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METHOD OF AND MEANS FOR TREATING TEXTILE MATERIALS

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The object of the present invention is to the facilitate the fulling and shrinking of textile materials comprising unworked fibres as well as yarn and woven knitted goods. The invention relates particularly to the treatment of animal fibres such as wool and hair having a scaly surface, but also mixtures of such fibres, even with vegetable, artificial fibres, can be dealt with according to the invention. The shrinking of animal fibres effected by the normal fulling, i. e. the alteration in the structure of the produced material, plays an important part in the textile industry. A corresponding treatment of vegetable fibres and goods produced therefrom is not quite so important. In the case of woollen goods and mixtures of wool and other, even vegetable and artificial fibres, a close structure is required in woven as in knitted goods. The closing of the structure is obtained by the fulling which causes the fibres to nextle closer together as well as to overlap, not only in the form or parallel threads, but cross-wise, i. e. from warp to weft and vice versa. It is evident that in this manner a closing up of crevices is effected, so that in the and a material will be produced in which the woven or knitted structure is no longer recognisable.

Such a treatment, like all mechanical stressing of the materials, is naturally harmful, particularly since it must be carried out in the presence of moisture, and the damage done naturally increases with the length of the treatment. Methods of shortening the treatment have therefore frequently been proposed any satisfactory result.

By the method according to the present invention, however, such a shortening of the treatment will be obtained in a simple and at the same time satisfactory manner.

The invention consists in treating the fibres or goods obtained therefrom with lubricating substances or solutions, preferably with lubricative emulsions or suspensions. It has been found that, with equal pH value, the addition of such lubricants will speed up the fulling and shrinking process and thus shorten the time during which the mass of fibres or the goods produced therefrom, will have to be subjected to the mechanical stressing. This means, therefore, less mechanical treatment as well as a shortening of the time during which the material has to be kept in moist condition. Both of these features will contribute to the preservation of the material, a fact which can easly be proved by testing the material for elasticity and tensile strength. As lubricants suitable for carrying out the invention may be mentioned in the first-place the hydrophobic lubricant paraffin, and then others such as wax, fat, oil (even mineral oil), and mixtures thereof, i. e. chiefly well-known lubricating compounds. These lubricating media may be used either in homogenic form or in solutions. However, since the fulling is carried out in the presence of the moisture, it is best to emipoy lubricants in the form of emulsions or suspensions. Instead of these hydrophobes or in admixture with them, hydrophilous, water-soluble compounds can be successfully employed. These compounds are capable of absorbing water and thereby acquire lubricating properties. Together with the hydrophobic compounds they constitute favourable emulsion and suspension stabilizers. In this respect they are like the hydrophiles which be mentioned later and which are subjected to strong hydration. Among the group of hydrophilous, watersoluble compounds, the aliphatic and cyclealiphatic hydroxyl compounds of fat alcohols may be mentioned as well as the amino and amide compounds. However, higher concentrated solutions of by hydrophilous, higher molecular, water-soluble compounds may by employed for the same purpose. Such colloidal solutions possess, in gel condition as well as in the subsequent solution stage, and even in the form of a froth, i. e. when emulsified with gas, excellent lubricating properties. If the last group be combined with one both of the abovementioned groups. For instance so as to use them, in a less concentrated form as dispersing media, the lubricating properties required for the treatment will be enhanced. Out of the latter group, the following may be mentioned: sodium octadecenoylmethylaminethane sulphonate, sodium butylmethylcyclohexanol sulphate, dodecanol sulphate of triethaneolamine (less alone than in combination with one or both the other groups), the condensation product of an aliphatic alcohol of higher molecular weight such as hexadecanol with ethylene oxide carried to water solubility (less than that also produces employable, hydrophilous, water-soluble or difficultly soluble compounds). It is also possible to use fat alcohol phosphate and higher amine (also oxyamine), for instance ammonium hexadecanol phosphate. Similar properties are found in the following hydrophiles: albuminous products such as gelatine, white of eggs, pectin, salts of nucleic acid, resin, alime and the like.

The lubricants are added to the fulling liquid which may either be neutral or have a pH value which approaches the isolectric range of the ma-

terials. On the other hand liquid may be alkaline or isoelectrically acid. The lubricant must naturally be adapted to the fulling liquid, since no dispersion having as dispersing medium a sebate, can be employed in an acid solution.

The invention will be further illustrated by means of the following exemples which, however, are not exclusive:

The following lubricants were prepared:

(1.) 50 parts by weight of sodium dodecanol sulphate were dissolved in 1,000 parts of water. While the solution is stirred 50 parts by weight of molten hexadecanol having a fusing point of about 40° C are added, and the mixture is diluted by the slow addition thereto of 4,000 parts of hot water, the mixture is stirred until cold.

(2.) 320 parts by weight of paraffin (fusing point 38–42° C) are melted together with 30 parts stearic acid and 10 parts triethanelamine. This mixture is poured in a thin jet and under stirring into 1,000 parts of water of about 50° C, the stirring being continued until the mixture is cold.

(3.) A soap composed of 33 parts by weight of oleic acid, 8.5 parts 40% potassium lye, and 100 parts of water of 80° C, is dissolved in 300 parts of water. This solution is stirred while 90 parts by weight of amide oleate and 60 parts molten paraffin are gradually added together with 900 parts warm water. The mixture is stirred until cold.

(4.) Example 3 is repeated, but the amide is replaced by a fat alcohol such as hexadecanol or octadecanol, a mixture of both, or a mixture of such fat alcohol with an amide.

(5.) In solution of 83.5 parts by weight of earth nut oil and 33 parts olein, 6.3 parts by weight of concentrated aqueous ammonia are added. The hot solution is mixed under stirring with 917.2 parts of water of about 40° C, and the stirring is continued until the mixture is cold.

(6.) The same as example 5, but the earth nut oil is replaced by mineral oil.

(7.) The commercial mixture of sodium hexametaphosphate and sodium tetrametaphosphate is used in a 10% aqueous solution.

(8.) A 3% solution is formed of slightly sulphurated caster oil (so-called turkey-red oil). The slight degrees of sulphuration is easily recognised by fact that large quantities of unsulphurated oil can be extracted by means of ether from a diluted solution thereof.

(9.) In a mixture of mineral oil and olein the calculated quantity of alkali lye, some turkey-red oil, and a given quantity of alcohol for clearing, are added. A clear liquid is obtained which, on dilution with water, gives a highly dispersive emulsion. Lubricants made up according to the above examples were used in the fulling of uniform piece of an easily fulled wool fabric. Each piece was treated in a testing device for one hour at a temperature of 30° C, and the percentage of shrinking in lenght and breadth in each particular case is shown in the following table:

	Per cent
Water alone	18
(1) 1% solution	41
(2) 1:3 water	51
(3) 1:5 water	53
(4) 1:3 water	59
(5) 1:3 water	44
(8) 1:3 water	32
(7) 10% solution	51.5
(8) 5% solution	46
(9) 1:5 water	48
Soap 1 gramme per litre	26
Soap 1%	42

In these results it is to be noted that the pH value of the solution plays an important part. It was found that the shrinking property of wool is less within the isoelectric range than in the case of the acid and alkali range. Particularly in the alkali range the effect aimed at by the present invention seems to be enhanced by the alkalinity, but it should be noted that the increased alkalinity invives increased injury to the goods. The present invention is not limited to the treatment of animal materials. It has been found that the treatment is also effective in the case of material made of native as well as regenerated cellulose and derivatives thereof. For instance it can be used in the manufacture of waterproof material i. e. a material which does not shrivel up when wet.

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