United States Patent

[11] 3,623,980

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[54] **PRODUCT FOR PERMANENTLY ATTACHING LONG CHAIN MOIETIES TO TEXTILE MATERIALS**
2 Claims, No Drawings

[52] **U.S. Cl.** **252/8.75,** 117/139.5, 252/8.8
[51] **Int. Cl.** **D06m**
[50] **Field of Search** 252/8.8; 117/139.5; 8/115.5, 116.2; 260/584

[56] **References Cited**

UNITED STATES PATENTS

3,497,556	2/1970	Lanner et al.	260/584
2,753,372	7/1956	Lundberg	162/164 X
3,256,180	6/1966	Weiss et al.	252/8.8
3,278,561	10/1966	Van Gaertner	260/348
3,356,526	12/1967	Waldman et al.	252/8.8

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ABSTRACT: A composition comprising a water dispersible reaction product of a primary alkyl amine having an alkyl chain containing from about 12 to about 30 carbon atoms and from about 1.25 to about 2 moles of epichlorohydrin per mole of amine; an additive selected from the group consisting of borax, urea, anionic detergent and mixtures thereof; if desired, a highly alkaline material such as sodium hydroxide; and the balance water; process for utilizing said compositions to treat textile materials especially materials which have been treated with anionic optical brighteners.

PRODUCT FOR PERMANENTLY ATTACHING LONG CHAIN MOIETIES TO TEXTILE MATERIALS

Background of the Invention

The reasons for attaching long alkyl chain moieties to textile materials include (*a*) the improvement of fiber-to-fiber and fiber-to-metal lubricity, (*b*) softening, and (*c*) improving water repellency. In order to achieve these results in an economic manner, it is highly desirable that the product can be applied from aqueous milieus. It is also important that the product applied to the textile material does not adversely effect the cloth, e.g., causing the cloth to yellow or lose strength.

This invention relates to compositions for treating textile materials, especially compositions containing the U.S. Pat. No. 3,497,556, issued to Lanner et al., Feb. 24, 1970. The condensation products of long alkyl chain amines and epichlorohydrin which are disclosed in the copending application of Lanner et al. are highly superior to similar compounds disclosed in the prior art in that the products of the Lanner et al. application do not cause textile materials to yellow as much as prior art compounds. However, even these superior products can yellow some textile materials to a slight degree when used at concentrations that provide, e.g., a durable softening effect.

Accordingly, it is an object of this invention to provide improved textile treating compositions utilizing amine/epichlorohydrin reaction products, said compositions having a diminished tendency to yellow textile materials when used to treat said textile materials.

The compositions of the Lanner et al. application and other amine/epichlorohydrin condensation products are normally affixed to the textile material to the greatest extent when applied with alkaline inorganic catalysts. However, the use of high levels of these alkaline inorganic catalysts tends to diminish the softening effect of the condensation products on the material, prior to the time when the material is washed for the first time. The alkaline inorganic catalysts also increase yellowing of the treated textile materials.

Accordingly, it is another object of this invention to provide improved compositions which attach readily to textile materials and provide superior immediate softening effects (initial softness).

SUMMARY

The above objects and other objects as will hereinafter be seen can be accomplished by providing:

1. A textile treating composition comprising from about 0.01 percent to about 99 percent of a water dispersible reaction product of a primary alkyl amine having an alkyl chain of from about 12 to about 30 carbon atoms and from about 1.25 to about 2 moles of epichlorohydrin per mole of amine;
2. from about 0.0005 percent to about 95 percent of an additive selected from the group consisting of:
   a. borax,
   b. anionic detergent,
   c. urea, and
   d. mixtures thereof;
3. from 0 percent to about 10 percent by weight of
   (1) of an emulsifier for (1) selected from the group consisting of the condensation product of a fatty alcohol containing from nine to about 18 carbon atoms and from about 10 to about 60 moles of ethylene oxide and the condensation product of an alkylphenol wherein said alkyl group contains from about nine to about 15 carbon atoms and from 10 to about 15 moles of ethylene oxide per mole of alkylphenol;
4. from 0 percent to about 20 percent of a highly alkaline material, e.g., one selected from the group consisting of alkali metal hydroxides, silicates, and carbonates and ammonium hydroxide; and
5. the balance water.

