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DRY-CLEANING PROCESS

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This invention relates to a process of dry-cleaning fabrics such as textile fabrics, felt articles, leather goods, etc., and more particularly to such a process wherein the fabric articles after being dry-cleaned are subjected to a protective impregnation. The invention also comprehends the product of this protective process.

An object of my invention is to protect fabrics against disadvantageous effects commonly attending their normal use, such as water-spotting, wear, rotting and premature deterioration, difficulty of pressing, failure to hold the press, accumulating dirt, difficulty of removing dirt therefrom by the usual dry-cleaning methods, etc.

Another object of my invention is to accomplish the foregoing objects by an improved dry-cleaning process, and to devise a process which can be used in conjunction with the usual dry-cleaning processes for obtaining my improved results.

Other objects will be apparent to those skilled in the art as the description of my invention proceeds.

It is well-known that fabric articles in use tend to water-spot as with rain or other water, show signs of wear as by rotting, or otherwise deteriorate, are frequently hard to press or fail to hold their press well, become easily soiled and otherwise easily accumulate dirt which is difficult to remove even by the known dry-cleaning methods.

I have discovered that if after the fabric articles have been dry-cleaned by the usual dry-cleaning methods they are dipped into a dilute solution consisting essentially of a water-insoluble cellulose ether in a suitable solvent therefor, that the articles upon evaporation of the solvent are protected against the disadvantageous effects which normally attend use of the untreated articles to which I have referred above. These advantageous results are obtained without any undesirable effects since the quantity of solids deposited in and upon the fibers and threads of articles treated by my process is so small that the appearance, hand (i. e., the feel to the touch), and flexibility are not affected in the least. The stiffness of the treated articles is substantially same as that of the untreated articles. The treated articles are not water-resistant nor even water-repellant, yet they do exhibit a high resistance to water-spotting. In the treated articles, substantially no cellulose ether is between the threads, virtually all being in the threads themselves.

As the cellulose ether I prefer to use ethyl cellulose. However, other water insoluble ethers of cellulose, such as n-butyl, isobutyl, benzyl, vinyl, crotyl, ethyl benzyl, and allyl cellulose are suitable. I may use mixtures of any two or more of the foregoing ethers. The ether selected must be insoluble in water and soluble in the common organic solvents such as dry cleaning fluids.

As a solvent for the cellulose ether, I may use any organic solvent or mixture of organic solvents in which the cellulose ether is soluble to at least the extent of my maximum proportions shown below. I prefer to use any usual dry-cleaning solvent such as benzol, toluol, xylol, carbon tetrachloride, trichlorethylene, ethylene dichloride, mixtures of toluol and ethyl alcohol or, in case a lowered fire hazard is desired, mixtures of benzol, toluol or xylene with a chlorinated hydrocarbon such as carbon tetrachloride, trichlorethylene or ethylene dichloride. I may use any mixtures of two or more of the foregoing solvents. I may use any oxygenated solvents either alone or with the foregoing solvents. Thus, I may use ketones such as acetone; alcohols such as methyl alcohol, ethyl alcohol, butyl alcohol; esters such as methyl acetate, ethyl acetate, butyl acetate; aldehydes such as benzaldehyde, etc. I may use any hydrocarbon solvent such as gasoline, petroleum naphtha, ethyl benzene, and the like, or any halogenated hydrocarbon solvent such as those above set forth or methylene chloride, propylene chloride, ethylene dibromide, etc., or other halogenated acetylene, ethylene, or paraffin derivatives, or halogenated aromatic derivatives such as chlorinated benzene or toluene. While the cellulose ethers are insoluble in gasoline or petroleum naphtha alone, yet these petroleum derivatives may be used in combination with other solvents.

The proportion of cellulose ether to solvent will vary in accordance with the conditions of treatment and with the amount of solid deposit desired in the treated article. The proportion may be greater where the article, while still wet with dry-cleaning solvents, is subjected to the solution of cellulose ether, because of the diluting effect of the solvents. However, this proportion is preferably maintained between ½ oz. and 1 pound of cellulose ether per gallon of solvent. The greater the proportion, the greater will be the amount of deposit, as will be at once understood by those skilled in the art.

To alter the appearance of characteristics of the treated material, I may add small amounts of solvent plasticizers such as dibutyl phthalate, or of non-solvent softeners such as blown castor oil to the treating solution. The selection of and

proportion of this added ingredient will vary according to the properties desired in the product. Usually the percentage will be between 1 and 20%, based on the weight of the total non-volatile content of the solution. I may, if desired, also add a suitable dye to the solution. Small quantities of compatible natural or synthetic resins may likewise be added. In all cases, the nature of and amount of the addition material should be such that the effect of the cellulose ether will predominate.

