

TITLE OF THE INVENTION:

DETERGENT COMPOSITION FOR HARD SURFACES

BACKGROUND OF THE INVENTION

5 i) Field of the Invention:

This invention relates to a detergent composition for hard surfaces, and more specifically to a detergent composition for hard surfaces, which is excellent in easiness of wiping, scarcely remains on the surface cleaned
10 after its wiping to give a good result, and possesses excellent detergency to dirt or smears, in particular, deteriorated oil and grease smears.

ii) Description of the Background Art:

15 As detergent compositions for hard surfaces, the following compositions have hitherto been used properly according to the kind and degree of dirt.

Namely, surfactant-solvent type detergents and surfactant-solvent-alkaline agent type detergents have been
20 principally used respectively for dirt from the hands and undeteriorated oil and grease smears, which are relatively light in degree of dirt, and for oil and fat smears appeared in or near a kitchen and deteriorated by an action of heat, sunlight, oxygen in air and/or the like, and the like.

25 However, when these detergents are used, the surfactant and alkaline agent remain on the surfaces cleaned

after wiping off the detergents, so that wipe streaks are left even after the cleaning, leading to an insufficient result. Therefore, these detergents require double wiping or sufficient rinsing with water, and are hence complicated.

5 As an attempt to solve such a problem, Japanese Patent Application Laid-Open No. 29498/1990 discloses a liquid housecleaning detergent composition which comprises, as essential components, an anionic surfactant, a terpene hydrocarbon solvent and a water-soluble salt of a divalent
10 metal, is excellent in cleansability and safe for the human body, scarcely affects substrates, and requires no rinsing.

 This detergent composition has shown a considerable improvement from the viewpoint of finish upon cleaning a glass surface or the like, but has required a further
15 improvement from the viewpoint of practical use. Japanese Patent Application Laid-Open No. 501570/1987 (through PCT route) discloses a detergent composition composed of a glycoside surfactant, a solvent, a water-soluble detergent and a builder. However, this composition has also required
20 sufficient rinsing because a portion of the composition has been observed remaining after wiping it.

 Further, Japanese Patent Application Laid-Open No. 85400/1992 has proposed a liquid detergent composition which comprises a specific anionic surfactant and a specific
25 amphoteric surfactant, has high detergency and leaves little wipe streaks. This composition has however overfoamed upon

its wiping due to its high foaming power, and has hence been poor in easiness of wiping (easiness of wiping operation).

On the other hand, alkyl diphenyl ether type surfactants having two sulfonic groups in their molecules have heretofore been used widely, for example, as emulsifiers upon preparation of polymers, chemical agents for fiber-dyeing processes, dispersing agents for agricultural chemicals and dispersants for crude oil sludge. However, it has not been known to use them in surfactant-solvent-amine compound type detergents for hard surfaces.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a detergent composition for hard surfaces, which is excellent in easiness of wiping, to say nothing of detergency, and leaves little wipe streaks to give a good result,

In view of the foregoing circumstances, the present inventors have carried out an extensive investigation. As a result, it has been found that when a diphenyl ether disulfonate type anionic surfactant, a water-soluble solvent and an amine compound are blended, a detergent composition which has excellent detergency to dirt, in particular, deteriorated oil and fat smears, is good in easiness of wiping, and scarcely leaves wipe streaks to give a good result, leading to completion of the present invention.

In an aspect of the present invention, there is thus

provided a detergent composition for hard surfaces, which comprises the following components (A), (B) and (C):

(A) a diphenyl ether disulfonate type anionic surfactant,

5 (B) a water-soluble solvent, and

(C) an amine compound.

In another aspect of this invention, there is also provided a detergent composition for hard surfaces, which comprises the following components (A), (B) and (C):

10 (A) 0.01-20 wt.% of a diphenyl ether disulfonate type anionic surfactant,

(B) 0.1-50 wt.% of a water-soluble solvent, and

(C) 0.01-30 wt.% of an amine compound.

