Patented June 27, 1939

2,164,235

UNITED STATES PATENT OFFICE

2,164,235

TREATING TEXTILES AND OILS THEREFOR

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No Drawing. Application October 10, 1936, Serial No. 105,147. In Great Britain January 21, 1936

5 Claims. (Cl. 19—66)

This invention relates to improvements in treating textile materials especially those consisting of or containing animal hairs such as wool, mohair, angora, recovered wool (e. g., shoddy) either alone or mixed with each other or with other fibres, e. g., silk, rayon or cotton.

In dealing with such materials it is frequently necessary to treat them with a lubricant which must subsequently be removable by ordinary scouring operations. Olive oil is generally used for this purpose but many other substances have been proposed. It is difficult, however, to find a substitute for olive oil which is reasonably cheap and satisfies the requirements of a textile lubricant, especially the somewhat exacting requirements of the worsted industry, in which a high-class material is subjected to a combing operation.

According to the invention such textile materials either in the loose form, or as sliver, yarn or fabric, or in intermediate stages of processing or in other form, are treated with a condensed ester or mixture of condensed esters as hereinafter defined, and after subjecting the treated materials to one or more textile operations (e. g., carding, combing, spinning, weaving or knitting), they are then scoured.

The condensed esters referred to are fully esterified synthetic esters substantially insoluble in water; such esters are oily bodies and are therefore to be distinguished from esters which are capable of dissolving or dispersing in water alone and which have wetting and foaming powers enabling them to be used as substitutes for soaps and Turkey red oils.

The condensed esters may be formed by combining an alcohol with an unsaturated acid which has been polymerised or by forming an ester of an alcohol and an unsaturated acid and polymerising such ester, or by using a condensed alcohol, e. g., di- or tri-glycol. The invention therefore contemplates three types of esters, the third type combining the characteristics of the first two:

1. A polymerised ester or an ester of a polymerised acid; in each case such esters may be described as containing a polymerised acid radical.

2. An ester of a di- or tri-glycol.

3. A di- or tri-glycol ester of a polymerised acid.

It is essential, moreover, that the esters employed, although substantially insoluble in water, should be readily emulsifiable especially when from 1 to 15% of a fatty acid such as oleic is added, so that they can be removed by scouring and that they should not oxidise easily when tested by standard available tests. They should compare favourably with olive oil in these respects.

Preferably both the alcohol and acid are of high molecular weight.

The most suitable alcohols for esters of type 1 have preferably but not necessarily six or more carbon atoms. Examples are ethyl alcohol, hexyl alcohol, lauryl alcohol, cetyl alcohol, cholesterol, methyl cyclohexanol, ethylene glycol, propylene glycol, or the simple substitution products of such alcohols.

The most suitable alcohols for esters of type 2 are diethylene and triethylene glycol.

The most suitable acids for esters of types 1 and 3 are derived by polymerisation from unsaturated fatty acids belonging to the $C_nH_{2n-2}O_2$ (oleic) series; the $C_nH_{2n-2}O_3$ (ricinoleic) series; the $C_nH_{2n-4}O_2$ (linoleic) series; or mixtures of these acids. The acids themselves may be polymerised or may be obtained by hydrolysis of polymerised esters. Simple substitution products of such acids may be used.

Alternatively, unpolymerised esters of unsaturated acids may be prepared, and then the esters themselves may be polymerised for use as textile oils.

The most suitable acids for esters of type 2 are the higher saturated fatty acids, e. g., stearic acid, and their hydroxy derivatives, e. g., dihydroxy stearic acid. Unsaturated fatty acids, preferably containing not more than one double bond, e. g., oleic acid, are also suitable. We may also use unsaturated acids of the types mentioned above which have been oxidised or hydrogenated; simple substitution products of such acids may also be employed.

The above esters are synthetic but the invention also includes the use of polymerised sperm oil which is a mixture of esters falling under the above definitions. It is not a glyceride and the alcohols thus contain less than three hydroxyl groups.

