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TREATMENT OF TEXTILE MATERIALS

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This invention is concerned with improvements in or relating to the treatment of textile materials and is more particularly concerned with improving the resistance of the materials to creasing or crushing.

According to the present invention, the resistance of textile materials to creasing or crushing is improved by bringing formaldehyde or other aldehydes or substances yielding aldehydes to reaction in or on the textile materials in presence of substances which are characterised by containing a chain of at least eight carbon atoms and preferably twelve or more carbon atoms in length, and which are preferably acids, alcohols, esters, ketones, salts of acids or the like. The substances employed are preferably stable to acidic conditions. Thus the salts of the acids are preferably neutral or acid salts, or at least are employed under neutral or acid conditions.

Thus the invention includes reacting formaldehyde or its equivalents in or on the material in the presence of lauric, myristic, oleic, palmitic, stearic or ricinoleic acid, or the fatty acids from cocoanut oil; lauryl, cetyl, oleyl, stearyl, ceryl and myricyl alcohols; esters either of these acids with the lower or higher alcohols or with di- or polyhydric alcohols, or of the above alcohols with lower or higher saturated or unsaturated acids, or di- or poly-carboxylic acids, for instance the methyl, ethyl, propyl, butyl, or amyl esters of the above-mentioned acids, or of abietic acid or the glycol or glycerine esters or partial esters of the said acids, or cetyl or ceryl palmitates or similar esters.

As indicated, the acids may be employed or applied to the materials in the form of their salts. For example, sulpho-ricinoleic acid may be employed in the form of Turkey red oil, or oleic or similar fatty acids may be employed in the form of their salts with aliphatic amines including oxyalkylamines such as triethanolamine. Where such a salt is itself basic in reaction, the reaction of the formaldehyde or equivalent body is preferably carried out under acidic conditions, for instance by adding hydrochloric acid to the solution of triethanolamine oleate or similar body which is to be applied.

Derivatives of any of the above bodies may likewise be applied in accordance with the present invention. For instance, the acids, alcohols, esters or the like may be sulphonated or sulphated as, for example, in Turkey red oil, or in the products sold under the trade names of Brilliant Avirol or Igepon.

The reaction may be assisted by means of catalysts, for example hydrochloric acid or other mineral acids, or lactic acid or other strong organic acids, which may be applied either separately from or together with the formaldehyde or equivalent, or preferably together with the other type of substance if this is not applied at the same time as the formaldehyde or equivalent.

It is desirable to incorporate the anti-creasing reagents in the textile fibre itself, and to avoid as far as possible their deposition between the fibres. The reagents may be applied in succession, and, after the application of each reagent, the material may be dried so as to cause the reagent to penetrate the fibre. Alternatively or in addition, the material may be impregnated with the reagent under vacuum or with increased pressure. Subsequent release of pressure generally enables the fibre to take up excess material deposited between the fibres. For instance, after soaking a fabric in a solution or emulsion of the desired reagent, the fabric may be centrifuged, or excess of reagent pressed off, and the fabric then subjected to considerable pressure so as to squeeze out any substantial excess above the amount which the fibres themselves are able to absorb. Mechanical pressure, for example by means of heavy calender rolls, is usually most effective.

The invention may be applied quite broadly to improving the resistance to creasing of all kinds of textile material in which the natural resistance is deficient. In particular the invention contemplates improving the resistance to creasing of natural cellulosic materials, for instance cotton and linen and regenerated cellulosic materials, for instance viscose, cuprammonium and nitrocellulose artificial silks, and also materials made of cellulose derivatives, for example cellulose acetate. Low grade animal fibre materials may also have their properties improved by the present invention.

Cellulose derivative materials or partially saponified cellulose ester materials may be caused to absorb the reagents under swelling conditions. Thus, for example, a swelling agent may be applied to the materials before or during the application of the reagents. A 40–48% (by volume) aqueous solution of acetone or of dioxane is very suitable in the case of acetone-soluble cellulose acetate or partially saponified cellulose acetate. Such a solution may be applied to the material before impregnation with the anti-creasing reagents, or the reagents may be dissolved in the swelling solution.

While formaldehyde is preferable in the above

processes, other aldehydes, for example acetaldehyde or glyoxal or other mono-, di- or poly-aldehydes, or substances yielding aldehydes, such as paraform, may be used.

The following examples illustrate the invention, but are not intended to limit it in any way:

Example 1

Viscose artificial silk or completely saponified cellulose acetate artificial silk is soaked for 5 minutes in a solution containing 500 parts by volume of 20% formaldehyde and 3 parts by volume of concentrated hydrochloric acid. The material is squeezed and dried at 50° C. and is then placed for 5 minutes in a 5% solution of ethyl stearate in methyl alcohol, squeezed, and dried at 50° C., then finally heated for 5 minutes at 140° C.

Example 2

A viscose fabric is soaked in a solution containing 500 parts of 20% formaldehyde, 3 parts of concentrated hydrochloric acid and 10–15 parts of triethanolamine oleate, the parts being by volume. After soaking, the fabric is squeezed and dried at 50° C., and is finally heated for 5 minutes at 140° C.

Example 3

The process is carried out as in Example 2 but using a solution containing 500 parts of 20% formaldehyde and 10 parts of Turkey red oil.

Example 4

The fabric is soaked in a solution of 5% Brilliant Avirol in 20% formaldehyde with or without concentrated hydrochloric acid, squeezed, dried, and finally heated as before.

Example 5

A 5% suspension of oleyl alcohol in 20% formaldehyde is substituted for the Brilliant Avirol—formaldehyde of the preceding example.

Example 6

A cellulose acetate fabric saponified to a loss in weight of 5 to 20 or 25% is swollen in aqueous acetone (46.5% acetone by volume), and is thereafter treated according to any of the preceding examples.

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

1. Process for improving the resistance to creasing of textile materials, which comprises incorporating in the materials an aldehyde or a substance yielding an aldehyde, and an alkyl ester of a higher fatty acid selected from the group consisting of the methyl, ethyl, propyl, butyl and amyl esters of an acid selected from the group consisting of lauric, myristic, oleic, palmitic, stearic and ricinoleic acids and heating the materials so treated to form a crease-resisting substance within the materials.

2. Process for improving the resistance to creasing of textile materials, which comprises incorporating in the materials formaldehyde or a substance yielding formaldehyde, and an alkyl ester of a higher fatty acid selected from the group consisting of the methyl, ethyl, propyl, butyl and amyl esters of an acid selected from the group consisting of lauric, myristic, oleic, palmitic, stearic and ricinoleic acids and heating the materials so treated to form a crease-resisting substance within the materials.

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