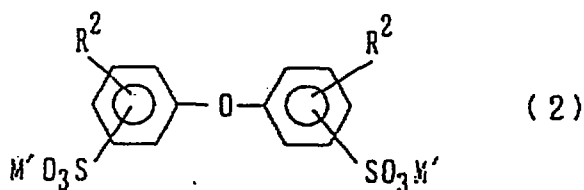
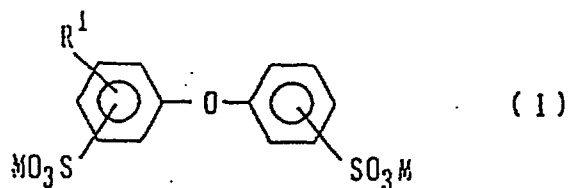
The detergent compositions for hard surfaces according
15 to the present invention have high detergency, in particular, to deteriorated oil and grease smears, are excellent in easiness of wiping, scarcely remains on the surfaces cleaned after their wiping and also show good finishing behavior.

20 The above and other objects, features and advantages of the present invention will be readily appreciated from the preferred embodiments of the present invention, which will be described subsequently in detail.

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DETAILED DESCRIPTION OF THE INVENTION AND PREFERRED EMBODIMENTS

No particular limitation is imposed on the component (A) useful in the practice of this invention so long as it is a diphenyl ether disulfonate. However, it may preferably comprise one or more anionic surfactants selected from compounds represented by the following general formulae (1) and (2):



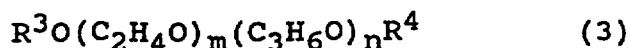
15 wherein R¹ and R² mean individually a linear or branched alkyl or alkenyl group having 5-15 carbon atoms, and M and M' denote individually an alkali metal atom, an ammonium group or an alkanol-substituted ammonium group.

R¹ and R² in the above general formulae may be
20 individually a linear or branched alkyl or alkenyl group having 5-15 carbon atoms. However, alkyl groups having 8-14 carbon atoms, in particular, alkyl groups having 12-14 carbon atoms are preferred in that the resulting detergent composition has good detergency and leaves little wipe
25 streaks, M and M' may be indivisually an alkali metal atom such as a sodium or potassium atom, an ammonium group, or an

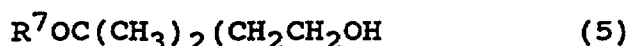
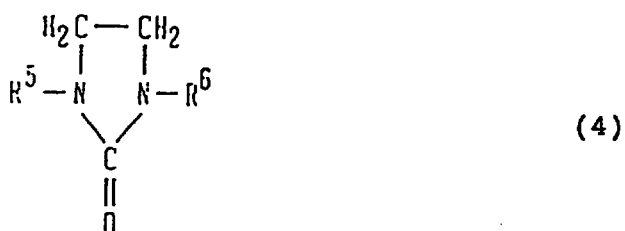
alkanol-substituted ammonium group such as monoethanol-ammonium or diethanolammonium. Of these, alkali metal atoms are particularly preferred. As the component (A), two compounds respectively selected from the surfactants
5 represented by the formulae (1) and (2) may preferably be used in a proportion of from 100/0 to 25/75, in particular, from 95/5 to 70/30 by weight. Incidentally, the compounds represented by the above general formulae (1) and (2) can be separately obtained in accordance with the conventionally-
10 known process in which diphenyl ether is alkylated by the Friedel-Crafts reaction, the resulting product is sulfonated with sulfur trioxide or the like in a dichloromethane solvent, and the resultant sulfonic compound is then neutralized. The alkylation reaction of diphenyl ether may
15 take place selectively at a para position, but alkylates different in number of alkyl groups substituted or orientation site may be obtained by differences of reaction conditions such as the amount of an alkylating agent to be used. However, no serious problem is posed so far as the
20 compounds represented by the formulae (1) and (2) are contained as principal components.

