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**LOW-FOAMING WASHING AND
CLEANSING AGENTS**

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No Drawing. Filed June 1, 1966, Ser. No. 554,325
Claims priority, application Germany, June 25, 1965, B 82,555; Dec. 18, 1965, B 85,038

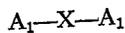
The portion of the term of the patent subsequent to May 7, 1985, has been disclaimed
Int. Cl. C11d 1/00, 1/66

U.S. Cl. 252—152

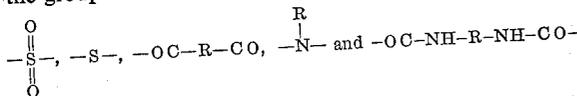
10 Claims

ABSTRACT OF THE DISCLOSURE

Low-foaming, washing and cleansing compositions particularly for use in mechanical dishwashers consisting essentially of a mixture of three types of polyoxyalkylene compounds which are: (A) ethylene oxide adducts of high molecular weight lipophilic radicals which adducts may additionally contain small amounts of oxypropylene and oxybutylene radicals, or mixed oxyethylene-oxypropylene glycols having an excess of oxyethylene units, (B) compounds of the formula



wherein A_1 represents high molecular weight lipophilic compounds adducted with ethylene oxide and which may also contain small amounts of oxypropylene and oxybutylene units and X is a bivalent linkage selected from the group consisting of



and (C) high molecular weight lipophilic radicals adducted with propylene oxide and/or butylene oxide which may contain small amounts of oxyethylene units, or mixed oxypropylene-oxyethylene glycols having an excess of oxypropylene units.

In an increasing measure, mechanical washing methods are being employed to wash china, glass, procelain, ceramic, metal and synthetic articles. Detergents containing specific surface-active compounds are generally utilized. These detergents should be low foaming, so that they do not affect the function of the washing apparatus. A foam formation of too large a volume, caused and increased by the vigorous motion of the bath in the machine, leads to considerable trouble, as the foam mass decreases the mechanical effect of the liquid sprayed onto the articles to be cleaned and furthermore may cause the bath in the machine to run over.

Recently, developments in washing apparatus have been directed toward further increasing the intensity of the liquor motion as well as the water volume cycled per minute, and in this way to further improve the mechanical cleansing effect. As a result of such developments, it was found that conventional washing agents, such as alkylene oxide adducts, were no longer satisfactory under these turbulent washing conditions. Instead, due to voluminous foam formation, the conventional washing agents gave rise to the disadvantages mentioned previously.

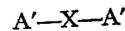
It is an object of this invention to provide novel compositions of washing and cleansing agents having low-foaming properties.

Another object of this invention is to provide novel

compositions of washing and cleansing agents that exhibit low-foaming properties in high speed mechanical washers.

A further object of the invention is to provide a composition of washing and cleansing agents having low-foaming properties comprising:

- (A) from 5% to 79.5% by weight of compounds based on ethylene oxide adducts selected from the group consisting of (1) high molecular weight lipophilic radicals having a replaceable hydrogen atom adducted with more than 50 mol percent to 100 mol percent of oxyethylene units and the remainder of oxyalkylene units selected from the group consisting of oxypropylene and oxybutylene, (2) an ethylene oxide adduct containing from 35 to 85 mol percent of oxyethylene units adducted to a polypropylene oxide polymer having an average molecular weight in the range of 1,000 to 4,000, and (3) an ethylene oxide adduct containing from 35 to 85 mol percent of oxyethylene units adducted to a propylene oxide adduct of a polyfunctional compound having from 2 to 6 carbon atoms and at least two replaceable hydrogen atoms, said propylene oxide adduct having an average molecular weight in the range of 1,000 to 4,000;
- (B) from 0.5% to 75% by weight of dimeric compounds based on ethylene oxide adducts of the formula



wherein A' represents a high molecular weight lipophilic radical having a replaceable hydrogen atom adducted with more than 50 mol percent to 100 mol percent of oxyethylene units and the remainder of oxyalkylene units selected from the group consisting of oxypropylene and oxybutylene and having a terminal alkylene group derived from an oxyalkylene unit, and X represents a bivalent linkage selected from the group consisting of (1) oxygen, (2) ethers derived from bifunctional compounds having a carbon chain of at least two carbon atoms capable of forming ether linkages with an alcohol, (3) esters derived from bifunctional compounds capable of forming carboxylic ester linkages with an alcohol, (4) urethanes derived from bifunctional groups capable of forming urethane linkages with an alcohol, (5) amines derived from chlorine-containing bifunctional compounds capable of forming ether linkages with an alcohol and amine linkages by reaction of the chlorine with an amino compound selected from the group consisting of ammonia and primary amines, (6) sulfides derived from chlorine-containing bifunctional compounds capable of forming ether linkages with an alcohol and sulfide linkage by reaction of the chlorine with a metallic sulfide selected from the group consisting of alkali metal sulfides and alkaline earth sulfides, (7) bifunctional linkages derived from epoxy-containing compounds capable of forming ether linkages with an alcohol, said epoxy-forming compound forming bifunctional linkages with a bifunctional compound selected from the group consisting of dihydroxy compounds and dimercapto compounds, and (8) $-\text{O}-\text{SO}_2-\text{O}-$; and

(C) from 20% to 94.5% by weight of compounds based on alkylene oxide adducts selected from the group consisting of (1) high molecular weight lipophilic radicals having a replaceable hydrogen atom adducted with more than 50 mol percent to 100 mol percent of oxyalkylene units selected from the group consisting of oxypropylene and oxybutylene and the remainder of oxyethylene units, (2) polypropylene oxide polymers having an average molecular weight in the range of 1000 to 5000 adducted with from 0 to 30 mol percent of oxyethylene units, and (3) propylene oxide adducts of a polyfunctional compound having from 2 to 6 carbon atoms and at least two replaceable hydrogen atoms, said propylene oxide adducts having an average molecular weight in the range of 1000

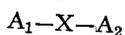
to 5000 and adducted with 0 to 30 mol percent of oxyethylene units.

These and other objects and advantages will become evident as the description proceeds.

Accordingly, the present invention relates to extraordinarily low-foaming washing and cleansing agents, having particular utility for the cleansing of dishes in mechanical dishwashers. They are characterized by a mixture comprising the following individual constituents:

(A) (1) Compounds containing both polyoxyalkylene radicals and higher molecular weight aliphatic or aliphatic-aromatic radicals, the polyoxyalkylene radicals of said compounds consisting of more than 50 mol percent of oxyethylene units, and a lesser molecular portion consisting of oxypropylene- and/or oxybutylene units; and/or (2) ethylene oxide adducts containing 35 to 85 mol percent of oxyethylene units adducted to a propylene oxide polymer with a molecular weight of 1000 to 4000, and preferably 1700 to 3250.

