

UNITED STATES PATENT OFFICE

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TEXTILE TREATMENT

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4 Claims. (Cl. 117-62)

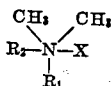
This invention relates to the treatment of textile materials, and more particularly it provides a finish which imparts a high degree of wash resistance to textile fabrics without detracting from the softness and other desirable properties thereof.

The invention is especially applicable to the finishing of cotton fabrics and yarns and has as an object the creation of a durable textile finish which will tend to protect the cellulose fibers during repeated launderings from the harmful effects of the usual laundry detergents. These effects appear in the form of losses in tensile strength which are cumulative with successive washings. By this invention, losses in tensile strength resulting from laundering are minimized, with the result that the durability of the fabric is materially enhanced.

The invention involves treatment of the cloth with a combination of chemicals preferably applied in a two-step process. The first treatment involves the application of a water-insoluble cellulose derivative and this is followed by the application of a material which in combination with the first treatment imparts to the fabric a highly improved resistance to hypochlorites, alkalis and soaps, even when the cloth is subjected to the elevated temperatures usually encountered in laundering. Nevertheless, the fabric as herein treated has a pleasant, soft, linen-like, crisp feel which remains practically unchanged despite repeated launderings.

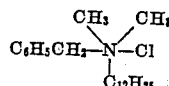
The water-insoluble and alkali-soluble cellulose derivative may be applied to the cloth as an alkaline solution of a cellulose ether, such as methyl cellulose or hydroxyethyl cellulose, followed by a treatment, as with an acid, to insolubilize the ether. Thus, the fabric may be immersed at room temperature in a 3.5% solution of methyl cellulose, or in a 3.5% solution of hydroxyethyl cellulose, in a 4.5% aqueous sodium hydroxide solution. The alkaline cellulose solution is then squeezed out to about 90% of the weight of the cloth and the cloth is then immersed in an acid solution, for example 5% sulphuric acid, to insolubilize the ether to alkalis. The fabric is thoroughly rinsed after the acid treatment.

After such fixation and insolubilizing of the cellulose derivative, the fabric, in accordance with this invention, is treated with a quaternary ammonium compound which has the general formula



in which X is a monovalent acid radical, such as chlorine, R₁ is an alkyl group having at least 8 carbon atoms, for example one of the groups—

dodecyl, hexadecyl and octadecyl, and R₂ is an alkyl group having an aryl group substituted for a hydrogen atom of the alkyl group. For instance, R₂ may be a benzyl group and a suitable compound thus may be



10 Quaternary ammonium compounds of this nature combine with the carboxyl groups of the insolubilized cellulose derivative to give an insoluble stable finish which withstands repeated laundering, and yet the cloth possesses a soft, pleasant feel.

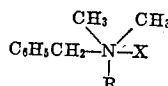
15 A 2.5% aqueous dispersion of the above quaternary ammonium compound (25% solids) may be applied to the fabric, also at room temperature, and the fabric may then be squeezed and dried. It is optional whether the fabric is dried intermediate the treatments with the cellulose derivative and with the ammonium compound.

20 In 80 x 80 cotton print cloth treated in accordance with our invention, the average loss in tensile strength after five repeated AATCC Test No. 4 washings has amounted to only 4 and 5% in the warp and filling respectively, as against from four to five times those losses in identical untreated fabrics.

30 This application is a continuation-in-part of our co-pending application Ser. No. 480,164, filed March 23, 1943.

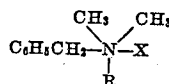
We claim:

1. The method of imparting improved wash resistance to a textile material, which comprises applying to the material an alkaline solution of an alkali-soluble and acid-insoluble cellulose ether, then applying an acid to insolubilize said cellulose ether, and thereafter applying to the material an aqueous dispersion of a quaternary ammonium salt having the formula



wherein X is a monovalent acid radical and R is an alkyl group having at least 8 carbon atoms.

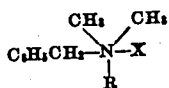
2. A textile material having improved wash resistance, said material carrying an adherent finish formed of the reaction product of an acid-insolubilized cellulose ether and a quaternary ammonium compound having the formula



wherein X is a monovalent acid radical and R is an alkyl group having at least 8 carbon atoms.

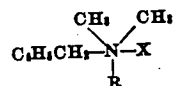
3. The method of imparting improved wash

resistance to a textile material, which comprises applying to the material an alkaline solution of hydroxyethyl cellulose, then applying an acid to insolubilize said hydroxyethyl cellulose, and thereafter applying to the material an aqueous dispersion of a quaternary ammonium salt having the formula



wherein X is a monovalent acid radical and R is an alkyl group having at least 8 carbon atoms.

4. A textile material having improved wash resistance, said material carrying an adherent finish formed of the reaction product of acid-insolubilized hydroxyethyl cellulose and a quaternary ammonium compound having the formula



10 wherein X is a monovalent acid radical and R is an alkyl group having at least 8 carbon atoms.

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