No particular limitation is imposed on the component (B) useful in the practice of this invention so long as it is a water-soluble solvent. However, it may preferably
25 comprise one or more water-soluble solvents selected from compounds represented by the following general formulae (3)

through (5):



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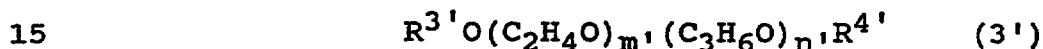


wherein R^3 and R^4 mean individually a hydrogen atom or an alkyl group having 1-8 carbon atoms, with the proviso that both groups R^3 and R^4 do not mean hydrogen atoms at the same time, m and n stand individually for an integer of 0-3, with the proviso that both m and n do not stand for integers of 0 at the same time, R^5 and R^6 denote individually an alkyl group having 1-3 carbon atoms, and R^7 means an alkyl group having 1-3 carbon atoms, dihydric alcohols having 4-12 carbon atoms and monohydric alcohols having 1-5 carbon atoms.

In the water-soluble solvent represented by the general formula (3), R^3 and R^4 may be individually a hydrogen atom or an alkyl group having 1-8 carbon atoms, with an alkyl group having 1-4 carbon atoms being particularly preferred. In the formula (3), m and n , which mean respectively the average numbers of moles of ethylene oxide (E.O.) and propylene oxide (P.O.) added, may preferably be 0-3. No particular limitation is imposed on

the sequence of addition of these oxides. The addition may be conducted at random. As specific examples of the compound of the formula (3), may be mentioned ethylene glycol monobutyl ether, dipropylene glycol dimethyl ether, 5 diethylene glycol monoethyl ether, diethylene glycol monobutyl ether, propylene glycol monomethyl ether, propylene glycol monobutyl ether, propylene glycol monoethyl ether, propylene glycol dimethyl ether, polyoxyethylene (p = 1) polyoxypropylene (p = 1) glycol dimethyl ether (p denotes 10 an average number of moles added), and the like.

Among these compounds of the formula (3), compounds represented by the following general formula (3') are particularly preferred from the viewpoint of detergency and easiness of wiping of the resulting detergent composition.



wherein $R^{3'}$ and $R^{4'}$ mean individually a hydrogen atom or an alkyl group having 1-4 carbon atoms, with the proviso that both groups $R^{3'}$ and $R^{4'}$ do not mean hydrogen atoms at the same time, and m' and n' stand individually for an integer 20 of 0-3, with the proviso that both m' and n' do not mean 0 at the same time, m' does not denote 1 and n' is not 0.

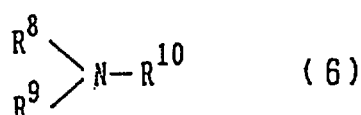
As specific examples thereof, may be mentioned propylene glycol monomethyl ether, diethylene glycol monobutyl ether and the like.

25 As preferable examples of the compound represented by the general formula (4), may be mentioned 1,3-dimethyl-2-

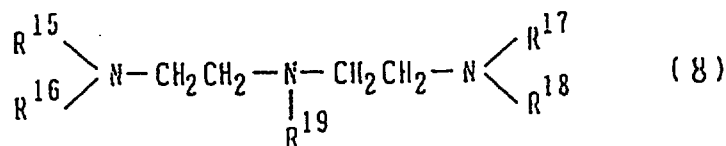
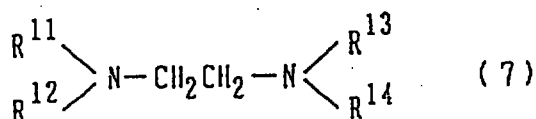
imidazolidinone and 1,3-diethyl-2-imidazolidinone. On the other hand, 3-methoxy-3-methylbutanol, 3-ethoxy-3-methylbutanol and the like are preferred as the compound represented by the general formula (5).

5 As examples of the dihydric alcohol having 4-12 carbon atoms, may be mentioned isoprene glycol, 2,2,4-trimethyl-1,3-pentanediol and the like. As examples of the monohydric alcohol having 1-5 carbon atoms, may be mentioned methanol, ethanol, isopropanol and the like. When these lower
10 alcohols are blended, the stability of the system at low temperatures can be more improved.