(B) Compounds of the general structural principle



wherein A_1 and A_2 signify the radical, of a polyoxyalkylene compound according to A wherein said compound contains both polyoxyalkylene radicals and higher molecular weight aliphatic or aliphatic-aromatic radicals, the polyoxyalkylene radicals of said compounds consisting of more than 50 mol percent of oxyethylene units, and a lesser molecular portion consisting of oxypropylene- and/or oxybutylene units, reduced at its end to a hydroxyl group and wherein X signifies an ether oxygen atom or a bridge link in the form of a bivalent inorganic radical or an organic radical containing if necessary hetero atoms or hetero atom groups other than acetal or ketal groups.

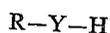
(C) (1) Compounds containing polyoxyalkylene radicals and higher molecular aliphatic or aliphatic-aromatic radicals, the polyoxyalkylene units of said compounds consisting of at least 50 mol percent of oxypropylene- and/or oxybutylene units and an identical or lesser molecular portion consisting of oxyethylene units; and/or (2) propylene oxide polymers with a total molecular weight of 1000 to 5000, preferably 1700 to 4100, to which up to 30 mol percent of ethylene oxide may be adducted.

It is unexpected that, to a large extent, the favorable characteristics of the mixtures are independent of the type of the bridge link in component B.

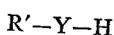
The mixtures possess a remarkable cleansing, degreasing and draining effectiveness and due to their low-foam volume, are particularly suitable for mechanical washing and cleaning methods.

The components A, B and C used for the preparation of the mixtures are known or are obtainable according to well known processes.

The preparation of the compounds A may be accomplished by an addition of alkylene oxides to those higher molecular weight aliphatic or aliphatic-aromatic compounds, which contain reactive hydrogen atoms, bonded through the heteroatoms O, S or N. The aliphatic compounds possess higher molecular weight radicals with 8 to 36, and preferably 10 to 20 carbon atoms and are preferably of the formula



wherein R represents a radical having from 8 to 36 carbon atoms selected from the group consisting of alkyl, alkenyl, alkadienyl and hydroxy-alkenyl, H represents a replaceable hydrogen and Y represents a bridging link selected from the group consisting of NH , O , S , $-CO-NH-$, $-SO_2NH-$, and $-CO-O-$. The aliphatic-aromatic compounds possess higher molecular weight radicals with 12 to 22, and preferably 14 to 18 carbon atoms and are preferably of the formula



wherein Y and H have the above assigned values and R' represents a radical having 12 to 22 carbon atoms se-

lected from the group consisting of alkylphenyl, alkinaphthyl, alkoxyphenyl and alkylcyclohexyl. The hydrocarbon radicals R and R' may contain conventional substituents such as hydroxyl groups, halide atoms, or alkyl side-chains.

The alkylene oxides to be added consist of more than 50 mol percent of ethylene oxide, while a lesser molecular portion may consist of propylene oxide and/or butylene oxide. When various alkylene oxides are used, as a rule ethylene oxide is added in the first step and thereafter propylene oxide and/or butylene oxide is then added. The reaction is accomplished in the usual manner, for example, by utilizing pressure in the presence of alkaline catalysts.

Compound A may also be prepared by reacting higher molecular weight aliphatic or aliphatic-aromatic compounds with compounds containing prepared polyoxyalkylene chains, for example, the esterification of higher molecular weight carboxylic acids with polyethylene glycols.

As starting compounds for the preparation of the above compound A, the following may be utilized; higher molecular weight aliphatic alcohols, carboxylic acids, mercaptans, amines, carboxylic acid amines or-alkanolamides, sulfonic acid amides and the like, as well as alkylphenols. The polyoxyalkylene derivatives obtained from these compounds contain 4 to 60, and preferably 10 to 40 oxyethylene units. Insofar as propylene oxide and/or butylene oxide are added, the molar ratio of ethylene oxide to propylene-or butylene oxide is advantageously from 1:0.03 to 1:0.3.

Examples for compound A are: The adduct of 15 mols of ethylene oxide with dodecyl alcohol; the adduct of 20 mols of ethylene oxide with a fatty alcohol mixture of the chain length C_8-C_{18} ; the adduct of 35 mols ethylene oxide with stearylalcohol; the adduct of 22 mols ethylene oxide with oleylalcohol; the adduct of 37 mols ethylene oxide with a dodecylalcohol dimerized according to the Guerbet method; the adduct of 25 mols ethylene oxide with isotridecylalcohol; the adduct of 30 mols ethylene oxide with nonylphenol; the adduct of 10 mols ethylene oxide with a coconut oil fatty acid amide mixture of the chain length $C_{12}-C_{18}$; the esterification product of 1 mol of a polyethylene glycol (molecular weight 2000) with 1 mol of a fatty acid mixture of the chain length $C_{16}-C_{18}$; a fatty amine mixture of the chain length $C_{12}-C_{18}$ reacted with 15 mols ethylene oxide; the adduct of 21 mols ethylene oxide and 3 mols propylene oxide with nonylphenol; the adduct of 40 mols ethylene oxide with an alcohol mixture obtained by the reduction of dimerized fatty acids of the chain length $C_{16}-C_{18}$; the addition product of 30 mols ethylene oxide and 9 mols propylene oxide with oleylalcohol; the adduct of 30 mols ethylene oxide and 2 mols butylene oxide with a fatty alcohol mixture of the chain length $C_{12}-C_{14}$; the adduct of 20 mols ethylene oxide with dodecylmercaptan. Of special interest are the alkylene oxide adducts with higher molecular weight fatty alcohols or alkylphenols.

The above compound A may be substituted either entirely or partly by an ethylene-oxide adduct, containing 35 to 85 mol percent of oxyethylene radicals, adducted to a propylene oxide polymer having a molecular weight of 1000 to 4000, preferably 1700 to 3250. The propylene oxide polymers having a molecular weight of 1000 to 4000 contain from 17 to 69 oxypropylene units in the molecule.

The ethylene oxide adducts to propylene oxide polymers, to be used in compound A are well known compounds. For example, they can be obtained by polymerization of propylene oxide in the presence of alkaline catalysts, such as sodium hydroxide, sodium methylate and others, to give a polypropylene glycol and subsequently adducted under the same conditions with 35 to 85 mol percent of ethylene oxide based on the total number of the alkylene oxide radicals in the molecule. The preparation of the propylene oxide polymers may be car-

ried out also by addition of propylene oxide to lower molecular weight hydroxyl and/or amino group containing aliphatic or aromatic compounds containing at least 2 reactive hydrogen atoms. Examples of such compounds are glycol, glycerin, sugar alcohols, ethylene diamine, phenylene diamine, alkanolamine and the like.