The compositions employed for treating the textile materials may consist of the pure or commercial esters as defined above or mixtures thereof with a diluent such as mineral oil or with a substance which assists emulsification, e. g., oleic acid or triethanolamine oleate, or aqueous emulsions may be used. Substances of a higher or lower viscosity may be added respectively to increase or reduce the viscosity. Thus petroleum jelly or polymerised rape oil may be added to increase the viscosity or a thin mineral oil or thin ester may be added to reduce the viscosity.

It has already been stated that the ester must be readily emulsifiable. It must emulsify fairly easily with soap solution with or without alkali. The diluent need not necessarily comply with this condition provided the mixture does so. The behaviour when present upon wool fibre is ascertained for example by the following scouring test:—A wool hank is steeped in a 3½% solution of the oil in a volatile organic solvent, squeezed, and allowed to stand 12 hours to ensure a complete and even impregnation. The hank is then scoured in a solution of 0.2% soap and 0.1% ammonia at 45° C. for one quarter of an hour in an apparatus which circulates the liquor; it is then washed in water, dried, and the percentage residual oil is ascertained. This test corresponds to a trade method of scouring wool hanks.

The preferred compositions have a viscosity between 250 and 500 seconds Redwood at room temperature and a flash point above 330° F. These qualities enable them to satisfy current requirements in the trade although they are not essential for practical success.

By way of example polymerised methyl cyclohexanol oleate prepared from commercial methyl cyclohexanol by esterification with oleic acid and subsequent polymerisation having an iodine value of 40 may be used as a substitute for olive oil (iodine value 88). This product is so little sensitive to oxidation that after 2 hours in the Mackay testing apparatus the temperature was only 213° F. (olive oil 490° F.).

Two parts of this polymerised methyl cyclohexanol oleate may be emulsified by the aid of 1 part of soap solution to form a "wool cream" which is suitably diluted before use. Twitchell base, triethanolamine oleate, or other known agents may also be used as the emulsifier, and stabilizing substances, e. g., casein dissolved in dilute ammonia may be used in forming or stabilizing of the emulsion.

By working according to this invention it is possible to produce oils which are even superior to olive oil in one or more of the following properties,—smaller liability to oxidation, absence of rancidity, absence of colour and odour, ease of scouring even after long storage.

I claim as my invention:

1. Process of treating textile materials containing animal hairs which consists in oiling the material with an oil having a viscosity between 250 and 500 seconds Redwood, and containing a fully esterified di-glycol ester, subjecting the oiled material to at least one mechanical textile operation, and scouring the material.

2. Process of treating textile materials which consists in oiling the materials with diglycol dioleate, submitting the oiled material to at least one mechanical textile operation and finally scouring the material.

3. Process of treating textile materials containing animal hairs, which comprises the step of oiling the material with a diglycol ester having its alcohol radical portion and its acid radical portion fully esterified by one another and therewith being non-hygroscopic and substantially insoluble in water.

4. Process of treating textile materials containing animal hairs, which comprises the step of oiling the material with a synthetic ester having an alcohol radical portion and an acid radical portion, said alcohol radical portion being comprised of an alcohol containing more than one and less than four glycol radicals, said alcohol radical portion and said acid radical portion being fully esterified by one another, said ester being of an oily character not readily dispersed in water and easily emulsified by alkali solution, and having a high resistance to oxidation.

5. Process of treating textile materials containing animal hairs, which comprises the step of oiling the material with a condensed synthetic ester having an alcohol radical portion and an acid radical portion, said alcohol radical portion being comprised of an alcohol containing more than one and less than four glycol radicals, said acid radical portion being comprised of a polymerized unsaturated fatty acid, said alcohol radical portion and said acid radical portion being fully esterified by one another, said ester being of an oily character not readily dispersed in water and easily emulsified by alkali solution, and having a high resistance to oxidation.

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