AMINE/EPICHLOROHYDRIN REACTION PRODUCTS

The preferred amine/epichlorohydrin reaction products are those described in the copending application of Arthur W. Lanner, John N. Kalberg, and George B. Walker, Ser. No. 556,880 filed June 13, 1966. These reaction products are prepared at a temperature of from 80° F. to about 200° F. with a reaction time of from about 30 minutes to about 10 hours and the reaction products are neutralized to an acid value of less than about 30, preferably from about 5 to about 15, the neutralization being carried out at a temperature of from 60° F. to about 150° F. Other similar reaction products can be used, but the preferred reaction products give treated textile products having a better color and the resulting textile materials are further improved by the effects of the additives of this invention as set forth hereinafter.

The primary alkyl amines which can be used in preparing the reaction products of this invention include those wherein the alkyl groups can be derived from naturally occurring glycerides (e.g., tallow, coconut oil, palm oil, soybean oil, lard, etc.), or can be obtained from petroleum sources and/or olefins such as ethylene polymers. The source is not important. However, the preferred alkyl groups are primarily straight chain moieties. Branched chain alkyl groups and alkyl groups containing cycloaliphatic moieties can also be used. The amine group can be attached at any point on the chain, but it is preferred to have the amine group attached to a terminal carbon atom. Mixtures of amines are preferred. Specific examples of amines include dodecyl, tetradecyl, hexadecyl, octadecyl, pentapropylene, hexapropylene, dodecylcyclohexyl, 12-cyclohexyldodecyl, eicosyl, and docosyl amines.

The structure of this reaction product is not known. The reaction product appears to be a relatively complex mixture. Similar reaction products, which have been disclosed in the prior art, have contained epoxy groups, but it has been shown that epoxy groups adversely affect the performance of the reaction product of this invention.

Compositions suitable for treating textiles normally contain from about 0.05 percent to about 5 percent by weight of the amine/epichlorohydrin reaction product, preferably from about 0.05 percent to about 1 percent when soft textiles are desired. When waterproofing is desired, the compositions preferably contain from about 1 percent to about 5 percent of the amine/epichlorohydrin reaction product. Compositions containing more than this amount of the reaction product will normally be diluted with water and compositions containing less than 0.05 percent of the reaction product will normally give a diminished effect. However, more dilute compositions lend themselves to repeated application by exhaustion from a standing bath employing relatively long immersion times, e.g., from about 5 minutes to about 30 minutes.

ADDITIVES

The additives of this invention which are combined with the amine/epichlorohydrin reaction products described hereinbefore provide advantages in initial and washed fabric softening and/or in the color of the treated textile material. The additives can all be added together or separately, however, the advantages of the individual additives when used in combination with other additives are, in some instances as described hereinafter, not the same advantages that the additives provide when used alone. The following descriptions will explain the use of the various additives.

BORAX

As discussed in the copending application of Lanner, et al., it is possible to use highly alkaline materials such as alkali metal hydroxides or carbonates and ammonium hydroxide as catalysts to speed the reaction of the amine/epichlorohydrin reaction products with the textile material which is to be treated in order to provide, e.g., more durable softness. It has now been discovered that borax can be used with these more

alkaline catalysts to provide essentially the same durable softness as is possible with the highly alkaline catalyst alone while maintaining the pH of the aqueous solution at a lower level where there is less damage to the cloth and to any alkali sensitive dyestuff or additive which may be present on the cloth. The borax can also be used by itself as a catalyst permitting the application of the reaction product to the textile materials at a lower pH and giving good durable softness. There is also an advantage in the improved color of the treated textile materials when borax is used as a catalyst, either alone or in combination with more alkaline catalysts.