Examples of compounds of the above type are the adducts of 17, 60 or 159 mols of ethylene oxide to a polypropylene glycol with a molecular weight of 1750 or having about 30 oxypropylene units; the adduct of 51 mols of ethylene oxide to a polypropylene glycol with a molecular weight of 2250; the adduct of 250 mols of ethylene oxide to a polypropylene glycol consisting of 48 oxypropylene radicals; the adduct of 295 mols of ethylene oxide to a polypropylene glycol consisting of 56 oxypropylene radicals; the adduct of 30 mols of propylene oxide and 26.5 mols of ethylene oxide or 48 mols of propylene oxide and 42 mols of ethylene oxide or 48 mols of propylene oxide and 146 mols of ethylene oxide to ethylene diamine; the adduct of 48 mols of propylene oxide and 42 mols of ethylene oxide to ethylene glycol.

Compounds of group B are formed by the linkage of 2 molecules of polyoxyalkylene compounds containing the high molecular weight radicals of A through their end hydroxyl groups. Preferably, those polyoxyalkylene compounds which contain at least 12 oxyethylene units in the molecule are used.

The following indicates the most significant linkage reactions; however, it should be understood that the invention is not limited hereupon in any manner.

(1) The direct etherification of 2 mols of polyoxyalkylene compounds containing the high molecular weight radicals of A at elevated temperatures in the presence of catalysts, such as p-toluolsulfonic acid.

(2) The reaction of 2 mols of polyoxyalkylene compounds containing the high molecular weight radicals of A with 1 mol of a bifunctional compound reacting to form ether groups.

Examples of such bifunctional compounds are: aliphatic dihalides such as dichloroethane, dibromoethane; diepoxides such as diepoxybutane; dihydrin halides such as α,α' -dichlorohydrin; epihydrin halides such as epichlorohydrin, epibromohydrin, 1-chloro-2,3-epoxybutane; compounds containing activated double bonds such as divinylsulfone, etc.

(3) The reaction of 2 mols of polyoxyalkylene compounds containing the high molecular weight radicals of A with 1 mol of a bifunctional compound reacting to form carboxylic ester groups. As such the following bifunctional compounds may be used: dicarboxylic acids such as oxalic acid, maleic acid, tartaric acid, phthalic acid, malonic acid, succinic acid, and also functional derivatives of dicarboxylic acids such as anhydrides, halides, esters of the aforementioned acids, phosgene and the like.

(4) The reaction of 2 mols of polyoxyalkylene compounds containing the high molecular weight radicals of A with 1 mol of a bifunctional compound reacting to form urethane groups. Such compounds are aliphatic and aromatic diisocyanates such as hexamethylene diisocyanate, toluylene diisocyanate-(2,4), etc.

(5) The reaction of 2 mols of a halide hydrin ether of a polyoxyalkylene compound containing the high molecular weight radical of A with 1 mol of ammonia or a primary amine or an alkali- or alkaline earth sulfide; or the reaction of 2 mols of glycidyl ether of a polyoxyalkylene compound containing the high molecular weight radicals of A with 1 mol of glycol, polyglycol, diphenol or dimercaptan to form the corresponding bridge links containing either N, S or O hetero atoms.

(6) The reaction of 2 mols of polyoxyalkylene compounds containing the high molecular weight radicals of A with 1 mol of bifunctional compounds which introduce as bridge links the radicals of inorganic acids, for example, sulfur chloride.

The compounds of group B may also be obtained in

a different manner, for example, by esterification of 1 mol of polyalkylene glycols having a molecular weight of about 1000 to 5000 with 2 mols of higher molecular weight aliphatic or aliphatic-aromatic carboxylic acids. The preparation may also be accomplished by reaction of a bis-chlorohydrin ether of a polyalkylene glycol with higher molecular weight primary or secondary amines or the reaction of a bis-glycidylether of a polyalkylene glycol with higher molecular weight alcohols, mercaptans or alkylphenols.

Examples for compounds of group B are:

(1) The etherification product from 2 mols of an addition product of 20 mols ethylene oxide to nonylphenol; the etherification product from 2 mols of the addition product of 14 mols ethylene oxide and 2 mols propylene oxide to a fatty acid mixture of the chain length $C_{12}-C_{18}$;

(2) The reaction product of 2 mols of an addition product of 18 mols ethylene oxide to dodecylalcohol with 1 mol dibromoethane; the reaction product of 2 mols of the addition product of 14 mols ethylene oxide to iso-octylphenol with 1 mol α,α' -dichlorohydrin; the reaction product of 2 mols of an addition product of 20 mols ethylene oxide and 1 mol propylene oxide to a fatty acid mixture of the chain length $C_{16}-C_{18}$ with 1 mol divinylsulfone;

(3) The esterification product from 28 mols of the addition product of 30 mols ethylene oxide and 2 mols butylene oxide to dodecylalcohol with 1 mol of phthalic acid; the reaction product of 2 mols of the addition product of 25 mols ethylene oxide to isotridecylalcohol with 1 mol of maleic acid anhydride; the reaction product of 2 mols of the adduct of 20 mols ethylene oxide to dodecylmercaptan with 1 mol of phosgene;

(4) The reaction product of 2 mols of the adduct of 38 mols of ethylene oxide with dodecylalcohol dimerized according to the Guerbet method and 1 mol of hexamethylene diisocyanate-(1,6); the reaction product of 2 mols of the adduct of 12 mols ethylene oxide to a coconut oil fatty acid amide admixture having chain lengths of $C_{12}-C_{18}$ with 1 mol of toluylene-diisocyanate-(2,4);

(5) The reaction product of 2 mols of the hydrin-chloride ether of the addition product of 35 mols ethylene oxide to stearic acid with 1 mol monoethanolamine; the reaction product of 2 mols of the bromohydrin ether of the adduct of 25 mols ethylene oxide to dodecylphenol with 1 mol of calcium sulfide; the reaction product of 2 mols of the glycidylether of the addition product of 20 mols ethylene oxide and 3 mols propylene oxide to a fatty amine admixture having chain lengths of $C_{12}-C_{18}$ with 1 mol diglycol;

(6) The reaction product from 2 mols of the adduct of 18 mols of ethylene oxide with nonylphenol and 1 mol of sulfur chloride.

