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TEXTILE FINISHING PROCESS

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This invention concerns a textile finishing process, improvements upon known textile finishing processes, additive features to such processes, and the improved product of such processes.

The novel process is applicable to all textile fiber and material, but more particularly to regenerated and artificial fiber, cellular wool, as well as mixed fibers and mixed fiber materials. and, above all, rayon mixtures.

It is an important object of this invention to overcome certain disadvantages which ordinarily accompany a finishing process in which a fiber or material is weighted, sized or fulled, as there are a discoloration or dulling of the colors of the material, an unstableness of weighting substance so that it dusts, etc.

But the principal object of this invention is to impart a greater resilience to textile fiber or textile material, so that the material lies flat and smooth or retains the shape into which it has been crimped or otherwise formed, and does not readily wrinkle or crease.

Other objects of this invention will be recognized from the following description.

Such objects may be obtained by using in a textile finishing process compounds which have an amorphous structure or a substantially or quasi amorphous structure with very fine crystal or compounds which have a tendency to divide out or deposit in such a formation, or compounds which have the characteristic of causing weighting compounds or other compounds used in a finishing process to yield the said formation or structure. When such an amorphous or quasi amorphous deposit is used, the pureness and brilliance of color is preserved, and, besides, the elasticity or resiliency of the fiber or material, is materially increased in practically all instances.

No absolute rule can be given in respect to the relative quantity of ingredients to be used for a finishing material of this invention; of course the substances cannot be mixed together arbitrarily; but a predetermined order may be established by way of experience and under due consideration of the weighting substance itself, as well as of the other ingredients of the finishing compound, and also of the material to be weighted. For instance, when sugar, glycerine, glue or the like is added to urea for the finishing treatment of textiles, the resulting dulling of the colors will be much less pronounced than when urea is used alone, but it is only under the best conditions that the resiliency of the material and its resistance to creasing or wrinkling will be increased to a useful extent.

A crystalline structure so fine that it appears to be amorphous, will be termed substantially amorphous herein. Really amorphous material may of course be comprised in such "substantially amorphous material."

While a strong amorphous deposit is always better than a coarse crystalline one, the crease-proofness can only reach a practical, appreciable magnitude under quite definite conditions and by the use of definite compounds, particularly inorganic salts.

An influence in this direction may be exerted by the use of very simple salts, such as sodium and magnesium sulphates, when these salts are induced to separate off in amorphous form. Other salts, such as borates and stannates as well as sodium-potassium tartrate, possess the required properties when applied to the fibers in high concentration, so that they predominate over other deposits on the fiber. The effect can be increased by the addition of substances which render the deposit on the fiber still more amorphous. But even without such additions, the increase in the elasticity and flexibility of the fibers, and thus in the crease-proofness of the material, will be of practical importance.

Agents suitable for effecting or supporting the formation of an amorphous deposit are primarily compounds which yield colloidal aqueous solutions. Furthermore there are compounds which give semi-colloidal solutions and are incapable of crystallizing. As examples may be mentioned glycerine, sugar (starch syrup), the white of eggs, glue, gelatine, starch solutions, gum arabic, gum tragacanth glycoside (tannin) and colloidal silicic acid.

Most useful are however dispersions of wax, fats, paraffin, and the like, which have a simultaneous softening effect and thus improve the feel of the material.

In most cases very little of these additional substances will be required. Exact rules cannot be given since the quantity depends on the nature of the material under treatment and of the weighting salts in use which latter differ greatly as regards crystalline properties. For each particular salt to be used, a corresponding favorable condition can be determined by anybody versed in the finishing art. According to the invention the weighting salt is, for the purpose of obtaining resilient, crease-proof material, employed in excess of other components, since otherwise the desired properties cannot be obtained with cer-

tainty. In the case of dispersions, suitable stabilizers are added.

The salts in question should be thoroughly mixed, as such or in concentrated solution, with the other components of the dispersion, the mixture being preferably homogenized. The product thus obtained can be thinned out for use in which case a better dispersion and better effect will be achieved than when the mixing is effected directly in the bath.

In the case of a paraffine mixture a certain "pearling" effect can be obtained if, in the preparation of the emulsion employed, the latter contains no wetting medium nor any equivalently acting substances. If the water repellant effect is desired, aluminum compounds must be added, or the material should subsequently be treated in a solution containing an aluminum compound.

The following examples serve to elucidate the invention, and are therefore illustrative and not limitative.

Example 1

20 parts by weight of cocoanut fat are thoroughly emulsified with 30 parts of stearine soap and 40 parts of water. 200 parts of sodium borate are added to the emulsion whereupon the mixture is worked in a ball mill into a homogeneous paste. This paste can be dissolved in warm water and forms an emulsion which may be diluted with 4 to 10 parts of water for the treatment of viscose silk. The treatment can be continued until an addition of 10 to 15% in the dry weight of the goods has been achieved.

The material thus treated will exhibit a greatly increased elasticity and offer resistance to bending, wrinkling or any other alteration in the shape it had when impregnated. Crimps or other formations of the fiber will be permanently fixed. The effect obtained with borate alone is not so favorable, although it has practical advantages. Nor will the effect by treatment with the fatty emulsion alone be obtained.