All will be discussed in more detail hereinafter, borax and urea can be used in combination to provide certain unobvious advantages. Although the use of borax appears to improve the color of the treated textile materials somewhat, the combination of borax with urea gives a larger improvement in the color and softness of the treated textile materials. The borax is normally used at a level of from about 50 percent to about 150 percent by weight of the amine/epichlorohydrin reaction product (i.e., if the level of amine/epichlorohydrin reaction product is within the range of about 0.05 percent to about 5 percent by weight of the total composition, the level of borax is within the range of 0.025 percent to about 12.5 percent by weight of the total composition). Amounts below 25 percent do not give adequate buffering to provide good durable softness and amounts above 250 percent do not provide any advantages in improved durable softness while further adversely affecting the initial softness of the treated materials. High levels of borax also adversely affect sewing lubricity and tend to promote yellowing of the treated materials at high temperatures.

ANIONIC DETERGENTS

Anionic detergents which are suitable for use in this invention include conventional water-soluble soaps containing carboxylic acid groups. The cation of the anionic detergents can be any water soluble cation such as the alkali metal cations, e.g., sodium, potassium, ammonium or substituted ammonium cations (mono-, di-, and triethanolammonium cations). Suitable fatty acid mixtures which can be used to prepare the soaps of this invention include the fatty acid mixtures described in U.S. Pat. Nos. 2,954,347–8. Preferred fatty acids are those derived from coconut oil or tallow, e.g., caprylic, capric, lauric, myristic, palmitic and stearic fatty acids. The soaps contain from about eight to about 18 carbon atoms.

Anionic synthetic detergents are particularly preferred. This class of synthetic detergents can be broadly described as the water-soluble salts, particularly the alkali metal salts, of organic sulfuric acid reaction products having in the molecular structure an alkyl radical containing from about eight to about 22 carbon atoms and a radical selected from the group consisting of sulfonic acid and sulfuric acid ester radicals. Important examples of the synthetic detergents which form a part of the preferred compositions of the present invention are the sodium or potassium alkyl sulfates, especially those obtained by sulfating the higher alcohols produced by reducing the glycerides of tallow or coconut oil; sodium or potassium alkylbenzene sulfonates, in which the alkyl group is a straight or branched chain containing from about nine to about 15 carbon atoms, especially those of the types described in U.S. Letters Pat. Nos. 2,220,099 and 2,477,383; sulfonated α-olefins containing from about 12 to about 18 carbon atoms, sodium alkyl glyceryl ether sulfonates, especially those ethers of the higher alcohols derived from tallow and coconut oil; sodium coconut oil fatty acid monoglyceride sulfates and sulfonates; sodium or potassium salts of sulfuric acid esters of the reaction product of 1 mole of a higher fatty alcohol (e.g., tallow or coconut oil alcohols) and about 3 moles of ethylene oxide; sodium or potassium salts of alkylphenol ethylene oxide ether sulfates with about four units of ethylene oxide per molecule and in which the alkyl radicals contain about nine carbon atoms; the reaction product of fatty acids esterified with isethionic acid and neutralized with sodium hydroxide where, for example, the fatty acids are derived from coconut oil; sodium or potassium salts of fatty acid amides of a methyl taurine in which the fatty acids, for example, are derived from coconut oil; and others known in the art, a number being specifically set forth in U.S. Letters Pat. Nos. 2,486,921, 2,486,922 and 2,396,278.

The alkyl groups contained in said detergent surfactants can be straight or branched and saturated or unsaturated as desired. The above list of detergent surfactants is exemplary and not limiting.

These anionic detergents when used with the amine/epichlorohydrin reaction products described hereinbefore provide an improvement in the color of the treated textile materials. This advantage is especially noticeable when the treated textile materials have also been treated with anionic optical brighteners. The anionic detergent will improve the color of the treated textile materials initially. The anionic detergent will also improve the color of the treated textile material where the textile material has been naturally aged, exposed to heat as in drying or rapid aging tests, exposed to ultraviolet light and/or exposed to nitrogen oxide fumes.