Compound B may also be: the esterification product of 1 mol of polyethyleneglycol 1500 with 2 mols of oleic acid; the esterification product of 1 mol of the adduct of 40 mols ethylene oxide to a polypropylene glycol having a molecular weight of 900 with 2 mols of a coconut oil fatty acid admixture having chain lengths of $C_{12}-C_{18}$; the reaction product of 1 mol of the bis-chlorohydrin ether of polyethyleneglycol 2000 with 2 mols of an amine admixture obtained from stearic acids; and the reaction product of 1 mol of the bis-glycidylether of polyethyleneglycol 1000 with 2 mols of dodecylmercaptan.

It is not in all cases necessary to prepare the compounds B in pure form. Frequently, it is practical to convert the polyoxyalkylene compounds containing high molecular weight radicals A only partially into the compounds B, and to use these admixtures directly for the preparation of the admixtures of the washing- and cleansing agents.

The preparation of the compounds C also starts with the same higher molecular weight compounds as used for the structure of compounds A. The preparation is likewise accomplished preferably by addition of alkylene oxides.

However, in compound C the portion of propylene oxide and/or butylene oxide amounts to at least 50 mol percent, whereas the same or a lesser portion may consist of ethylene oxide. When various alkylene oxides are used, ethylene oxide generally is added first and thereafter propylene oxide and/or butylene oxide. The polyoxyalkylene derivatives thus obtained contain 4 to 40, preferably 7 to 25, oxypropylene- and/or oxybutylene units, preferably in combination with either a lesser or an identical number of oxyethylene units. In the latter case, the molar ratio of the oxyethylene units to the oxypropylene- and/or oxybutylene units is 1:33 to 1:1.

Examples for compounds of group C are the following: the adduct of 7 mols of ethylene oxide and 10 mols of propylene oxide or of 9 mols of ethylene oxide and 16 mols of propylene oxide to a fatty alcohol admixture of the chain lengths C_{12} - C_{18} ; the adduct of 4 mols of ethylene oxide and 12 mols of propylene oxide to a fatty acid ethanolamide admixture with the chain lengths C_{12} - C_{18} ; the adduct of 7 mols of ethylene oxide and 10 mols of propylene oxide to nonylphenol; and the addition product of 9 mols of ethylene oxide and 9 mols of propylene oxide to tallow alcohol. The addition products of ethylene oxide and propylene oxide to higher molecular fatty alcohols or alkylphenols are of particular interest.

The above compound C may be substituted either entirely or partially by a propylene oxide polymer having a total molecular weight of 1000 to 5000, preferably 1700 to 4100, to which up to 30 mol percent of ethylene oxide may be added. The propylene oxide polymers having a molecular weight of 1000 to 5000 contain from 17 to 86 oxypropylene units in the molecule. These compounds C not containing high molecular weight radicals are obtained similarly as are the compounds A not containing high molecular weight radicals by polymerization of propylene oxide or by the addition of propylene oxide to lower molecular compounds with 2 to 6 carbon atoms containing at least 2 reactive hydrogen atoms. Preferably, up to 30 mol percent of ethylene oxide, based on the total number of the alkylene oxide radicals in the molecule are added to the resultant propylene oxide polymer.

Examples of compounds C not containing high molecular weight radicals are: the adduct of 4.5 mols of ethylene oxide to a polypropylene glycol with a molecular weight of 1750; the adduct of 7 or 16 mols of ethylene oxide to a polypropylene glycol with a molecular weight of 2750; the adduct of 8.5 mols of ethylene oxide to a polypropylene glycol consisting of 56 oxypropylene radicals; the adduct of 35 mols of propylene oxide to glycerin; the adduct of 48 mols of propylene oxide and 7 mols of ethylene oxide to ethylene diamine.

In general the washing and cleansing composition of the invention may be composed of 5-79.5% by weight of the components A; 0.5 to 75% by weight of the components B, and 20 to 94.5% by weight of the components C. Preferably, mixtures of 20-50% by weight of the components A, 2.5 to 20% by weight of the components B, and 30-75% by weight of the components C are utilized. The amounts used of these admixtures in the cleansing bath are within the concentration zone of about 0.02-1.0 g./l., preferably 0.05 to 0.3 g./l., based on the total amount of the components A, B and C.

When utilized in washing and cleansing compositions in the above proportions other commonly employed materials in such agents may also be employed.

Within the quantitative proportions given above, the composition of the admixtures is variable without running the risk that the outstanding advantage of low foam would be lost. In this way it is possible to render the admixture suitable for the specific requirements of practical use. Thus, agents with exceptionally good cleaning and wetting effect are obtained, when a relatively large portion of the components A, which in themselves are inclined to greater foam formation, is present in the admixture. The draining and clear-drying effect, which is

important for the appearance of the articles cleaned and dried, may also be favorably influenced, when the portion of the component A is relatively high.

Concentrated liquid products, such as those preferably used for dishwashers equipped with automatic metering devices, may be prepared by dissolving the admixtures in water, using organic, water-miscible solvents if necessary. By varying the constituents with respect to composition and quantities, those liquid concentrates may be standardized in such a manner, that they possess a good temperature stability and that they are not inclined to precipitate or separate in layers. In the same way it is possible to vary the dehydration temperature of the admixtures in aqueous solution and to adjust said dehydration temperature to the respective requirements, for example, for the rinsing temperature utilized. The most extreme low-foaming compositions are attained, as a rule when the dehydration temperature of the mixture is below the rinsing temperature of commercial machines.

The following specific embodiments of the invention are illustrative thereof. It is obvious however that other expedients may be employed and the specific embodiments are not to be deemed limitative in any manner.

EXAMPLES

The foam behavior of different cleansing admixtures was examined for comparison purposes in a special foam examination apparatus. The startlingly favorable foam behavior of the admixtures of the invention, in particular in comparison to any corresponding 2-component admixtures, may be realized from the test results given in the tables following hereinafter.

The foam apparatus used was constructed in similar manner as a modern dishwasher operating according to the spray system. By means of a rotating pump about 170 liters of water per minute were rotated and sprayed into the metering chamber by means of a rotating spray arm equipped with nozzles. Foam heights from 0 to 280 mm. may be measured in reproducible manner, whereas larger foam volumes cannot be measured accurately, and, therefore, they are indicated in the table as ">280." The bath temperature during the tests was 50° C., the hardness of the water used was 16 dH. and the duration of the foam test lasted 5 minutes. The reading of the foam heights was conducted immediately after the apparatus became idle. This foam apparatus is described in "Fette, Seifen, Anstrichmittel," 66 (1964), 529 ("Fats, Soaps, Paints").

The letters A, B and C indicate the types of compounds corresponding with the description text.

