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TREATMENT OF FILAMENTS, THREADS, YARNS, AND THE LIKE

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This invention relates to processes for the treatment of textile filaments, threads, yarns and the like, and particularly to processes for lubrication and similar treatments.

In the lubrication and similar treatments of textile filaments and the like, particularly those containing cellulose acetate or other organic derivatives of cellulose, difficulties have been encountered when the usual agents, particularly unsaturated fats and oils such as olive oil, are employed, in that the resulting yarns, especially if a considerable time elapses between their lubrication and further treatment, may exhibit uneven properties when subjected to processes of delustring or dyeing. The use of saturated fats, on the other hand, is subject to the disadvantage that they are in general too hard to be satisfactorily applied.

We have now found that hydrogenated unsaturated oils and fats are very suitable for the treatment of textile materials, and that when they are employed the difficulties in respect of subsequent delustring or dyeing may be greatly reduced and even eliminated entirely. While it is not essential that they should be completely hydrogenated, it appears advantageous that most of the unsaturated groups which they contain should be reduced. Thus, hydrogenated oils or fats having an iodine value of 5–6, and preferably less, e. g. 1–3, may be applied for the purposes of the present invention. Again, it is desirable that the oils or fats employed should contain a relatively high proportion of the medium fatty acids, e. g. lauric and myristic acids, preferably in the form of their esters, and they may also have a high Reichert-Meisal value.

The present invention, therefore, comprises the treatment of textile materials, e. g. filaments and yarns, with hydrogenated unsaturated fats and oils. The quantity employed will, of course, depend upon the particular object in view, but it may be mentioned that when a lubricating treatment is to be applied, amounts of up to 5%, and preferably 1–3%, on the weight of the material have been found very suitable, while in the case of a sizing operation larger proportions are usually necessary.

As stated above, the oils and fats employed are those obtained by the partial or complete hydrogenation of unsaturated oils and fats, and have preferably a low iodine value, a high content of the medium fatty acids and a high Reichert-Meisal value. Hydrogenated oils obtained by treatment of substances of the cocoanut oil group, e. g. palm kernel oil and cocoanut oil, are especially valuable in this connection, and the invention will therefore be described with particular reference to the use of hydrogenated cocoanut oil, though of course it is by no means limited thereto.

The processes according to the present invention may be applied to the filaments and the like by any suitable method. Thus the materials may be treated during their passage from bobbins, cops, beams, tubes, hanking frames, rollers or the like to any suitable receiving device, or in the case of artificial materials, for example filaments having a basis of cellulose acetate, treatment with the oil may be continuous with the production of the materials. In this latter case the artificial filaments or yarn may be passed from a wet or dry spinning apparatus to the means for applying the oil and may then be taken up on spools, bobbins or other receiving devices. A further method of applying the oil comprises treating the materials in any suitable manner while they are in warp formation.

The hydrogenated cocoanut oil may be applied to the materials in either a molten or partially molten state, or it may be employed in solution in a suitable solvent or as an emulsion. Thus the textile material may be caused to pass in contact with a rotating roller which is partially immersed in a bath containing the oil, or with pads or wicks supplied with the oil. Alternatively, the materials may be passed through a bath containing the oil, or it may be applied to them by means of a spraying mechanism. Further, if desired, the materials may be treated by immersion in baths containing or consisting of the oil, for example, when wound on bobbins or other carrying devices.

When the cocoanut oil is applied as a solution or emulsion, it is of course desirable that the liquid medium employed should not have any pronounced solvent action or other detrimental effect upon the material being treated.

The treatment may be carried out at normal or elevated temperatures.

While the invention has been described in particular connection with lubrication processes, yet it may also be applied to other operations, e. g. sizing, and, if desired, the application of the lubricant may be combined with the application of other treating agents, such as for example plasticizers and swelling agents and hygroscopic solids, as described in U. S. application S. No. 565,924 filed 29th September, 1931 and in British specification No. 351,084.

While the process of the present invention is

particularly advantageous in relation to the treatment of artificial materials containing cellulose acetate or other organic esters of cellulose, yet it may also be applied to the treatment of artificial filaments obtained from other cellulose derivatives, for example cellulose nitrate, methyl, ethyl and benzyl cellulose and other cellulose ethers, mixed esters and ether-esters of cellulose and to other artificial or natural fibres.