The combination of large amounts of anionic detergents with urea decreases slightly the effectiveness of the urea in improving initial softness as discussed hereinafter but contributes slightly to initial softness when an inorganic catalyst is used and there is no urea present.

It appears that the optimum amount of anionic detergent is one mole of anionic detergent per mole of amine or quaternary ammonium group in the amine/epichlorohydrin reaction products. Amounts as low as one-fourth of this amount provide an improvement in the color of the treated textile materials and amounts above a 2.5:1 ratio on a molar basis do not provide any additional noticeable improvement while adversely affecting the softness of the treated textile material.

The anionic detergent should be added to compositions containing the amine/epichlorohydrin reaction product, or vice versa, slowly to avoid precipitation of a complex.

UREA

Urea when used in combination with the amine/epichlorohydrin reaction products provides a dramatic improvement in the initial softness of the treated textile material. This improvement is especially dramatic when an inorganic catalyst such as sodium hydroxide and/or borax has been used to provide improved durable softness.

However, urea does not improve initial softness when large amounts of an anionic detergent have also been used as set forth hereinbefore.

In addition to providing a dramatic improvement in the initial softness when inorganic catalysts are present, the urea, in combination with either borax, an anionic detergent, or both, gives a big improvement in the color of the treated textile fabric, especially when an anionic optical brightener has been used to treat the textile fabric.

There is a critical amount of urea required for achieving optimum results when the urea is used with the amine/epichlorohydrin reaction product. It has been found that there should be 2,000 percent by weight of urea based on the amount of amine/epichlorohydrin reaction product used to provide optimum initial softness. At a percentage of approximately 1,300 percent the initial softness has dropped off and at a percentage of 3,000 percent the initial softness is again beginning to drop off.

HIGHLY ALKALINE CATALYSTS

The highly alkaline catalysts which are normally used in the compositions of this invention are the alkali metal hydroxides and carbonates and ammonium hydroxide. Other alkaline catalysts can also be used.

Alkaline catalysts should not be added to compositions which are not going to be used very soon since alkaline

catalysts tend to form excessive amounts of epoxy groups on the amine/epichlorohydrin reaction product when the product is stored for more than a few hours.

The compositions of this invention can also contain other ingredients such as organic solvents. In larger amounts, e.g., up to 20 percent by weight of the composition, they aid in preparing a more fluid product as sold to the mill.

The compositions can also contain inert inorganic salts such as NaCl. At a level of about 10 percent in very concentrated compositions the NaCl improves dispersibility of the compositions in water, thereby facilitating the preparation of dilute dispersions suitable for treating textile materials. However, preferably there should be no more than about 0.5 percent of NaCl in the dilute composition which is used to treat textile materials since high inorganic salt levels adversely affect the softness of the treated textile material, especially when urea is not used.

APPLICATIONS

The textile materials to be treated, the methods of application of the compositions of this invention, the amounts of the compositions required based on the amount of amine/epichlorohydrin reaction product to be applied to the textile material and the types of reaction products to be used for softening, waterproofing, etc., are all set forth in the copending application of Lanner, et al., Ser. No. 556,880. The same amounts of amine/epichlorohydrin reaction products should be used when the compositions of this invention are substituted for the compositions of the copending application. Similarly, the compositions can contain the textile lubricant described in the copending application of Arthur W. Lanner, Ser. No. 550,890, filed May 18, 1966.

It is preferred that the compositions which are used to treat textile materials be made up initially in dilute form where possible since this will diminish interactions between the ingredients.

All parts, ratios and percentages herein are by weight unless otherwise specified.