TABLE I

Ex. No.	Composition of the admixture	Concentration, g./l.	Foam height in mm.
55	1a.... A. Nonylphenol adducted with 20 mols of ethylene oxide.	0.12	>280
	B. Reaction product from 2 mols of a fatty alcohol C_{12} - C_{18} plus 20 mols of ethylene oxide and 1 mol of divinylsulfone.	0.01	-----
60	1b.... A. Nonylphenol adducted with 20 mols of ethylene oxide.	0.12	>280
	C. Fatty alcohol C_{12} - C_{18} adducted with 5 mols of ethylene oxide plus 13 mols of propylene oxide.	0.12	-----
65	1c.... A. Nonylphenol adducted with 20 mols of ethylene oxide.	0.12	-----
	B. Reaction product from 2 mols of a fatty alcohol C_{12} - C_{18} plus 20 mols of ethylene oxide and 1 mol of divinylsulfone.	0.01	35
70	2a.... A. Nonylphenol adducted with with 20 mols of ethylene oxide.	0.12	>280
	B. Reaction product from 2 mols of nonylphenol adducted with 20 mols of ethylene oxide and 1 mol of divinyl sulfone.	0.01	-----
75	2b.... A. Nonylphenol adducted with 20 mols of ethylene oxide.	0.12	-----
	B. Reaction product from 2 mols of nonylphenol adducted with 20 mols of ethylene oxide and 1 mol of divinylsulfone.	0.01	20

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TABLE I—Continued

Ex. No.	Composition of the admixture	Concentration, g./l.	Foam height in mm.
	C. Fatty alcohol C ₁₂ -C ₁₈ adducted with 5 mols of ethylene oxide plus 13 mols of propylene oxide.	0.12	-----
3a	A. Nonylphenol adducted with 20 mols of ethylene oxide. C. Fatty alcohol C ₁₂ -C ₁₈ adducted with 5 mols of ethylene oxide plus 13 mols of propylene oxide.	0.12	>280
3b	A+B. Etherification product from nonylphenol adducted with 20 mols of ethylene oxide containing 60% of starting product and 40% ether. C. Fatty alcohol C ₁₂ -C ₁₈ adducted with 5 mols of ethylene oxide plus 13 mols of propylene oxide.	0.12	20
4a	A. Nonylphenol adducted with 20 mols of ethylene oxide. C. Fatty alcohol C ₁₂ -C ₁₈ adducted with 5 mols of ethylene oxide plus 13 mols of propylene oxide.	0.12	>280
4b	A. Nonylphenol adducted with 20 mols of ethylene oxide. B. Reaction product from 2 mols of nonylphenol adducted with 20 mols of ethylene oxide, 2 mols of epichlorohydrin and 1 mol of monoethanolamine. C. Fatty alcohol C ₁₂ -C ₁₈ adducted with 5 mols of ethylene oxide plus 13 mols of propylene oxide.	0.12	20
4c	A. Nonylphenol adducted with 20 mols of ethylene oxide. B. Reaction product from 2 mols of nonylphenol adducted with 30 mols of ethylene oxide, 2 mols of epichlorohydrin and 1 mol of butylamine. C. Fatty alcohol C ₁₂ -C ₁₈ adducted with 5 mols of ethylene oxide plus 13 mols of propylene oxide.	0.12	20
4d	A. Nonylphenol adducted with 20 mols of ethylene oxide. B. Reaction product from 2 mols of tallow fatty alcohol adducted with 20 mols of ethylene oxide, 2 mols of epichlorohydrin and 1 mol of monoethanolamine. C. Fatty alcohol C ₁₂ -C ₁₈ adducted with 5 mols of ethylene oxide plus 13 mols of propylene oxide.	0.12	20
5a	A. Adduct of 20 mols of ethylene oxide to a dimerization product of decylalcohol prepared according to Guerbet. C. Nonylphenol adducted with 9 mols of ethylene oxide plus 10 mols of propylene oxide.	0.12	>280
5b	A. Adduct of 20 mols of ethylene oxide to a dimerization product of decylalcohol prepared according to Guerbet. B. Reaction product from 1 mol of the adduct A, 1 mol of epichlorohydrin and 0.5 mol of butylamine. C. Nonylphenol adducted with 9 mols of ethylene oxide plus 10 mols of propylene oxide.	0.12	25
6a	A. Fatty alcohol C ₁₆ -C ₁₈ adducted with 15 mols of ethylene oxide. C. Nonylphenol adducted with 9 mols of ethylene oxide plus 10 mols of propylene oxide.	0.12	>280
6b	A+B. Reaction product from 1 mol of fatty alcohol C ₁₆ -C ₁₈ adducted with 15 mols of ethylene oxide, 0.2 mol of epichlorohydrin and 0.1 mol of butylamine. C. Nonylphenol adducted with 9 mols of ethylene oxide plus 10 mols of propylene oxide.	0.12	25
7a	A. Nonylphenol adducted with 20 mols of ethylene oxide. C. Fatty alcohol C ₁₂ -C ₁₈ adducted with 5 mols of ethylene oxide plus 13 mols of propylene oxide.	0.12	>280
7b	A. Nonylphenol adducted with 20 mols of ethylene oxide. B. Reaction product from 2 mols of a fatty alcohol C ₁₂ -C ₁₈ adducted with 20 mols of ethylene oxide, 2 mols of epichlorohydrin and 1 mol of calcium sulfide. C. Fatty alcohol C ₁₂ -C ₁₈ adducted with 5 mols of ethylene oxide plus 13 mols of propylene oxide.	0.12	15
7c	A. Nonylphenol adducted with 20 mols of ethylene oxide. B. Reaction product from 2 mols of nonylphenol adducted with 25 mols of ethylene oxide, 2 mols of epichlorohydrin and 1 mol of calcium sulfide. C. Fatty alcohol C ₁₂ -C ₁₈ adducted with 5 mols of ethylene oxide plus 13 mols of propylene oxide.	0.12	20

10
TABLE I—Continued

Ex. No.	Composition of the admixture	Concentration g./l.	Foam height in mm.
5	8a A ₁ . Nonylphenol adducted with 20 mols of ethylene oxide. A ₂ . Fatty alcohol C ₁₂ -C ₁₈ adducted with 20 mols of ethylene oxide. C. Fatty alcohol C ₁₂ -C ₁₈ adducted with 5 mols of ethylene oxide plus 13 moles of propylene oxide.	0.05	-----
10	8b A ₁ . Nonylphenol adducted with 20 mols of ethylene oxide. A ₂ +B. Esterification product from 1 mol of a fatty alcohol C ₁₂ -C ₁₈ adducted with 20 mols of ethylene oxide and 0.25 mol of phthalic acid. C. Fatty alcohol C ₁₂ -C ₁₈ adducted with 5 mols of ethylene oxide plus 13 mols of propylene oxide.	0.05	>280
15	8c A ₁ . Nonylphenol adducted with 20 mols of ethylene oxide. A ₂ . Fatty alcohol C ₁₂ -C ₁₈ adducted with 20 mols of ethylene oxide. B. Diester from polyethylene glycol 1550 and 2 mols of fatty acid C ₁₂ -C ₁₈ . C. Fatty alcohol C ₁₂ -C ₁₈ adducted with 5 mols of ethylene oxide plus 13 mols of propylene oxide.	0.13	-----

The following three component combinations are exceptional low-foam mixtures, which, when used at concentrations of from 0.1-0.5 g./l. in 50° C. water, of any hardness, under practical conditions, form no closed foam layer on the cleansing liquors. They do not develop more than 10-20 mm. foam in the foam test apparatus.