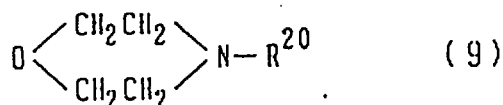
No particular limitation is imposed on the component (C) useful in the practice of this invention so long as it is an amine compound. However, it may preferably comprise
15 one or more amine compounds selected from compounds represented by the following general formulae (6) through (9):



20



25



wherein R⁸, R¹¹, R¹³, R¹⁵, R¹⁷, R¹⁹ and R²⁰ mean individually a hydrogen atom or an alkyl group having 1-4 carbon atoms, and R⁹, R¹⁰, R¹², R¹⁴, R¹⁶ and R¹⁸ denote individually a hydrogen atom, an alkyl group having 1-4
5 carbon atoms or a hydroxyalkyl group having 2-3 carbon atoms.

As exemplary compounds represented by the general formula (6), may be mentioned ammonia, monoethanolamine, diethanolamine, N-methylpropanolamine and the like.

10 As exemplary compounds represented by the general formula (7), may be mentioned N-(β -aminoethyl)ethanolamine and the like.

As exemplary compounds represented by the general formula (8), may be mentioned diethylenetriamine and the
15 like.

As exemplary compounds represented by the general formula (9), may be mentioned morpholine, N-ethylmorpholine and the like.

Among these, monoethanolamine and morpholine are
20 particularly preferred.

The detergent composition for hard surfaces according to a preferred embodiment of the present invention is obtained by blending the above-described components (A), (B) and (C), and satisfies all of detergency, in particular, to
25 deteriorated oil and grease smears, easiness of wiping, and finishing behavior. However, all such effects can not be

exhibited if any one of these components is omitted.

In the detergent composition for hard surfaces according to another preferred embodiment of the present invention, the effects of the present invention can be more enhanced by blending the components (A), (B) and (C) in specific proportions. The component (A) may preferably be blended in a proportion of 0.01-20 wt.% (hereinafter indicated merely by "%"), more preferably 0.01-10%, most preferably 0.1-3% of the whole amount of the detergent composition. The component (B) may be preferably be blended in a proportion of 0.1-50%, more preferably 1-30%, most preferably 1-20% of the whole amount of the detergent composition. The component (C) may be preferably be blended in a proportion of 0.01-30%, more preferably 0.01-20%, most preferably 0.05-10% of the whole amount of the detergent composition. Any amounts of the component (A) less than 0.01% result in a detergent composition insufficient in detergency. On the other hand, if the component (A) is blended in any proportion exceeding 20%, the effects of enhancing the easiness of wiping and finishing behavior according to the present invention are not expected to more heighten correspondingly. Any amounts of the component (B) less than 0.1% result in a detergent composition not wholly satisfied in detergency, while any proportions exceeding 50% result in a detergent composition impaired in finishing behavior. It is not hence preferable to blend the component

(B) in any proportions outside the above range. If the amount of the component (C) is less than 0.01%, its influence on the detergent effect becomes insufficient, and its blending will hence mean little. On the other hand, if
5 the component (C) is blended in any proportion exceeding 30%, the effects of the present invention can not be more heightened correspondingly.

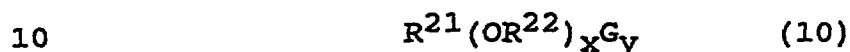
The detergent compositions for hard surfaces according to the present invention may optionally contain, as a
10 component (D), at least one surfactant other than those described above within limits not impeding the effects of the present invention. No particular limitation is imposed on such a surfactant. However, it may preferably comprise one or more surfactants selected from the group consisting
15 of nonionic, anionic and amphoteric surfactants. Specific surfactants useful as the component (D) are as follows.

As examples of the anionic surfactants, may be mentioned alkylbenzene sulfonates, alkylene oxide-added alkyl (or alkenyl) ether sulfates, alkyl- or alkenyl-
20 sulfates, olefinsulfonates, alkanesulfonates, fatty acid salts, alkylene oxide-added alkyl (or alkenyl) ether carboxylates, α -sulfo-fatty acid salts and esters thereof, and the like.

