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UNITED STATES PATENT OFFICE

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ARTIFICIAL TEXTILE MATERIALS AND METHOD OF PREPARING THE SAME

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4 Claims. (Cl. 28—1)

This invention relates to the preparation or treatment of artificial materials particularly textile materials, such as yarns or filaments made of organic derivatives of cellulose, whereby the same are rendered more amenable to textile operations or have other improved properties.

An object of my invention is to prepare or treat textile materials, particularly yarns or filaments containing cellulose acetate or other organic derivatives of cellulose by the employment of oils or fatty acids in conjunction with a para-benzene derivative, whereby the yarns or filaments are rendered more pliable and can therefore be knitted, woven or knotted more readily. Other objects of the invention will appear from the following detailed description.

It is desirable to apply finishes which soften or lubricate the yarns in many processes of conversion of textile yarns such as twisting, winding, knitting or weaving. The finishes considered most useful for this purpose contain oils, such as olive oil or castor oil. However, when such oils are applied to the yarn, upon ageing they hydrolize to develop free acid; they tend to oxidize and to polymerize and form viscous and gummy bodies.

I have found that if para-benzene derivatives containing an OH radicle are added to such oils, yarns to which the resulting mixture has been applied, remain soft and not sticky when exposed to the air for long periods of time. Moreover the presence of these para-benzene derivatives greatly retard the development in such oils of free acidity, prevent oxidation and largely overcomes the tendency of such oils upon ageing to render cellulose acetate yarns less resistant to the delustering action of hot aqueous liquids. All phenol derivatives have some preservative power in oils; I have found, however, that outstanding in effectiveness in this respect, are the para derivatives of phenol such as hydroquinone.

In accordance with my invention I employ the animal or vegetable oils or the fatty acids derived therefrom in conjunction with para derivatives of phenol in the preparation or treatment of artificial materials particularly those containing cellulose acetate or other organic derivatives of cellulose.

The animal or vegetable oils employed may be any suitable one such as olive oil, teaseed oil, peanut oil, castor oil, cocoanut oil, neat's-foot oil and in general the glycerides of the fatty acids such as oleic acid, palmitic acid or stearic acid. One of such oils or a mixture of two or more such oils may be employed. If desired the fatty acids themselves may be employed. These oils may be used alone or in conjunction with mineral lubricating oils and sulphonated oils as well as in conjunction with bodies having a beneficial effect such as diethylene glycol, glycerine, etc.

In order to prevent such oils and fatty acids from oxidizing, hydrolizing, polymerizing or otherwise becoming sticky and thus impart harshness to the textile material, I add a para derivative of phenol. Any suitable para derivative of phenol may be employed, for example hydroquinone, methyl ester of paraoxy benzoic acid, propyl ester of paraoxy benzoic acid and other like derivatives of benzol. Of these, however, I prefer to employ the hydroquinone in relation to which the invention will be described in particular. The para derivatives of benzene may have the graphic formula



where R is OH or $COOR^1$ wherein R^1 is an alkyl group such as methyl, ethyl, butyl and propyl radicals.

The amount of hydroquinone or other compound employed may be any suitable one being usually small and on the order of 0.2 to 4% of the weight of the oils or fatty acids employed.

In one form of my invention, the vegetable or animal oils or the fatty acids in admixture with the para derivative of benzol may be added to the spinning dope or solution from which the yarns, filaments, artificial bristles or straw and the like are formed, and such solution may then be extruded through orifices to an evaporative atmosphere as in dry spinning or into the precipitating bath as in wet spinning, or thin foils or thin films may be made from such solutions by casting the same on to a film casting wheel or by other known methods.

In another form of my invention the mixture of oils or fatty acids and the para derivative of phenol may be applied to the yarns, filaments, fabrics, films or foils after their formation. They may be applied either alone or in admixture with other materials as a lubricant or finish. Thus the lubricant or finish may also contain softening agents such as the polyhydric alcohols, their derivatives and substitution products, the examples of which are diethylene glycol and glycerine.

The textile materials or other artificial materials to be prepared or treated in accordance with this invention preferably contain organic derivatives of cellulose which may be organic esters of cellulose or cellulose ethers. Examples of such organic esters of cellulose are cellulose acetate, cellulose formate, cellulose propionate and cellulose butyrate, while examples of such cellulose ethers are ethyl cellulose, methyl cellulose and benzyl cellulose.

Yarns, artificial straw or filaments when prepared or treated in accordance with this invention have great pliability due to the presence of the animal or vegetable oils or the free fatty acids, as shown by the fact that such yarns may be readily knitted into fabric containing many stitches per unit length and artificial bristles, horsehair and straw may be knotted quite tightly and bent quite severely without breaking. Moreover when such yarns are exposed to the air for long periods of time, because of the presence of the para derivative of phenol, they retain their softness and pliability and can be readily knitted. In order to further illustrate my invention but without being limited thereto the following specific example is given.

Example

A finish is prepared as follows:

	Parts by weight
Olive oil	99
Hydroquinone	1

The above mixture may also be made substituting the methyl ester of parahydroxy benzoic acid and the propyl ester of parahydroxy benzoic acid. The above mixture is applied to a yarn consisting wholly of acetone soluble cellulose acetate filaments, by causing such yarn to pass over wicks, rollers or other furnishing devices for applying such mixture, in their transit from the dry spinning machine in which they are formed to a winding device. The amount of finish applied is 1 to 60% on the weight of the yarn.

The para derivatives of phenol greatly reduce the tendency of the olive oil to polymerize upon ageing and inhibits oxidation. Moreover while cellulose acetate yarns or fabrics treated with olive oil alone after a period of time tend to deluster more readily when treated with hot aqueous fluids the presence of the para derivative of phenol greatly reduces this tendency of delustering. Moreover, the above type of finish has the property of maintaining a finish, over the entire yarn or fabric, of the same consistency. Thus when the material is subjected to dyeing, washing or other hot aqueous liquid treatments there is no streakiness produced as in the case where the lubricant finish tends to change its chemical composition in one place more than in another.

It is to be understood that the foregoing description is given merely by way of illustration and that many variations may be made therein without departing from the spirit of my invention.

Having described my invention, what I desire to secure by Letters Patent is:

1. Process of improving the properties of filaments or yarns of a cellulose derivative selected from the group of organic acid esters of cellulose and cellulose ethers which comprises applying thereto a finish containing a vegetable or animal oil such as olive oil, teaseed oil, peanut oil, castor oil, cocoanut oil or neat'sfoot oil and hydroquinone in the proportion of 0.2 to 4% calculated on the weight of the oil employed.

2. Process of improving the properties of filaments or yarns of cellulose acetate which comprises applying thereto a finish containing olive oil and hydroquinone in the proportion of 1% calculated on the weight of olive oil.

3. Yarns or filaments of a cellulose derivative selected from the group of organic acid esters of cellulose and cellulose ethers and containing a vegetable or animal oil such as olive oil, teaseed oil, peanut oil, castor oil, cocoanut oil or neat's-foot oil and hydroquinone in the proportion of 0.2 to 4% calculated on the weight of the oil employed.

4. Yarns or filaments of cellulose acetate containing olive oil and hydroquinone in the proportion of 1% calculated on the weight of olive oil.

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CERTIFICATE OF CORRECTION.

Patent No. 2,067,951. January 19, 1937.

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, line 43, for "1 to 60%" read from 1 to 6%; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 9th day of March, A.D. 1937.

(Seal)

Henry Van Arsdale
Acting Commissioner of Patents.

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2. Process of improving the properties of filaments or yarns of cellulose acetate which comprises applying thereto a finish containing olive oil and hydroquinone in the proportion of 1% calculated on the weight of olive oil.

3. Yarns or filaments of a cellulose derivative selected from the group of organic acid esters of cellulose and cellulose ethers and containing a vegetable or animal oil such as olive oil, teaseed oil, peanut oil, castor oil, cocoanut oil or neat's-foot oil and hydroquinone in the proportion of 0.2 to 4% calculated on the weight of the oil employed.

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