TABLE II

Ex. No.	Composition of the admixture	Percent by weight
9	A. Fatty alcohol C ₁₂ -C ₁₈ adducted with 30 mols of ethylene oxide. B. Esterification product from 2 mols of nonylphenol adducted with 20 mols of ethylene oxide and 1 mol of malonic acid. C. Fatty alcohol C ₁₂ -C ₁₈ adducted with 7 mols of ethylene oxide plus 13 mols of propylene oxide.	40
10	A. Nonylphenol adducted with 20 mols of ethylene oxide plus 2 mols of propylene oxide. B. Reaction product from 2 mols of nonylphenol adducted with 20 mols of ethylene oxide and 1 mol of toluylene diisocyanate-(2,4). C. Fatty alcohol C ₁₂ -C ₁₈ adducted with 9 mols of ethylene oxide plus 16 mols of propylene oxide.	40
11	A. Fatty alcohol C ₁₂ -C ₁₈ adducted with 20 mols of ethylene oxide. B. Reaction product from 2 mols of nonylphenol adducted with 20 mols of ethylene oxide and 1 mol of sulfurylechloride. C. Nonylphenol adducted with 7 mols of ethylene oxide plus 13 mols of propylene oxide.	40
12	A ₁ . Secondary alcohol C ₁₅ adducted with 20 mols of ethylene oxide. A ₂ . Fatty alcohol C ₁₂ -C ₁₈ adducted with 20 mols of ethylene oxide. B. Reaction product from 2 mols of nonylphenol adducted with 35 mols of ethylene oxide, 2 mols of epichlorohydrin and 1 mol of butylamine. C. Fatty alcohol C ₁₂ -C ₁₈ adducted with 5 mols of ethylene oxide plus 13 mols of propylene oxide.	9
13	A. Nonylphenol adducted with 20 mols of ethylene oxide. B. Reaction product from 2 mols of nonylphenol adducted with 20 mols of ethylene oxide and 1 mol of hexamethylene diisocyanate-(1,6). C. Fatty alcohol C ₁₂ -C ₁₈ adducted with 5 mols of ethylene oxide plus 13 mols of propylene oxide.	32
14	A. Oleylalcohol adducted with 20 mols of ethylene oxide. B. Reaction product from 2 mols of nonylphenol adducted with 35 mols of ethylene oxide and toluylene diisocyanate-(1,4). C. Octyleresol adducted with 10 mols of ethylene oxide plus 18 mols of propylene oxide.	50

(15) Admixtures with essentially similar properties are obtained, when in Examples 8 to 13 component A is substituted by tallow fatty alcohol adducted with 15 to 25 mols of ethylene oxide or fatty alcohol C₁₂-C₁₄ adducted with 15 to 30 mols of ethylene oxide.

(16) A liquid washing agent composition, which is extraordinarily low foaming even under very unfavorable mechanical dishwasher conditions and which is suitable for all types of commercial dishwashers, has the following composition:

20% of the adduct of 20 mols of ethylene oxide to nonylphenol
4% of the reaction product from 2 mols of the addition product of 20 mols of ethylene oxide to a fatty alco-

hol admixture of the chain lengths C_{12} - C_{18} and 1 mol of divinylsulfone
30% of the addition product of 5 mols of ethylene oxide and 13 mols of propylene oxide to a fatty alcohol admixture of the chain lengths C_{12} - C_{18}
10% of ethanol and
36% of water.

The agent can be easily measured into the supply water of the dishwasher by means of an automatic dosing device. The concentration used is about 0.2 to 0.4 g./l.

(17) An exceptionally low-foaming, liquid washing agent for dishwashers in ordinary households has the following composition:

10% of the adduct of 20 mols of ethylene oxide to nonylphenol
5% of the reaction product from 2 mols of the chlorohydrin ether of the adduct of 20 mols of ethylene oxide to a fatty alcohol admixture of the chain lengths C_{12} - C_{18} and 1 mol of monoethanolamine
15% of the adduct of 7 mols of ethylene oxide and 13 mols of propyleneoxide to nonylphenol
10% of ethanol
60% of water.

The product possessed an excellent heat and cold stability. Using 0.1-0.3 g./l. of said product in the wash water, a good water drainage for the articles to be washed was obtained without any drop formation. In the foam examination apparatus the admixture, when 0.3 g./l. of product were used, did not develop more than 15 mm. of foam height. In practical use no closed foam layer occurred on the washing liquors.

The following examples demonstrate admixtures containing components A, B and C wherein either component A and/or component C does not contain a high molecular weight radical.

The foam-testing apparatus is that described previously in connection with Table I.