In carrying out my process, I first dry clean the article in the usual way known to the art. The article may or may not have been protected by a prior application of my treating material. I may dry clean by washing the article in the usual dry cleaning solvents such as benbol, carbon tetrachloride, trichlorethylene. Then I dip the article in the treating solution above described, allow the solvents to evaporate and press in the usual way. Dirt will have but little adherence to articles cleaned and protected in this manner, and the dirt which does adhere will be very easily removed in the next dry-cleaning since the cellulose ether is soluble in dry cleaning solvents and will carry the adhered dirt directly into the solvents. In conjunction with this next dry-cleaning I may employ my treating process, thus renewing the protective means.

A non-limiting, specific example of a suitable treating solution for use in carrying out my invention is:

Ethyl cellulose	Oz. by wt. 2
Ethylene dichloride ($CH_2Cl—CH_2Cl$)	Gallon 1

By the term "fabrics" as used in the specification and claims, I intend to include the fibrous bases above referred to such as textile fabrics as men's suits, ladies' dresses, upholstery, drapes, curtains, silk, felts as felt hats, leather articles such as gloves, pocketbooks and the like.

While the increase in weight of fabrics treated by my process is variable due to the great differences in cloth in weave and in condition of the fibers, the increase is very slight varying from a low limit of $\frac{1}{40}$ of a gram per square foot to as high as four or five grams per square foot.

I may use a heated solution of the cellulose ether, and I may employ heat and/or forced draft to accelerate the drying of the saturated fabrics. These and other modifications which are within the spirit of my invention will be readily apparent to those skilled in the art and I desire that my invention be limited only by the language of the appended claims.

I claim:

1. The process of cleaning and renovating a fabric having an impregnation of a water-insoluble cellulose ether to protect it against water-spotting and adherence of dirt without substantially altering the flexibility, feel, and appearance of the fabric and without appreciably increasing the stiffness of the fabric, which comprises dry-cleaning the fabric by subjecting it to the action of dry-cleaning solvents, thereby removing from the fabric the protective water-insoluble cellulose ether impregnation together with adhered and imbedded dirt, then immersing the fabric in a dilute solution of a water-insoluble cellulose ether in a volatile organic solvent therefor, and allowing the volatile organic solvent to evaporate from the fabric, whereby the fibers of the fabric are impregnated with a quantity of the cellulose ether such that the fabric is protected against water-spotting and adherence of dirt, while its flexibility, feel and appearance are not substantially altered and its stiffness is not appreciably increased.

2. The process of cleaning and renovating a fabric having an impregnation of ethyl cellulose to protect it against water-spotting and adherence of dirt without substantially altering the flexibility, feel, and appearance of the fabric, and without appreciably increasing the stiffness of the fabric, which comprises dry-cleaning the fabric by subjecting it to the action of dry-cleaning solvents, thereby removing from the fabric the protective ethyl cellulose impregnation, together with the adhered and imbedded dirt, then immersing the fabric in a dilute solution of ethyl cellulose in a volatile organic solvent therefor, and allowing the volatile organic solvent to evaporate from the fabric, whereby the fibers of the fabric are impregnated with a quantity of ethyl cellulose such that the fabric is protected against water-spotting and adherence of dirt, while its flexibility, feel and appearance are not substantially altered and its stiffness is not appreciably increased.

3. The process of cleaning and renovating a fabric having an impregnation of ethyl cellulose to protect it against water-spotting and adherence of dirt without substantially altering the flexibility, feel, and appearance of the fabric, and without appreciably increasing the stiffness of the fabric, which comprises dry-cleaning the fabric by subjecting it to the action of dry-cleaning solvents, thereby removing from the fabric the protective ethyl cellulose impregnation, together with adhered and imbedded dirt, then immersing the fabric in a dilute solution of ethyl cellulose in a volatile organic solvent therefor, said solution containing between one half ounce and one pound of ethyl cellulose per gallon of solvent, and allowing the volatile organic solvent to evaporate from the fabric, whereby the fibers of the fabric are impregnated with a quantity of ethyl cellulose such that the fabric is protected against water-spotting and adherence of dirt, while its flexibility, feel, and appearance are not substantially altered and its stiffness is not appreciably increased.

EDMOND H. BUCY.