The following examples illustrate the practicability of this invention:

In the following examples "concentrated product" refers to a finished composition the following formula:

The reaction product of tallow alkyl amine and epichlorohydrin in a molar ratio of epichlorohydrin to amine of about 1.5:1; the reaction taking place at a temperature of about 125° F. for a period of about six hours; the reaction product being neutralized to an acid value of about nine with sodium hydroxide; the temperature of the neutralization reaction being kept below about 100° F. and said reactions being carried out in isopropyl alcohol	15%
The lubricant composition of Example I of the copending application of Arthur W. Lanner, Ser. No. 550,890, filed May 18, 1966, (Oxidized Fischer-Tropsch Wax and mixed cationic-nonionic emulsifier system)	5%
Sodium chloride	5%
The reaction product of coconut fatty alcohol and 45 moles of ethylene oxide	1%
Isopropanol	4%
Water	Balance

The Hunterlab Color and Color Difference Meter Model D-25 *b* and *b'* are a measure of the blueness or yellowness of the material. Positive *b* numbers measure yellowness, Negative numbers measure blueness, (see 1966 Brochure of Hunter Associates Laboratory, Inc., on the Hunterlab Color and Color Difference Meter, Model D–25). Smaller positive instrument numbers indicate less yellowness and larger negative numbers indicate a bluer and therefore more desirable color. The *b* values represent all the color of this type. The *b'* represent the same color minus that screened out by a ultraviolet filter. In the *b* and *b'* values 0.5 units is a significant difference that is readily discernible by the human eye.

The softness values in the following examples were obtained by grading the textile materials by hand using a scale in which **10** represents a very soft cloth and **1** represents a very harsh cloth.

All of the cloths in the following examples were scoured and bleached cotton broadcloth which had been pretreated with a commercially available anionic optical brightener, Calcofluor EDS, at a pad bath level of 0.13 percent and a solution pickup of about 70 percent.

Where the cotton cloth was washed it was washed 10 times in a solution of "Tide" a commercially available built anionic detergent at the recommended levels of usage.

EXAMPLE I

The following table summarizes data showing the effect of various compositions on cotton broadcloth with respect to softness and color of the treated fabrics. The balance of the composition in each instance is water.

The textiles were treated by immersing them in a padding bath filled with the composition at a temperature of about 80° F. to obtain a pickup of about 70 percent of the composition by weight of the cloth. The cloth was then air dried and then oven heated at a temperature of about 300° F. for about one-half of a minute.

TABLE I
% COMPOSITION BY WEIGHT

Run	Concentrated Product	NaOH	Borax	Urea	Anionic [2]	Softness		b of 1 minus b of cloth		b' of 1 minus b' of cloth		b of 2 minus b of cloth		b' of 2 minus b' of cloth	
						Before Washing	After Washing	(x)	(y)	(x)	(y)	(x)	(y)	(x)	(y)
1.	0.0					1	2								
2.	2.5					8	4–5	−1.0	−2.1	−.2	−1.0				
3.	2.5	0.075				5	5–6	−2.7	−3.8	−1.2	−1.8	−1.3	−1.7	−1.0	−1.2
4.	2.5		0.4			4	6	−0.6	−2.4	+0.1	−1.3	+0.4	−0.3	+0.1	−0.3
5.	2.5			10		9	4–5	−1.1	−2.4	−1.8	−1.2	−0.1	−0.3	−0.4	−0.2
6.	2.5				0.2	7	4	−0.1	0.0	−0.2	−0.1	+0.5	+1.0	−0.1	−0.1
7.	2.5	0.075	0.4			3	6	−1.2	−2.7	−0.6	−1.6	−0.2	−0.6	−0.4	−0.6
8.	2.5		0.4	10		9	7–8	−0.1	−0.8	−0.5	−0.9	+1.0	+0.3	−0.0	0.5
9.	2.5			10	0.2	7	4	+0.7	+0.1	−0.2	−0.4	+1.5	+2.2	−0.1	+0.6
10.	2.5	0.075	0.4	10		9	7	+0.3	−1.7	−0.2	−1.4	+1.3	+0.4	0.0	−0.4
11.	2.5		0.4	10	0.2	5	6	+0.8	+0.3	+0.1	−0.9	+1.6	+1.7	+0.2	+0.1

[2] Sodium coconut alkyl glyceryl ether sulfonate.
(x) Hunter Color Difference Meter readings immediately after application.
(y) Hunter Color Difference Meter readings after aging 40 hours at 180° F.