TABLE III

Ex. No.	Composition of the admixture	Concentration, g./l.	Foam height in mm.
18a...	A. Nonylphenol adducted with 20 mols of ethylene oxide.	0.12	>280
	C. Adduct of 6 mols of ethylene oxide to a polypropylene glycol of molecular weight 2,260.	0.24	-----
18b...	A. Nonylphenol adducted with 20 mols of ethylene oxide.	0.12	-----
	B. Reaction product from 2 mols of nonylphenol adducted with 20 mols of ethylene oxide and 1 mol of divinylsulfone.	0.025	40
	C. Adduct of 6 mols of ethylene oxide to a polypropylene glycol of molecular weight 2,260.	0.24	-----
19a...	A. Adduct of 159 mols of ethylene oxide to a polypropylene glycol of molecular weight 1,750.	0.12	280
	C. Adduct of 4.5 mols of ethylene oxide to a polypropylene glycol of molecular weight 1,750.	0.06	-----
19b...	A. Adduct of 159 mols of ethylene oxide to a polypropylene glycol of molecular weight 1,750.	0.12	-----
	B. Reaction product from 2 mols of nonylphenol adducted with 20 mols of ethylene oxide and 1 mol of divinyl sulfone.	0.025	5
	C. Adduct of 4.5 mols of ethylene oxide to a polypropylene glycol of molecular weight 1,750.	0.06	-----
20a...	A. Adduct of 48 mols of propylene oxide and 146 mols of ethylene oxide to ethylene diamine.	0.12	180
	C. Coconut oil fatty alcohol C_{12} - C_{18} adducted with 5 mols of ethylene oxide plus 13 mols of propylene oxide.	0.06	-----
20b...	A. Adduct of 48 mols of propylene oxide and 146 mols of ethylene oxide to ethylene diamine.	0.12	-----
	B. Reaction product from 2 mols of the chlorohydrin ether of coconut oil fatty alcohol C_{12} - C_{18} adducted with 20 mols of ethylene oxide and 1 mol of monoethanolamine.	0.015	5
	C. Coconut oil alcohol C_{12} - C_{18} adducted with 5 mols of ethylene oxide plus 13 mols of propylene oxide.	0.06	-----

TABLE III—Continued

Ex. No.	Composition of the admixture	Concentration, g./l.	Foam height in mm.
5	21a... A. Nonylphenol adducted with 20 mols of ethylene oxide.	0.12	>280
	C. Glycerin adducted with 35 mols of propylene oxide.	0.07	-----
	21b... A. Nonylphenol adducted with 20 mols of ethylene oxide.	0.12	-----
	B. Reaction product from 2 mols of the chlorohydrin ether of nonylphenol adducted with 35 mols of ethylene oxide and 1 mol of butylamine.	0.12	20
	C. Glycerin adducted with 35 mols of propylene oxide.	0.07	-----
10	22a... A. Nonylphenol adducted with 20 mols of ethylene oxide.	0.12	>280
	C. Adduct of 6 mols of ethylene oxide to a polypropylene glycol of molecular weight 2,260.	0.24	-----
	22b... A. Nonylphenol adducted with 20 mols of ethylene glycol.	0.12	-----
	B. Reaction product from 2 mols of the chlorohydrin ether of nonylphenol adducted with 20 mols of ethylene oxide and 1 mol of sodium sulfide.	0.05	30
	C. Adduct from 6 mols of ethylene oxide to a polypropylene glycol of molecular weight 2,260.	0.24	-----
15	23a... A. Nonylphenol adducted with 20 mols of ethylene oxide.	0.08	120
	C. Glycerin adducted with 35 mols of propylene oxide.	0.24	-----
25	23b... A. Nonylphenol adducted with 20 mols of ethylene oxide.	0.08	-----
	B. Diester of coconut oil fatty alcohol C_{12} - C_{18} adducted with 20 mols of ethylene oxide and phthalic acid.	0.16	10
	C. Glycerin adducted with 35 mols of propylene oxide.	0.24	-----
30	23c... A. Nonylphenol adducted with 20 mols of ethylene oxide.	0.17	-----
	B. Diester of polyethylene glycol of the molecular weight 1,550 and coconut oil fatty acid C_{12} - C_{18} .	0.09	20
	C. Glycerin adducted with 35 mols of propylene oxide.	0.10	-----
35	24a... A. Adduct of 265 mols of ethylene oxide to a polypropylene glycol of molecular weight 3,240.	0.24	-----
	C. Fatty alcohol C_{12} - C_{18} adducted with 5 mols of ethylene oxide plus 13 mols of propylene oxide.	0.16	160
40	24b... A. Adduct of 265 mols of ethylene oxide to a polypropylene glycol of molecular weight 3,240.	0.24	-----
	B. Diester of coconut oil fatty alcohol C_{12} - C_{18} adducted with 20 mols of ethylene oxide and phthalic acid.	0.12	20
	C. Fatty alcohol C_{12} - C_{18} adducted with 5 mols of ethylene oxide plus 13 mols of propylene oxide.	0.16	-----
45	25a... A. Nonylphenol adducted with 20 mols of ethylene oxide.	0.18	>280
	C. Glycerin adducted with 35 mols of propylene oxide.	0.06	-----
50	25b... A. Nonylphenol adducted with 20 mols of ethylene oxide.	0.18	-----
	B. Diurethane of nonylphenol adducted with 20 mols of ethylene oxide and hexamethylen diisocyanate (1,6).	0.06	25
	C. Glycerin adducted with 35 mols of propylene oxide.	0.06	-----
55	25c... A. Nonylphenol adducted with 20 mols of ethylene oxide.	0.10	-----
	B. Diurethane of nonylphenol adducted with 35 mols of ethylene oxide and toluylene diisocyanate (technical product).	0.14	15
	C. Glycerin adducted with 35 mols of propylene oxide.	0.08	-----
60	26a... A. Adduct of 265 mols of ethylene oxide to a polypropylene glycol of molecular weight 3,240.	0.06	160
	C. Glycerin adducted with 35 mols of propylene oxide.	0.06	-----
65	26b... A. Adduct of 265 mols of ethylene oxide to a polypropylene glycol of molecular weight 3,240.	0.06	-----
	B. Diurethane of nonylphenol adducted with 20 mols of ethylene oxide and toluylene diisocyanate (technical product).	0.06	30
	C. Glycerin adducted with 35 mols of propylene oxide.	0.06	-----

(27) In a dishwasher for commercial kitchens, with precleansing and rinsing chambers, the dishes were precleansed with an alkaline detergent comprising polyphosphates, soda and waterglass, and if necessary additions of sodium hypochlorite. Subsequently, the articles to be

cleansed were then passed through the clear rinsing area, wherein a clear rinsing agent of the following composition at amounts of 0.5 gm./l. was introduced by means of an automatic dosing device. The temperature of the rinsing bath was about 80° C.

	Parts by weight
Nonylphenol adducted with 20 mols of ethylene oxide	18
Diurethane of nonylphenol adducted with 20 mols of ethylene oxide and hexamethylene diisocyanate (1,6)	6
Glycerin adducted with 35 mols of propylene oxide	6
Ethanol	15
Water	55

The above clear-rinsing agent is fluid and has a turbidity temperature of about 35° C. The rinsing water ran smoothly off the rinsed dishes. The remaining thin water film dried completely during the short passage of the dishes from the rinsing area to the removal point without drop formation and without leaving any traces. No disturbing foam formation was observed in the dishwasher.

