solution is made by dissolving 50 parts by weight of ammonium thiocyanate in 50 parts by weight of acetone to which is added 5 parts by weight of diacetone alcohol. This solution is then applied in a similar manner to the method described in Example 1.

Example 3

A solution is prepared by dissolving 100 parts by weight of calcium thiocyanate in 100 parts by weight of methylated spirits to which is added one part by weight of olive oil soap.

This solution is then applied to the back of the fabric, having a cotton back and a pile preferably of cellulose acetate or any other similar cellulose derivative, by means of a printing block, or stencil of the requisite design or by any other suitable means, the fabric having been previously scoured. As some precipitation of the soap may take place on account of the presence of the calcium thiocyanate care should be taken that the solution is agitated before use.

The treated fabric is then dried in a stove maintained at 100–110° C. and immediately on removal or even in the stove itself, the fabric is brushed to remove the treated pile. The fabric may then be finished as described in Example 1.

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

1. Process for the treatment of textile materials containing organic derivatives of cellulose, which comprises treating at least a part of the organic cellulose derivative with a solution in a volatile organic liquid of an inorganic salt having a swelling action upon the cellulose derivative, and causing the organic liquid to evaporate until the treated material is in a solid condition and capable of removal by brushing.

2. Process for the treatment of textile materials containing organic derivatives of cellulose, which comprises treating at least a part of the organic cellulose derivative with a solution of an inorganic salt in a volatile liquid, the said salt and organic liquid each having at least a swell-

- ing action upon the cellulose derivative, and causing the organic liquid to evaporate until the treated material is in a solid condition and capable of removal by brushing.
- 5 3. Process for the treatment of textile materials containing cellulose acetate, which comprises treating at least a part of the cellulose acetate with a solution in a volatile organic liquid of an inorganic salt having a swelling action upon the cellulose acetate, and causing the organic liquid to evaporate until the treated material is in a solid condition and capable of removal by brushing.
- 10 4. Process for the treatment of textile materials containing cellulose acetate, which comprises treating at least a part of the cellulose acetate with a solution of an inorganic salt in a volatile liquid, the said salt and organic liquid each having at least a swelling action upon the cellulose acetate, and causing the organic liquid to evaporate until the treated material is in a solid condition and capable of removal by brushing.
- 15 5. Process for the treatment of textile materials containing acetone-soluble cellulose acetate, which comprises treating at least a part of the cellulose acetate with a solution of calcium thiocyanate in acetone, causing the acetone to evaporate until the treated material is in a solid condition and capable of removal by brushing, and thereafter removing the cellulose acetate affected.
- 20 6. Process for the treatment of textile materials containing acetone-soluble cellulose acetate, which comprises treating at least a part of the cellulose acetate with a solution of a metallic thiocyanate in acetone containing a relatively non-volatile solvent for the cellulose acetate, and causing the liquid constituents to evaporate until the treated material is in a solid condition and capable of removal by brushing, and thereafter removing the cellulose acetate affected.
- 25 7. Process for the treatment of textile materials containing acetone-soluble cellulose acetate, which comprises treating at least a part of the cellulose acetate with a solution of ammonium thiocyanate in acetone containing diacetone alcohol, causing the liquid constituents to evaporate until the treated material is in a solid condition and capable of removal by brushing, and thereafter removing the cellulose acetate affected.
- 30 8. Process for the treatment of textile materials containing organic derivatives of cellulose, which comprises treating at least a part of the organic cellulose derivative with a solution in a volatile organic liquid of an inorganic salt having a swelling action upon the cellulose derivative, and subsequently drying the material at a temperature between 100 and 110° C. to render the treated material capable of removal by brushing.
- 35 9. Process for the treatment of textile materials containing organic derivatives of cellulose, which comprises treating at least a part of the organic cellulose derivative with a solution in a volatile organic liquid of an inorganic salt having a swelling action upon the cellulose derivative together with a soap, and causing the organic liquid to evaporate until the treated material is in a solid condition and capable of removal by brushing.
- 40 10. Process for the treatment of textile materials containing cellulose acetate, which comprises treating at least a part of the cellulose acetate with a solution in a volatile organic liquid of an inorganic salt having a swelling action upon the cellulose acetate together with a soap, and causing the organic liquid to evaporate until the treated material is in a solid condition and capable of removal by brushing.
- 45 11. Process for the production of pattern effects upon textile materials containing cellulose acetate, which comprises locally treating the cellulose acetate with a solution in a volatile organic liquid of an inorganic salt having a swelling action upon the cellulose acetate, causing the organic liquid to evaporate until the treated material is in a solid condition and capable of removal by brushing, and thereafter removing the cellulose acetate affected.
- 50 12. Process for the production of pattern effects upon textile materials containing acetone-soluble cellulose acetate, which comprises treating the cellulose acetate locally with a solution of calcium thiocyanate in acetone, causing the acetone to evaporate until the treated material is in a solid condition and capable of removal by brushing, and thereafter removing the cellulose acetate affected.
- 55 13. Process for the production of pattern effects upon textile materials containing acetone-soluble cellulose acetate, which comprises treating the cellulose acetate locally with a solution of ammonium thiocyanate in acetone containing a relatively non-volatile solvent for cellulose acetate, causing the liquid constituents to evaporate until the treated material is in a solid condition and capable of removal by brushing, and thereafter removing the cellulose acetate affected.
- 60 14. Process for the production of pattern effects upon textile materials containing cellulose acetate, which comprises treating the cellulose acetate locally with a solution in a volatile organic liquid of an inorganic salt having a swelling action upon the cellulose acetate, drying the material at a temperature between 100 and 110° C. to render the treated material capable of removal by brushing, and thereafter removing the cellulose acetate affected.
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