It will be apparent that the methods by which the oil is applied to the material to be treated may vary widely, as may the proportions used, but the two following examples are given by way of illustration, and relate to the lubrication or sizing of cellulose acetate threads or the like by means of hydrogenated cocoanut oil.

Example 1

Artificial yarn of cellulose acetate is caused to travel across and in contact with the periphery of a rotatably mounted wheel or roller dipping into a trough containing hydrogenated cocoanut oil having the following characteristics:—

Melting point	30–40° C.
Acid value (as oleic acid)	Up to 0.4%
Saponification value	240–250
Iodine value	About 1.0

The oil in the trough is maintained in the necessary liquid state by steam heating means. Conveniently the yarn contacting with the periphery of the supply wheel extends in the general direction of the axis of rotation thereof, as in the arrangement described and shown in U. S. application S. No. 370,763 filed 14th June, 1929. In such an arrangement the rate of supply of oil to the yarn may be varied, for example, by varying the rotational speed of the wheel, the diameter thereof or the effective width of its periphery by substituting a further wheel having a bevelled edge or an edge of different bevel. The amount of oil so applied to the yarn may thus be varied up to a maximum of approximately 5% of the weight of the yarn.

Example 2

In order to apply relatively large quantities of a flexible size preparatory to textile operations, hydrogenated cocoanut oil having characteristics corresponding to that used in Example 1 above is applied during the preliminary reeling or warping of the yarn by means of a slowly rotating padded roller dipping into a trough which contains the oil and is heated by steam or by electrical means. By applying the lubricant to the yarn in this way, quantities of 5–10% or over may be applied to the yarn.

It is found that threads, yarns and the like treated with hydrogenated unsaturated oils and fats according to the present invention exhibit very desirable properties, particularly as regards uniformity in their reaction to dyeing, delustring and like operations as between portions of yarn which have occupied external positions on bobbins, cheeses and like storing means, and portions which have occupied inner and more protected positions during storage.

What we claim and desire to secure by Letters Patent is:—

1. Method of treating textile filaments, threads, yarns and the like, comprising applying thereto an oil or fat obtained by hydrogenating an unsaturated fat or fatty oil.

2. Method of treating textile filaments, threads, yarns and the like of an organic derivative of cellulose, comprising applying thereto an oil or fat obtained by hydrogenating an unsaturated fat or fatty oil.

3. Method of treating textile filaments, threads, yarns and the like of cellulose acetate, comprising applying thereto an oil or fat obtained by hydrogenating an unsaturated fat or fatty oil.

4. Method of treating textile filaments, threads, yarns and the like of an organic derivative of cellulose, comprising applying thereto an oil or fat obtained by hydrogenating an oil of the cocoanut oil group.

5. Method of treating textile filaments, threads, yarns and the like of cellulose acetate, comprising applying thereto an oil or fat obtained by hydrogenating cocoanut oil.

6. Method of treating textile filaments, threads, yarns and the like of an organic derivative of cellulose, comprising applying thereto an oil or fat obtained by hydrogenating an unsaturated fat or fatty oil until its iodine value is less than 6.

7. Method of treating textile filaments, threads, yarns and the like of cellulose acetate, comprising applying thereto an oil or fat obtained by hydrogenating an unsaturated fat or fatty oil until its iodine value is less than 6.

8. Method of treating textile filaments, threads, yarns and the like of an organic derivative of cellulose, comprising applying thereto a dispersion of an oil or fat obtained by hydrogenating an unsaturated fat or fatty oil.

9. Method of treating textile filaments, threads, yarns and the like of an organic derivative of cellulose, comprising applying to such products when arranged in the form of a warp sheet an oil or fat obtained by hydrogenating an unsaturated fat or fatty oil.

10. Filaments, threads, yarns and the like, having applied thereto an oil or fat obtained by hydrogenating an unsaturated fat or fatty oil.

11. Filaments, threads, yarns and the like of an organic derivative of cellulose, having applied thereto an oil or fat obtained by hydrogenating an oil of the cocoanut oil group.

12. Filaments, threads, yarns and the like of cellulose acetate, having applied thereto an oil or fat obtained by hydrogenating cocoanut oil.

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