

UNITED STATES PATENT OFFICE

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TREATMENT OF YARNS, FABRICS, FILMS, AND THE LIKE

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This invention relates to the loading of yarns or threads or woven, knitted or other textile fabrics or other materials made of or containing artificial filaments or fibres of cellulose acetate or other carboxylic acid esters of cellulose, for example cellulose formate, propionate or butyrate, or cellulose ethers, for example methyl, ethyl or benzyl cellulose, or the corresponding condensation products of cellulose and glycols or other polyhydric alcohols. The invention also relates to the loading of ribbons, films or similar products made of the aforesaid cellulose derivatives. All such yarns, threads, fabrics or other materials or ribbons, films or similar products are hereinafter included in the term materials comprising organic substitution derivatives of cellulose.

I have found that the said materials may be very easily loaded with loading agents of the kind employed for loading natural silk provided that the materials are treated either initially or before or during or both before and during any stage of the loading operation with urea, urethanes, thiourea, thiourethanes, guanidine or their alkyl or aryl substitution products, including mixed derivatives such as diethyldiphenyl urea. The said bodies are hereinafter referred to as ureoid bases.

The said ureoid bases may best be applied to the materials in aqueous solution.

Care should be taken to avoid using such concentrations, temperatures or other conditions as to produce tendering or loss of lustre or other undesirable effects on the quality or character of the materials.

The treatment with the ureoid base or aqueous solution thereof is usually applied before the loading operation proper, and may also with advantage be applied before each stage of the loading operation, or, when the cycle of loading operations is repeated, before each cycle or each stage of each cycle. Alternatively the ureoid base may be incorporated with each or any of the aqueous solutions used for loading.

The loading may be effected by treatment with any suitable loading agents. Thus, for example, the materials may be loaded with

insoluble compounds or salts such as tannates, phosphates or silicates by two stage processes involving the use or application of an aqueous solution of a chloride or other soluble salt of a metal, for example tin, zinc, aluminium, bismuth, tungsten, antimony, etc., preceded or followed by the application of a solution of tannic acid, a phosphate, silicate or other precipitant for the metal.

The materials loaded according to the present invention present a number of advantages over the unloaded materials. Thus the tendency of woven fabrics made of yarns of cellulose acetate or other organic substitution derivatives of cellulose to slip, that is to say for the yarns to become displaced in the fabric, the tendency of circular knitted fabrics to "ladder", and the tendency of warp knitted fabrics to "split" are all considerably reduced and may even be practically eliminated.

The loaded materials can also be subjected to higher temperatures than the unloaded materials without melting or becoming sufficiently plastic to endanger their characteristic form or structure, so that for example the possibility of damaging cellulose acetate and like fabric by using too hot an iron in ironing is lessened. The flammability of the materials is likewise reduced. Further the fullness or volume of the yarns, threads or fabrics is improved.

The manner in which the invention may be carried into effect is described in the following example which is purely illustrative but not limitative in character.

Example.—Cellulose acetate woven or knitted fabric is soaked for $\frac{1}{2}$ hour in a cold 2% solution of monomethyl urea. The fabric is removed, drained and steeped in a stannic chloride solution of 40° Tw. for half an hour, after which it may be rinsed and either washed thoroughly with water containing lime in solution or given a phosphate treatment by first thoroughly washing in warm water and then steeping in a bath of 12% sodium dihydrogen phosphate at 40° C. for half an hour, from which bath it is removed, rinsed and soaped and finally rinsed again.

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

1. Process for loading materials comprising organic substitution derivatives of cellulose, comprising treating the materials at any stage of the loading operation with a ureoid base.
2. Process for loading materials comprising organic substitution derivatives of cellulose, comprising treating the materials at any stage of the loading operation with an aqueous solution of a ureoid base.
3. Process for loading materials comprising organic substitution derivatives of cellulose, comprising treating the goods with an aqueous solution of a ureoid base and then with the loading agents.
4. Process for loading materials comprising organic substitution derivatives of cellulose, comprising treating the goods with an aqueous solution of a ureoid base and then loading with a tin compound.
5. Process for loading materials comprising organic substitution derivatives of cellulose, comprising treating the goods with an aqueous solution of a ureoid base and then loading by means of stannic chloride and a phosphate.
6. Process for loading materials comprising cellulose acetate, comprising treating the materials at any stage of the loading operation with a ureoid base.
7. Process for loading materials comprising cellulose acetate, comprising treating the materials at any stage of the loading operation with an aqueous solution of a ureoid base.
8. Process for loading materials comprising cellulose acetate, comprising treating the goods with an aqueous solution of a ureoid base and then with the loading agents.
9. Process for loading materials comprising cellulose acetate, comprising treating the goods with an aqueous solution of a ureoid base and then loading with a tin compound.
10. Process for loading materials comprising cellulose acetate, comprising treating the goods with an aqueous solution of a ureoid base and then loading by means of stannic chloride and a phosphate.
11. Process for loading materials comprising cellulose acetate, comprising treating the materials at any stage of the loading operation with monomethyl urea.
12. Process for loading materials comprising cellulose acetate, comprising treating the materials at any stage of the loading operation with an aqueous solution of monomethyl urea.
13. Process for loading materials comprising cellulose acetate, comprising treating the goods with an aqueous solution of monomethyl urea and then with the loading agents.
14. Process for loading materials comprising cellulose acetate, comprising treating the

goods with an aqueous solution of monomethyl urea and then loading with a tin compound.

15. Process for loading materials comprising cellulose acetate, comprising treating the goods with an aqueous solution of monomethyl urea and then loading by means of stannic chloride and a phosphate.

In testimony whereof I have hereunto subscribed my name.

HENRY DREYFUS.

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