Instead of the sodium borate, other water soluble borates may be used, for instance potassium borate, ethanolamine borate or triethanolamine borate, and mixtures thereof. If the borate is entirely or partly replaced by sodium potassium tartrate, the result will be less good. A replacement by stannate will produce a better result. While these compounds will produce practically the same effect when not dispersed, the effect of the combination is better on account of the softening properties of the emulsion.

2 to 5 parts of hexadecanol may be added as a stabilizer, in Example 1. But the fatty alcohol may also take the place of the other fat-supplying bodies, for instance of the paraffin, oil or wax. Instead of hexadecanol, stearine amide or the like may be used. That combination proved particularly useful for the impregnation of material compound of a mixture of natural and cellular wool.

Similar combinations are obtained as follows:

Example 2

60 parts by weight of borate and 40 parts of Rochelle salts, or 100 parts borate or 60 parts sodium stannate, 20 parts of a weak alkaline emulsion of cocoanut fat and 2 parts gum arabic in 1,000 parts water of 50° C. The mixture is stirred until cold. A warmed solution of this mixture may be used for treating lining material of artificial silk or cotton. Material is centrifuged and dried as usual.

Example 3

100 parts by weight of water contain 70 parts of sodium-potassium tartrate and 10 parts of a paraffin or cocoanut fat emulsion. Ladies' dress material containing 70% cellular wool, can be treated with this mixture at a temperature of 45° C. The treatment is preferably carried out on a gumming machine.

Example 4

A lining material of artificial silk is treated on a foulard at 55° C with a bath containing 8% of sodium borate and 1.5% of a weakly alkaline olive oil emulsion. The material is centrifuged, dried in the usual manner, and calendered.

Example 5

Printed cotton is treated on a jigger at a temperature of 50° C with a bath containing 12% of sodium borate, 1% of a weakly alkaline paraffine emulsion, and 0.5% of gum arabic. The wringing or centrifuging and drying is effected in the usual manner.

Treatment on a gumming machine with a bath containing 5% of borate and 1% of a weakly alkaline cocoanut fat emulsion, at a temperature of 45° C is recommended for ladies' dress material composed of 70% natural wool and 30% cellular wool.

Example 6

10 parts by weight of paraffin and 10 parts of earth nut oil are emulsified in the requisite amount of water by means of 23 parts by weight of olein ammonia soap until a paste is obtained. Into this paste are worked, preferably in a colloid or ball mill, 100 parts by weight of Rochelle salt and 100 parts of sodium borate. Suitable emulsion stabilizers such as glue, or hydrophile, water insoluble compounds such as fatty alcohol (hexadecanol) or the like, may be added. By treatment with this emulsion in diluted form, artificial silk material may be increased in weight by 10% to 15%. Apart from the increased elasticity produced in the material by this treatment, the material will appear full, soft and flexible to the touch. The result is particularly good when the tartrate is omitted and the borate proportion is increased to 150 to 200 parts.

The paraffin contents of the emulsion imparts a certain depearling effect which can be increased by substituting paraffin for the oil.

Example 7

A paraffin emulsion containing 30 parts by weight of paraffin (melting point 40° to 42° C), 3 parts albumen, 1 part oxalic acid and 66 parts water is worked into a paste with 200 parts borate. In a 10% bath of this paste a cellular wool gabardine is treated on a gumming machine, centrifuged and dried. The material will appear full to the touch, the tendency of the material to crease will be considerably reduced, and the water depearling effect will be very good.

Example 8

Emulsify 25 parts by weight of paraffin, 5 parts of petrolatum oil, 3.5 parts of albumen, and 65.5 parts of water. 3% of this emulsion are added to a bath containing of 9% borate. A dress material composed of cellular wool is treated with this bath on a foulard. After centrifuging and drying, the material will be found to be highly

resistive to creasing. It also shows a good water depearling effect.

In order to render the material water-proof, 1.5 and 2 parts by weight of sodium aluminate are added to the bath. Or a waterproofing effect can be produced by after treatment in a bath containing 1% aluminun formate (12° Be).

Example 9

A 10% solution of borate is mixed with 1% starch syrup. With this solution a viscose lining material is treated on a foulard. After the usual centrifuging, drying and calendering, the material will be found to appear full to the touch and resistive to creasing.

If in this last example the borate is replaced by a water soluble stannate, the resistance of the material to creasing will be still greater.

Example 10

20 parts by weight of olive oil are emulsified together with 2 parts of castor oil soap in 80 parts of water. The emulsion is thoroughly mixed with 500 parts sodium sulphate. The product thus obtained is dissolved in 12% water and used as a bath on the gumming machine for the treatment of woolen dress material. After drying, the material will be found to be pleasantly soft and full to the touch, and the colors of the material will be clear.

The advantage as regards the color will not be obtained by the use of sodium sulphate alone. The tendency of the material to crease would also be diminished.

Example 11

A printed cotton material is treated on a jigger with a bath containing 10% of magnesium sulphate and 2% of dextrine. After centrifuging and drying the material will be found to be much more full to the touch, and there will be an 8% increase of the dry weight of the material. The colors remain clear.

By way of magnesium sulphate alone the material will become unpleasantly hard, and it will look dusty.

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