(28) For a household dishwasher of high capacity a detergent of the following composition is suitable:

	Parts by weight
An adduct of 48 mols of propylene oxide and 146 mols of ethylene oxide with ethylene diamine	18
The reaction product from 2 mols of the chlorohydrin ether of coconut oil fatty alcohol—C ₁₂ —C ₁₈ adducted with 20 mols of ethylene oxide and 1 mol of monoethanolamine	5
Coconut oil alcohol—C ₁₂ —C ₁₈ adducted with 5 mols of ethylene oxide + 13 mols of propylene oxide	9
Isopropanol	10
Water	58

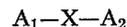
The liquid product is used in amounts of about 0.5 gm./l. For dishes, which are not too soiled, the concomitant usage of an alkaline detergent may be omitted. A prevention of the progress of rinsing due to foam development did not occur.

The preceding specific embodiments are illustrative of the invention. It is obvious, however, that other expedients may be employed without departing from the spirit of the invention or the scope of the appended claims.

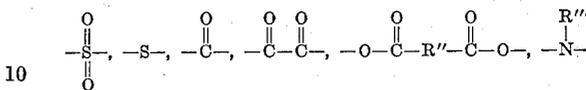
We claim:

1. A composition of washing and cleansing agents having low-foaming properties consisting of: (A) from 20% to 79.5% by weight of compounds based on ethylene oxide adducts selected from the group consisting of (1) an ethylene oxide adduct containing from 4 to 60 oxyethylene units of a high molecular weight lipophilic radical of the formula selected from the group consisting of R-Y-H and R'-O-H wherein R represents a radical having from 8 to 36 carbon atoms selected from the group consisting of alkyl, alkenyl, and mono-hydroxy-alkenyl, R' represents alkylphenyl having from 12 to 22 carbon atoms; and Y represents a bridging link selected from the group consisting of O, S, NH, CONH and COO; adducted first with oxyethylene units and thereafter with oxyalkylene units selected from the group consisting of oxypropylene and oxybutylene, said oxyethylene units being in a ratio to said oxyalkylene units selected from the group consisting of (a) 1 to 0 and (b) 1 to 0.03 to 1 to 0.3, (2) an ethylene oxide adduct containing from 35 to 85 mol percent of oxyethylene units adducted to a polyoxypropylene glycol having an average number of oxypropylene units of between 17 and 69, the total number of oxypropylene units and oxyethylene units in said adduct being 100 mol percent, and (3) an ethylene oxide adduct selected from the group consisting of an adduct of 30 mols of propylene oxide and 26.5 mols of ethylene oxide to ethylene diamine, an adduct of 48 mols of propylene oxide and 42 mols of ethylene oxide to ethylene diamine, an adduct of 48 mols of propylene oxide and 146 mols of ethylene oxide to ethylene diamine and an adduct of 48 mols of propylene

oxide and 42 mols of ethylene oxide to ethylene glycol; (B) from 2.5 to 20% by weight of dimeric compounds based on ethylene oxide adducts of the formula



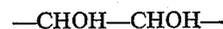
5 wherein X is a bivalent linkage selected from the group consisting of



and



15 wherein R'' is a member selected from the group consisting of —CH₂—, —CH₂—CH₂—, —CH=CH—,



and phenylene, R''' is a member selected from the group consisting of hydrogen, hydroxyethyl and butyl and R^{IV} is a member selected from the group consisting of hexamethylene and toluylene; and A₁ and A₂, which may be same or different, represent an ethylene oxide adduct containing from 4 to 60 oxyethylene units of a high molecular weight lipophilic radical of the formula selected from the group consisting of R-Y-H and R'-O-H wherein R represents a radical having from 8 to 36 carbon atoms selected from the group consisting of alkyl, alkenyl, and mono-hydroxy-alkenyl, R' represents alkylphenyl having from 12 to 22 carbon atoms, and Y represents a bridging link selected from the group consisting of O, S, NH, CONH and COO; adducted first with oxyethylene units and thereafter with oxyalkylene units selected from the group consisting of oxypropylene and oxybutylene units; said oxyethylene units being in ratio to said oxyalkylene units selected from the group consisting of (a) 1 to 0 and (b) 1 to 0.03 to 1 to 0.3, and having a terminal methylene group derived from said oxyalkylene oxide units; (C) from 30% to 75% by weight of compounds based on alkylene oxide adducts selected from the group consisting of (1) an alkylene oxide adduct of a high molecular weight lipophilic radical of the formula selected from the group consisting of R-Y-H and R'-O-H wherein R represents a radical having from 8 to 36 carbon atoms selected from the group consisting of alkyl, alkenyl and mono-hydroxy-alkenyl, R' represents alkylphenyl having from 12 to 22 carbon atoms, and Y represents a bridging link selected from the group consisting of O, S, NH, CONH and COO; adducted first with oxyethylene oxide units and thereafter with oxyalkylene oxide units selected from the group consisting of oxypropylene and oxybutylene, said oxyethylene units being in a ratio to said oxyalkylene units selected from the group consisting of (a) 0 to 1 and (b) 1 to 33 to 1 to 1.1, from 4 to 40 oxypropylene units and oxybutylene units being present in said adduct, (2) a polyoxypropylene glycol having an average number of oxypropylene units of between 17 and 86 adducted with from 0 to 30 mol percent of oxyethylene units, the total number of oxypropylene units and oxyethylene units in said adduct being 100 mol percent, and (3) a propylene oxide adduct selected from the group consisting of an adduct of 35 mols of propylene oxide to glycerine and an adduct of 48 mols of propylene oxide and 7 mols of ethylene oxide to ethylene diamine.

2. Composition of claim 1, wherein X of ingredient B is



3. Composition of claim 1 wherein ingredient A contains at least 12 oxyethylene units.

4. Composition of claim 1 wherein R of ingredient A contains from 10 to 20 carbon atoms.

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5. Composition of claim 4 wherein R' of ingredient A contains from 14 to 18 carbon atoms.

6. Composition of claim 5 wherein ingredient A contains from 10 to 40 oxyethylene units.

7. Composition of claim 1 wherein ingredient A(1) contains from 4 to 60 oxyethylene units and 1 to 20 oxypropylene units in a molar ratio of oxyethylene units to oxypropylene units of 1:0.03 to 1:0.3.

8. Composition of claim 1 wherein ingredient C contains from 1 to 30 oxyethylene units and 4 to 40 oxypropylene units in a molar ratio of oxyethylene to oxypropylene of 1:33 to 1:1.

9. Aqueous low-foaming compositions containing from 25% to 60% of the composition of claim 1.

10. The method of rinsing of solid articles which comprise rinsing said solid articles with water containing from 0.02 to 1 gram per liter of the composition of claim 1.

16

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U.S. Cl. X.R.

252—89, 137, 161; 260—613