As can be seen from the results in the above table, sodium hydroxide and borax both improve the softness of the treated cloth after washing, i.e., durable softness, but there is a color advantage for the cloth treated with borax or borax and sodium hydroxide as a catalyst over cloth treated with sodium hydroxide alone as a catalyst, the treated with compositions containing urea and containing no anionic have a much better softness before washing even when inorganic catalysts are also present. It will be noted, however, that when urea and an

anionic detergent are both present the initial softness is less.

The anionic detergent clearly improves the color of the treated fabrics. The combination of urea and anionic detergent and the combination of urea, anionic and borax are particularly preferred from the standpoint of the color of the treated textile material when the textile materials contain anionic optical brighteners.

EXAMPLE II

The following table summarizes the results obtained when cotton broad cloth is treated with concentrated product and various levels of different anionic detergents. The results clearly show that the anionic detergent improves the color, especially the color after aging, of the treated cloth. However, it will be noted that the softness, especially durable softness of the cloth is somewhat less in most instances when an anionic detergent is present, having been added in the amounts shown to the dilute application bath.

TABLE II

	COMPOSITION % BY WEIGHT						Hunter Color Difference Meter Readings: Immediately after application		After aging for 40 hours at 180° F.		Softness	
Run	Concentrated Product	CnAS[3]	TAS[4]	TAE_3S[5]	CnAGS[2]	$C_{16}-C_{18}$ olefin sulfonate[6]	b	b'	b	b'	Unwashed	After ten washes
1.	5						−2.5	3.0	−0.8	3.8	8	5
2.	5	0.2					−2.6	3.1	−1.6	3.5	8	6
3.	5	0.4					−3.2	2.8	−2.5	3.3	6	4
4.	5	0.6					−3.0	3.0	2.9	3.0	6	4
5.	5		0.2				−2.6	2.9	−1.8	3.2	8	4
6.	5		0.4				−3.2	2.9	−2.7	2.8	8	4
7.	5		0.6				−3.0	3.1	−2.9	3.0	7	3
8.	5			0.4			−3.2	2.9	−2.9	3.2	5	4
9.	5				0.4		−3.3	2.7	−2.8	3.1	7	4
10.	5					0.4	−3.2	3.0	−2.6	3.3	7	4

[2] Sodium coconut alkyl glyceryl ether sulfonate.
[3] Sodium coconut alkyl sulfate.
[4] Sodium tallow alkyl sulfate.
[5] Sodium tallow alcohol polyethylene oxide (3 moles of ethylene oxide per mole of detergent) sulfate.
[6] Sodium salt of the reaction product of $C_{16}-C_{18}$ α-olefin and SO_3.

EXAMPLE III

A composition having the formula:

The reaction product of tallow alkyl amine and epichlorohydrin in a molar ratio of epichlorhydrin to amine of about 1.5:1; the reaction taking place at a temperature of about 125° F. for a period of about 6 hours; the reaction product being neutralized to an acid value of about nine with sodium hydroxide; the temperature of the neutralization reaction being kept below about 100° F. and said reactions being carried out in isopropyl alcohol	4.5%
Urea	88.5%
Borax	4.5%
Sodium coconut alkyl poly(4)ethoxy sulfate	0.6%
The lubricant composition of Example I of the copending application of Arthur W. Lanner, Ser. No. 550,890, filed May 18, 1966 (Oxidized Fischer-Tropsch Wax and mixed cationic-nonionic emulsifier system)	1.5%

EXAMPLE IV

The following composition is a valuable concentrated composition suitable for storage and shipping. It can be diluted to prepare a composition suitable for treating textile materials.

