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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 means of the reaction products of hydroxylamine or hydrazine or derivatives of these bodies with formaldehyde or other aldehydes or substances yielding or acting as aldehydes. The reaction may be brought about in or on the textile materials themselves, and may take place in the presence of suitable catalysts, for example hydrochloric acid or other mineral acids or organic acids. The reaction may, for example, be effected by heating the textile materials carrying the reagents for a few minutes.

As previously indicated, the invention includes not only hydroxylamine and hydrazine themselves as reagents, but also their derivatives, for example the organic derivatives such as alkyl, aryl, aralkyl and acidyl derivatives; the last, in the case of hydroxylamine derivatives, are usually known as hydroxamic acids. These organic derivatives as well as the hydroxylamine and hydrazine themselves have the general formula



where R_1 and R_2 are hydrogen or organic radicles, e. g. those mentioned above, and X is OH or NH_2. The radicles which are substituted for hydrogen in the hydroxylamine or hydrazine may be, for example, lower alkyl radicles such as methyl, ethyl, propyl, butyl and the like, or higher alkyl radicles, for example those of the alcohols obtained by reduction of the higher fatty acids, for example the radicles of lauryl, oleyl, stearyl and palmityl alcohols, or they may be aromatic or hydro-aromatic radicles, for example phenyl, tolyl, xylyl, cyclohexyl or benzyl radicles, or acidyl radicles, for example acetyl, propionyl, lauryl, stearyl, palmityl, oleyl and benzoyl.

The catalyst may be applied separately from the other reagents, but is most conveniently applied together with the hydroxylamine, hydrazine or derivative thereof. For example, the hydroxylamine may be applied in the form of hydrochloride.

It is desirable to incorporate the anti-creasing substance in the textile fibre itself, and to avoid as far as possible its deposition between the fibres. The reagents for the formation of the anti-creasing substance 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. Cellulose acetate and like cellulose derivative materials are preferably subjected to a saponification treatment before applying the anti-crease treatment, the saponification being complete or partial, for example to a loss in weight of 15% or more in the case of cellulose acetate. Low grade animal fibre materials may also have their properties improved by the present invention.

Cellulose derivative 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% aqueous solution of acetone or of dioxane is very suitable in the case of acetone-soluble cellulose acetate. Such a solution may be applied to the material before impregnation with the hydroxylamine, hydrazine or derivative thereof, or the reagent may be dissolved in the swelling solution.

The materials to be treated may be subjected to any desired treatment designed to impart particular properties thereto. For example, artificial materials may be stretched before the treatment. Cellulose derivative materials in particular are especially amenable to increase in tenacity by stretching, and reference is made in this connection to U. S. applications S. Nos. 4,510 and 4,511 filed February 1, 1935.

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

Example 1

A viscose fabric is soaked for about 5 minutes in a 5% solution of hydroxylamine hydrochloride. It is then dried, dipped in a 40% aqueous solution of formaldehyde, again dried, and heated at about 130° C. for 5 minutes or at a higher temperature for a shorter period.

Example 2

A viscose fabric is soaked in a 5% solution of hydrazine sulphate for 5 minutes. It is then dried, dipped in a 40% aqueous solution of formaldehyde, again dried, and heated at 130° C. for about 5 minutes. A creaseless effect is thereby produced.

In a similar way other fabrics, and especially cellulosic fabrics, may be treated. 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 or acting as aldehydes, such as paraform, may be used.

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

1. Process for improving the resistance to creasing or crushing of textile materials which comprises incorporating in the textile materials a reaction product of an aldehyde with a single substance capable of condensation therewith, said substance being selected from the group consisting of hydroxylamine, hydrazine and alkyl, aryl, aralkyl and acidyl derivatives of hydroxylamine and hydrazine.

2. Process for improving the resistance to creasing or crushing of textile materials which comprises incorporating in the textile materials a reaction product of formaldehyde with a single substance capable of condensation therewith, said substance consisting of hydroxylamine.

3. Process for improving the resistance to creasing or crushing of cellulosic textile materials which comprises incorporating in the textile materials a reaction product of formaldehyde with a single substance capable of condensation therewith, said substance consisting of hydroxylamine, the incorporation being effected by successively soaking the textile material with hydroxylamine and with formaldehyde, drying the material and heating for a short time to bring about condensation.

4. Process for improving the resistance to creasing or crushing of cellulosic textile materials which comprises incorporating in the textile materials a reaction product of formaldehyde with a single substance capable of condensation therewith, said substance consisting of hydrazine, the incorporation being effected by successively soaking the textile material with hydrazine and with formaldehyde, drying the material and heating for a short time to bring about condensation.

5. Process for improving the resistance to creasing or crushing of cellulosic textile materials which comprises incorporating in the textile materials a reaction product of formaldehyde with a single substance capable of condensation therewith, said substance consisting of hydroxylamine, the incorporation being effected by impregnation of the material with hydroxylamine and formaldehyde followed by heating for a short time.

6. Process for improving the resistance to creasing or crushing of cellulosic textile materials which comprises incorporating in the textile materials a reaction product of formaldehyde with a single substance capable of condensation therewith, said substance consisting of hydrazine, the incorporation being effected by impregnation of the material with hydrazine and formaldehyde followed by heating for a short time.

7. Process for improving the resistance to creasing or crushing of cellulosic textile materials which comprises incorporating in the textile materials a reaction product of formaldehyde with a single substance capable of condensation therewith, said substance consisting of hydroxylamine, the incorporation being effected by impregnating the material with a solution of a hydroxylamine salt, drying, impregnating with aqueous formaldehyde, again drying and heating to bring about condensation.

8. Process for improving the resistance to creasing or crushing of textile materials which comprises incorporating in the textile materials a reaction product of formaldehyde with a single substance capable of condensation therewith, said substance consisting of hydrazine.

9. Process for improving the resistance to creasing or crushing of cellulosic textile materials which comprises incorporating in the textile materials a reaction product of formaldehyde with a single substance capable of condensation therewith, said substance consisting of hydrazine, the incorporation being effected by impregnating the material with a solution of a hydrazine salt, drying, impregnating with aqueous formaldehyde, again drying and heating to bring about condensation.

10. Cellulosic textile materials which are resistant to creasing or crushing and which contain a condensation product of formaldehyde with a single substance capable of condensation therewith, said substance being selected from the group consisting of hydroxylamine, hydrazine and alkyl, aryl, aralkyl and acidyl derivatives of hydroxylamine and hydrazine.

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