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PROCESSING OF TEXTILE FIBERS

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The invention relates in general to textile treatments and in particular to a process of lubricating and softening textile materials and to correlated improvements in compositions for use in such processes.

Heretofore, in the process of imparting lubricating and softening properties to worsted, synthetic and other fibers, the use of olive oil has invariably been resorted to. This oil possesses a somewhat unique characteristic of giving the fibers sufficient lubrication and softness at the outset for carding, spinning, weaving, etc. After storing the treated fibers for about a month, during which period the olive oil oxidized and polymerized yielding enhanced fiber softness and tackiness, the original lubricating properties were deleteriously affected. In an attempt to overcome this drawback, various proposals have been made including the process of oxidizing and/or polymerizing the oil before application to the fiber. Notwithstanding the improvements that have been made, constant need exists for improved compositions and processes for applying the same.

The general object of the invention is to obviate the foregoing and other disadvantages in the prior art.

A specific object of the invention is to provide a composition for imparting improved softening and lubricating properties to textile fibers.

Another object of the invention is to provide an improved process for softening and lubricating textile fibers.

Other objects will in part be obvious and will in part appear hereinafter.

According to the invention the process comprises incorporating in or applying to textile fibers the novel composition of the invention comprising a blown fatty oil selected from the group consisting of blown semi-drying oils and blown non-drying oils and an ester selected from the group consisting of the lower monohydric alcoholic esters of the higher fatty acids, the lower monohydric alcoholic esters of naphthenic acids and the lower fatty acid esters of the fatty alcohols containing at least eight carbon atoms. The oily composition may be employed as such or it may be dispersed or emulsified in an aqueous medium. An emulsifying agent may be blended with the composition, or an alkaline agent may be added to saponify a portion thereof, thus forming a soap which functions as the emulsifier.

It has now been discovered that a particularly effective treatment for natural and artificial fibrous materials is provided, according to the

invention, when these materials are treated with compositions, the principal constituents of which comprise a blown animal or vegetable oil, fat or wax and an ester selected from the aforesaid group. The expression "blown oil" is used herein to connote any non-drying or semi-drying animal or vegetable oil, fat or wax which has been partially or completely oxidized and/or polymerized. This constituent lends to the fibers the necessary and desirable tackiness.

The blown oils may be prepared in accordance with any known and suitable process. Likewise, any suitable non-drying or semi-drying oil may be subjected to oxidation and/or polymerization and used in the composition of the invention. Suitable oils may comprise, inter alia, olive oil, rapeseed oil, rice bran oil, teaseed oil, corn oil, neat's-foot oil, sperm oil, cottonseed oil, castor oil, lard oil, etc., or any suitable mixture of these or other fatty oils or waxes.

The second essential component of the composition of the invention which provides softness and lubricating qualities to textile fibers comprises any suitable lower monohydric alcoholic ester of a higher fatty or similar acid such as the naphthenic acids. The naphthenic acids are so similar to the higher fatty acids, as far as this invention is concerned that they may be used in combination with or in lieu of the monohydric alcoholic esters of the higher fatty acids. Examples of such lower monohydric alcoholic esters of the higher fatty and naphthenic acids include, among others, the methyl, ethyl, propyl, isopropyl, butyl, isobutyl, amyl, etc., esters of stearic, oleic, palmitic, lauric, caprylic, capric, ricinoleic, linoleic, naphthenic, etc., acids. While the use of the foregoing type of esters is preferred in the composition of the invention, the esters produced by the esterification of fatty alcohols, containing 8 or more carbon atoms, with the lower fatty acids is also contemplated; and as examples of the latter type the following are illustrative: octyl formate, decyl acetate, lauryl acetate, myristyl propionate, palmityl acetate, oleyl butyrate, stearyl acetate, naphthenyl propionate, ricinoleyl formate, etc.

The relative proportions of the two components of the novel composition may be varied within wide limits, it being preferred, however, that the synthetic esters comprise at least 35% and up to 95% of the composition. Other substances may also be included in the composition, such for example as, animal, vegetable and mineral oils and waxes, derivatives thereof such as the amides, amines, ketones, etc., as well as prod-

ucts produced therefrom by sulfonation, sulfation, phosphation, etc. Other fatty esters may also be included such as the mono or diglycerides or the glycol esters of the higher fatty acids and sulfonation or sulfation products thereof.

As aforementioned, the composition of the invention may be applied to the individual fibers before carding or spinning or to spun yarns, threads or fabrics produced therefrom by means of spraying or otherwise coating by means of rollers, wicks and the like. In certain instances the composition may be dissolved or dispersed in an organic solvent and applied as indicated above. Moreover, an emulsifier may be blended with the composition to render it dispersible; or common alkaline agents, such as alkalis, carbonates, borax, triethanolamine, etc., may be added to render the composition dispersible in an aqueous medium. Such an emulsion may be applied as mentioned *supra* or the fibers, yarns, etc., may be passed through or otherwise submerged in a bath containing the emulsion.

In the manufacture of synthetic fibers and yarns from cellulose esters, such as, cellulose acetate, nitrate, formate, propionate, butyrate, etc., or cellulose ethers, such as, ethyl, methyl, butyl, etc., cellulose, the composition of the invention may be dissolved or dispersed in a suitable solvent and incorporated into the spinning solution before extrusion thereof. The composition may be similarly incorporated into other spinning solutions, such as, viscose, cuproammonium solutions of cellulose, casein, synthetic resins, etc. Of course, the composition may also be applied to the exterior of synthetic fibers and yarns as well.

In general the composition and process of the invention are applicable in the treatment of all animal, vegetable and synthetic fibrous materials including, *inter alia*, wool, worsteds, cotton, silk, ramie, hemp, jute, etc., as well as the aforementioned and other synthetic fibers including filaments, fibers, staple fiber, yarns, etc.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following examples which are given merely to illustrate further the invention and are not to be construed in a limiting sense:

Example I

In the treatment of worsted fibers, the top is sprayed with a composition containing 90 parts of methyl oleate and 10 parts of blown teaseed oil, the latter having a viscosity of about 1200 seconds at 100° F. In the treatment of fibers before carding and/or spinning, the blown oil selected should have a sufficiently high viscosity to impart to the fibers a degree of tackiness essential for the carding and drawing operations.

Example II

In the process of Example I a composition containing 80 parts of butyl stearate and 10 parts each of blown rice bran and teaseed oils may be used.

Example III

In the treatment of cotton, silk or synthetic fibers, a composition containing 35% to 95% alkyl ester of a fatty residue and 5% to 65% of a blown vegetable oil emulsified in an aqueous medium may be applied to the fibers by coating or by immersing the fibers in a bath thereof.

Example IV

To a spinning solution containing 25% cellulose acetate in acetone, there is added 1% to 2% of a 50-50 mixture of a blown vegetable oil and an alkyl ester of a higher fatty acid. Yarn produced by the dry spinning of this solution is further treated by the exterior application of the composition disclosed in Example III.

The composition of the invention is easily saponified and readily removed from the fibrous materials during the conventional scouring operations. Fibrous materials treated according to the invention retain the softness and lubricating properties imparted thereto for long periods of time in the event that it is necessary to store the material. However, storing of the treated material is not necessary as it may be worked immediately after treatment.

Since certain changes in carrying out the above process and certain modifications in the composition which embody the invention may be made without departing from its scope, it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all the generic and specific features of the invention herein described and all statements of the scope of the invention, which as a matter of language might be said to fall therebetween; and that they are intended to be inclusive in scope and not exclusive, in that if desired, other materials may be added to my novel composition of matter herein claimed without departing from the spirit of the invention. Particularly it is to be understood that in said claims, ingredients or components recited in the singular are intended to include compatible mixtures of said ingredients wherever the sense permits.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A composition for softening and lubricating textile fibers comprising a blown fatty oil selected from the group consisting of blown semi-drying oils and blown non-drying oils and an ester selected from the group consisting of the lower monohydric alcoholic esters of the higher fatty acids, the lower monohydric alcoholic esters of naphthenic acids and the lower fatty acid esters of the fatty alcohols containing at least eight carbon atoms.

2. A composition for softening and lubricating textile fibers comprising a blown fatty oil selected from the group consisting of blown semi-drying oils and blown non-drying oils and a lower monohydric alcoholic ester of a higher fatty acid.

3. A composition for softening and lubricating textile fibers comprising a blown fatty oil selected from the group consisting of blown semi-drying oils and blown non-drying oils and a lower monohydric alcoholic ester of naphthenic acids.

4. A composition for softening and lubricating textile fibers comprising a blown fatty oil selected from the group consisting of blown semi-drying oils and blown non-drying oils and a lower fatty acid ester of a fatty alcohol containing at least eight carbon atoms.

5. A composition for softening and lubricating textile fibers comprising a blown fatty oil selected from the group consisting of blown semi-drying oils and blown non-drying oils and a methyl ester of a higher fatty acid.

6. A composition for softening and lubricating

textile fibers comprising a blown fatty oil selected from the group consisting of blown semi-drying oils and blown non-drying oils and methyl oleate.

7. A composition for softening and lubricating textile fibers comprising a blown fatty oil selected from the group consisting of blown semi-drying oils and blown non-drying oils and a butyl ester of a higher fatty acid.

8. A composition for softening and lubricating textile fibers comprising a blown fatty oil selected from the group consisting of blown semi-drying oils and blown non-drying oils and butyl palmitate.

9. A composition for softening and lubricating textile fibers comprising a blown fatty oil selected from the group consisting of blown semi-drying oils and blown non-drying oils and ethyl naphthenate.

10. A composition for softening and lubricating textile fibers comprising blown teaseed oil and a lower monohydric alcoholic ester of a higher fatty acid.

11. A composition for softening and lubricating textile fibers comprising blown rice bran oil and a lower monohydric alcoholic ester of a higher fatty acid.

12. A composition for softening and lubricating textile fibers comprising blown teaseed oil, blown rice bran oil and a lower monohydric alcoholic ester of a higher fatty acid.

13. A process of softening and lubricating textile materials which comprises applying thereto a composition comprising a blown fatty oil selected from the group consisting of blown semi-drying oils and blown non-drying oils and an

ester selected from the group consisting of the lower monohydric alcoholic esters of the higher fatty acids, the lower monohydric alcoholic esters of naphthenic acids and the lower fatty acid esters of the fatty alcohols containing at least eight carbon atoms.

14. A process of softening and lubricating textile materials which comprises applying thereto an emulsified composition comprising a blown fatty oil selected from the group consisting of blown semi-drying oils and blown non-drying oils and an ester selected from the group consisting of the lower monohydric alcoholic esters of the higher fatty acids, the lower monohydric alcoholic esters of naphthenic acids and the lower fatty acid esters of the fatty alcohols containing at least eight carbon atoms.

15. A process of softening and lubricating textile materials which comprises applying thereto a composition comprising a blown fatty oil selected from the group consisting of blown semi-drying oils and blown non-drying oils and a lower monohydric alcoholic ester of a higher fatty acid.

16. A process of softening and lubricating wool fibers which comprises applying thereto a composition comprising a blown fatty oil selected from the group consisting of blown semi-drying oils and blown non-drying oils and an ester selected from the group consisting of the lower monohydric alcoholic esters of the higher fatty acids, the lower monohydric alcoholic esters of naphthenic acids and the lower fatty acid esters of the fatty alcohols containing at least eight carbon atoms.

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