The amine/epichlorohydrin reaction product of Example III	15%
The lubricant composition of Example III	5%
Ethanol	10%
The reaction product of coconut alcohol and 45 moles of ethylene oxide	2%
Isopropanol	47%
Sodium coconut alkyl glyceryl ether sulfonate	8%

EXAMPLE V

When the following anionic detergents are substituted on a molar basis for the specific anionic detergents in the compositions of example II, substantially equivalent results are obtained in that the textile material is softened and the color of the textile material is improved relative to textile material treated with the concentrated product alone:

Sodium and potassium dodecyl benzene sulfonates, sodium and potassium salts of dodecylphenol ethylene oxide ether sulfates containing about 4 units of ethylene oxide per molecule, sodium and potassium lauroyl isethionates, sodium and potassium salts of coconut fatty acid amides of methyl taurine, and the sodium, potassium, ammonium, monoethanolammonium, diethanolammonium and triethanolammonium slats of any of the above detergents and those detergents specifically listed in example II.

EXAMPLE VI

When, in example I, potassium and ammonium hydroxides, or sodium and potassium carbonates, are substituted either wholly or in part, on a molar basis, for the sodium hydroxide, substantially equivalent results are obtained in that the treated textile material has a good durable softness.

What is claimed is:

1. A textile treating composition comprising:
1. from about 0.05 percent to about 5 percent by weight of a water dispersible reaction product prepared by a process comprising reacting a primary alkyl amine having an alkyl chain of from about 12 to about 30 carbon atoms with from about 1.25 to about 2 moles of epichlorohydrin per mole of amine at a temperature of from about 80° F. to about 200° F. for a reaction time of from about 30 minutes to about 10 hours, and neutralizing the product of this reaction to an acid value of less than about 30, the neutralization being carried out at a temperature of from about 60° F. to about 150° F., said reaction product being substantially free of epoxy groups so as to promote easy dispersibility in water;
2. from 0.025 percent to about 12.5 percent by weight borax;
3. a water soluble anionic synthetic detergent wherein said anionic detergent is present in said composition in a molar ratio of 0.25 to 2.5 moles of anionic detergent per mole of amine or quaternary ammonion group present in (1); selected from the group consisting of alkali metal alkylglyceryl ether sulfonates, alkali metal alkylsulfates, alkali metal alkylpolyethylene oxide sulfates containing about three units of ethylene oxide per molecule, wherein the alkyl groups contain from about 8 to about 22 carbon atoms, and sulfonated α-olefins containing from about 12 to about 18 carbon atoms.
4. from 0 percent to about 10 percent by weight of an emulsifier which is a reaction product selected from the group

consisting of the condensation product of a fatty alcohol containing from 9 to about 18 carbon atoms and from about 10 to about 60 moles of ethylene oxide, and the condensation product of an alkyl phenol wherein the alkyl groups contain from about 9 to about 15 atoms and from 10 to about 15 moles of ethylene oxide per mole of alkyl phenol;

5. the balance water.

2. The composition of claim 11 containing from about 0.5 percent to about 5 percent by weight of the reaction product.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,623,980 **Dated** November 30, 1971

Inventor(s) Arthur W. Lanner and Kenneth R. Ericson

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Col. 1, line 14, after "the" and before "U.S." insert -- the compounds disclosed in --.

Col. 6, line 72, after "the" and before "treated" insert -- textiles --.

Col. 8, line 63, after "detergent" and before "wherein" insert -- selected from the group consisting of alkali metal alkylglyceryl ether sulfonates, alkali metal alkylsulfates, alkali metal alkylpolyethylene oxide sulfates containing about three units of ethylene oxide per molecule, wherein the alkyl groups contain from about 8 to about 22 carbon atoms, and sulfonated α-olefins containing from about 12 to about 18 carbon atoms --.

Col. 8, line 67, to Col. 8, line 73, delete the material beginning with "selected" and ending with "18 carbon atoms".

Col. 9, line 5, after "15" and before "atoms" insert -- carbon --.

Signed and sealed this 16th day of May 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents