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2,865,855

TEXTILE TREATING COMPOSITION

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This invention relates to a novel composition of matter. More specifically, it relates to a modified mineral oil composition useful for the finishing of textiles, particularly those containing a cellulose ester component.

It is an object of the present invention to provide a novel, modified mineral oil composition for textile use.

Another object is to provide a modified mineral oil based lubricant for a cellulose acetate textile.

A still further object is to provide an improved lubricated cellulose acetate textile.

These and other objects will become apparent in the course of the following specification and claims.

By the term "textile" is meant a fiber, filament, spun yarn, staple, fabric, pellicle and the like.

In the highly mechanized operation of textile manufacture, it has become essential to adapt the various raw materials to high-speed operations by use of finish dressings. Thus, successful knitting, twisting, weaving and winding of textile yarns, filaments or fibers is intimately related to proper lubrication and softening of the material being processed. Improper lubrication causes excessive breakage, due to friction, in various points where the textile contacts the processing equipment. It is recognized in the art that low and medium viscosity mineral oils, in general, do not soften cellulose ester textiles to any extent. Consequently, lubrication of such materials with dressings containing a major proportion of mineral oils has often caused an undesirable wiriness. To impart softness to the yarn, it has become the practice to modify the mineral oil with a vegetable oil, such as coconut or olive oil, which additive acts as a softener. The ester of an acid or an alcohol containing a long chain hydrocarbon group such as those obtained from fats have also been used for this purpose. Another widely used material has been the sulfonic acid derivatives of the various vegetable oils, a popular additive being sulfonated peanut oil. Such combinations when used upon a cellulose ester textile have been observed to cause delustering on the boil-off and shuttle marks during weaving.

In accordance with the present invention, it has been found that a yarn dressed with a mineral oil base lubricant, containing a minor proportion of the acetylation product of the ester formed from ricinoleic acid and 2-methoxy ethanol or a mixture of such an ester with acetylated mono- and di-glycerides of ricinoleic acid, possesses enhanced softening properties. The preparation of derivatives of this type is described in detail in U. S. Patent No. 2,562,218. In general, the process consists in the acetylation of the 2-methoxy ethanol ester of ricinoleic acid. The ester is conveniently produced by alcoholysis of castor oil having a free fatty acid content of about 0.5% or less in the presence of an alkali-metal hydroxide catalyst. After separation of the liberated glycerine, the acetylation is accomplished by conventional procedure. A preferred material can be prepared by acetylating that mixture resulting upon the incomplete alcoholization of castor oil with 2-methoxy ethanol. The

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final product contains a mixture of acetylated mono- and di-ricinolein along with acetylated methoxy-ethyl ricinoleate. A mixture of from 10 to 15 parts by weight of acetylated mono- and di-ricinolein with 85 to 90 parts by weight of acetylated methoxy-ethyl ricinoleate, available on the open market under the trademark "Flexricin 62" from the Baker Castor Oil Company of 120 Broadway, New York 5, N. Y., has been found particularly valuable. It is referred to hereinafter as acetylated, partially alcoholized castor oil. A saponification number of at least 315 is characteristic of this material. The presence of as high as 2% tri-ricinolein and/or its acetylated derivative can be tolerated.

It is conventional practice to modify lubricants by the addition of antistatic agents, supplementary lubricants, emulsifiers, co-blending agents, antioxidants, clarifiers, preservatives and the like. Examples I to III illustrate suitable combinations of such materials in mineral oil base finishes for direct application. The examples are cited by way of illustration and not by way of limitation.

Example I

	Percent
Mineral oil (#50 White)-----	65
Acetylated, partially alcoholized castor oil-----	18
Polyethylene glycols ¹ having a viscosity of 385 SUS at 100° F. (supplementary lubricant)-----	5
Dilauryl dimethyl ammonium chloride (antistatic agent)-----	12

¹ Sold under the name of "Ucon" fluids by Union Carbide and Carbon Corp., of 30 E. 42nd Street, New York 17, New York.

Example II

	Percent
Mineral oil (#50 White)-----	60
Acetylated, partially alcoholized castor oil-----	10.5
Polyethylene glycols having a viscosity of 385 SUS at 100° F. (supplementary lubricant)-----	5
5 ethoxy soya amine ¹ (antistatic agent)-----	17.5
Sulfonated peanut oil (softener)-----	5.3
Oleic acid (clarifier)-----	1.6
Sodium ortho phenyl phenate (preservative)-----	0.1

¹ The condensation product of five mols of ethylene oxide with one mol of the amine produced from the acids derived from soya bean oil by replacing the —COOH group with —CH₂NH₂.

Example III

	Percent
Mineral oil (#50 White)-----	60
Acetylated, partially alcoholized castor oil-----	16.8
The dehydrolysis product of triethanolamine with ricinoleic acid (antistatic agent)-----	20.6
Oleic acid (clarifier)-----	0.5
Sodium ortho phenyl phenate (preservative)-----	0.1

The above mixtures form clear, brilliant oils. The order of combining the various components is not critical. Normally, the acetylated, partially alcoholized castor oil is added slowly and stirred into the mineral oil. The other ingredients are then blended into the mixture in a similar fashion. At times a slight haze develops which may be removed by means of the addition of minor amounts of a higher fatty acid as a clarifier as illustrated in Examples II and III. The compositions may be applied by any convenient method, such as by roller, pad or wick. The treated textiles are well-lubricated as evidenced by low and uniform frictional properties. They are pliable and possess excellent processing properties, particularly in twisting, winding and warping operations. The formulations do not soften the yarn so excessively that shuttle marks and streaky fabrics result from their use.

Examples IV and V below illustrate the application of the compositions described above to freshly-spun, non-pigmented, 75-denier, 24-filament, cellulose acetate yarn.

Example IV

The composition of Example II is applied by means of a roller to 18 pounds of yarn. The yarn takes up approximately 3% of its own weight in finish. No difficulty is experienced in winding this yarn on cones.

Example V

The composition of Example III is applied by a finish roll. The yarn take-up is 3.3% of the yarn weight. This composition shows a reduction of 10% of breakage during coning over a similar composition which did not contain the acetylated, partially alcoholized castor oil. Further, fabric junctions resulting from the preparation of fabric from the inside and outside of yarn cakes reveal no detectable luster differences after normal scouring and desizing.

Examples VI and VII illustrate compositions containing mineral oil modified with acetylated partially alcoholized castor oil as defined herein which are useful in the preparation of aqueous emulsions from which the finish may also be applied.

Example VI

	Percent
Mineral oil (#50 White)-----	58
Acetylated, partially alcoholized castor oil-----	9.1
Polyethylene glycols having a viscosity of 385 SUS at 100° F-----	3
The dehydrolysis product of triethanolamine with ricinoleic acid (antistatic agent)-----	9.9
Triethanolamine (emulsified)-----	7
Coconut oil fatty acids ¹ (supplementary lubricant)-----	13

¹ The mixed acids derived from coconut oil.

Example VII

	Percent
Mineral oil (#50 White)-----	58
Acetylated, partially alcoholized castor oil-----	6
Polyethylene glycols having a viscosity of 385 SUS at 100° F. (supplementary lubricant)-----	3
Sulfonated peanut oil (softener)-----	3
5 ethoxy soya amine (antistatic agent)-----	10
Triethanolamine (emulsifier)-----	7
Coconut oil fatty acids (supplementary lubricant)---	13

The constituents of each of these examples, when blended together, form clear oils that may be added to water to form stable emulsions having excellent wetting and spreading properties. Normally, water emulsions from 15% to 25% of oil concentrate are used to obtain a dressed yarn containing about 3% of the dressing based on the yarn. Yarns so treated have excellent textile processing properties. Particularly, subsequent winding operations proceed smoothly, packages being free of loops and thrown threads. Fabrics woven from cellulose acetate yarn treated with these compositions are observed to be free of streaks and shuttle marks attributable to excessively softened yarn.

As is evident from the examples, the most critical components of the composition are the mineral oil and the acetyl 2-methoxy ethyl ricinoleate. Other materials such as antistatic agents, lubricating enhancers, emulsifiers and the like may be added as desired. The nature and source of the mineral oil is not critical provided it is of suitable viscosity and free of impurities which would cause color difficulties or the like.

The invention has been described particularly with reference to application of the composition to textiles produced from cellulose acetate because of the pronounced advantages found in treating these particular textile materials. However, the composition can be applied with advantage to textiles such as the fibers, filaments, yarns,

fabrics, pellicles and the like of other natural or synthetic materials. Among these may be mentioned cotton, wool, flax, regenerated cellulose and those produced from polymers of polyamides, polyesters and polyacrylic resins.

The proportions of the ingredients may vary over wide ranges for purposes of the present invention. Generally, it is preferred that at least 2% of acetyl 2-methoxy ethyl ricinoleate be present in the final composition. As much as 50% may be present without deleterious effects. It is particularly desirable to use between 5% and 10% of this component. It is preferred that at least 50% of the final composition be mineral oil, the mineral oil component normally comprising at least 65% of the final composition. The proportions of antistatic agents, supplementary lubricants, emulsifying agents and the like will vary widely, depending upon the particular agents employed and the properties desired in the final composition. In general, these materials are added in minor proportions.

Cellulose acetate filamentary and staple yarns bearing the above-described compositions have been found to have a very desirable coefficient of kinetic friction. Problems of over-running and entangling are eliminated. The compositions spread well to completely cover the yarn and do not become yellow, gummy or rancid upon aging. Such yarns have been observed to remain pliable without becoming overly soft in the process of being woven into fabric.

Many other composition modifications employing the stipulated partial ester will be apparent to those skilled in the art without a departure from the inventive concept.

What is claimed is:

1. A textile containing as a dressing composition a mixture of mineral oil, constituting at least about 50% by weight of the said dressing, and the acetylated derivative of a 2-methoxy ethyl ricinoleate, constituting at least about 2% by weight of the said dressing.

2. The article of claim 1 wherein the textile contains a component derived from cellulose acetate.

3. The article of claim 1 wherein the textile is produced from cellulose acetate.

4. The article of claim 3 wherein the cellulose acetate textile is in the form of a continuous filament.

5. A composition of matter consisting essentially of a yarn dressing wherein mineral oil constitutes at least about 50% by weight of the dressing and the acetylated derivative of 2-methoxy ethyl ricinoleate constitutes at least about 2% by weight of the dressing.

6. A yarn dressing comprising a mixture of which mineral oil constitutes from about 50% to about 65% by weight and of which the acetyl-2-methoxy ethyl ricinoleate component of the acetylated derivative of the incomplete alcoholization product of castor oil and 2-methoxy ethanol constitutes from about 5% to about 10% by weight.

7. A composition of matter consisting essentially of an oil in water emulsion wherein the dispersed phase consists of from about 15 to about 25% of a yarn dressing oil concentrate comprising, based on weight of said concentrate, from about 50 to about 65% by weight of mineral oil and from about 5 to about 10% by weight of the acetyl-2-methoxy ethyl ricinoleate component of acetylated, partially-alcoholized castor oil.

References Cited in the file of this patent

UNITED STATES PATENTS

2,113,325	Koch	Apr. 5, 1938
2,562,218	Smith	July 31, 1951
2,564,768	Seymour et al.	Aug. 21, 1951