As examples of counter ions to the anionic
25 surfactants, may be mentioned alkali metal ions such as sodium and potassium ions, ammonium ion, and alkanol-

substituted ammonium ions such as monoethanolammonium, diethanolammonium and triethanolammonium.

As examples of the nonionic surfactants, may be mentioned polyoxyalkylene alkyl (or alkenyl) ethers, polyoxyalkylene alkylphenyl ethers, sucrose fatty acid esters, fatty acid glyceryl esters, amine oxides, higher fatty acid alkanolamides or their addition products with alkylene oxides, and alkylglycosides represented by the following general formula (10):



wherein R^{21} means a linear or branched alkyl, alkenyl or alkylphenyl group having 8-18 carbon atoms, R^{22} denotes an alkylene group having 2-4 carbon atoms, G represents a residue derived from a reducing sugar having 5-6 carbon atoms, x stands for a number of 0-5 in terms of the average value, and y means a number of 1-10 in terms of the average value.

In the general formula (10), x is a number of 0-5 in terms of the average value. Both water-solubility and crystallinity of the detergent compositions according to the present invention are controlled by this value. Namely, the compositions have an inclination that the water-solubility becomes higher and the crystallinity becomes lower as x increases. The value of x is preferably 0-2, with 0 being particularly preferred. On the other hand, when y is greater than 1 in terms of the average value, namely, a

surfactant represented by the general formula (10) and containing a di- or higher polysaccharide chain as a hydrophilic group is contained, the bond form of the saccharide chain may be a 1-2, 1-3, 1-4 or 1-6 bond, or an
5 alpha- or beta-pyranoside or furanoside bond. It is also possible to contain any mixture having a combined form of these bonds. The average value of y in the general formula (10) may be 1-10, preferably 1-3, more preferably 1-1.5, most preferably 1-1.4. Incidentally, the measurement of y
10 in this invention is based on the proton NMR method.

Further, R^{21} in the general formula (10) may be a linear or branched alkyl, alkenyl or alkylphenyl group having 8-18 carbon atoms. However, alkyl groups having 10-14 carbon atoms are preferred from the viewpoint of
15 improvement in solubility, foamability and cleansability. Furthermore, R^{22} may be an alkylene group having 2-4 carbon atoms. However, the number of carbon atoms is preferably 2-3 from the viewpoint of the solubility in water. Moreover, the structure of G is dependent upon the raw material to be
20 used, which is a monosaccharide or di- or higher polysaccharide. As examples of the raw material for G , may be mentioned monosaccharides such as glucose, fructose, galactose, xylose, mannose, lyxose, arabinose and mixtures thereof; and disaccharides and higher polysaccharides such
25 as maltose, xylobiose, isomaltose, cellobiose, gentiobiose, lactose, sucrose, nigerose, turanose, raffinose, gentianose,

melezitose and mixtures thereof. Of these, preferred materials are glucose and fructose for the monosaccharide, and maltose and sucrose for the di- or higher polysaccharide because of their good availability and low cost. Of these, 5 glucose is particularly preferred from the viewpoint of availability.

In addition, examples of the nonionic surfactants include nonionic surfactants containing at least one long-chain, branched alkyl or alkenyl group and at least three 10 hydroxyl groups in their molecules, such as an addition compound of pentaerythritol with 1 mole of isostearyl glycidyl ether, an addition compound of sorbitol with 1 mole of isostearyl glycidyl ether, an addition compound of mannitol with 1 mole of 2-octyldodecyl glycidyl ether, an 15 addition compound of methylglucoside with 1 mole of isostearyl glycidyl ether, an addition compound of diglycerol with 1 mole of isostearyl glycidyl ether, and phytanetriol.

As examples of the amphoteric surfactants, may be 20 mentioned sulfobetaines and carboxobetaines containing a linear or branched alkyl or alkenyl group having 1-22 carbon atoms, and the like.

In the present invention, among the above-mentioned surfactants, the higher fatty acid alkanolamides or their 25 addition products with alkylene oxides, amine oxides, alkylglycosides, sulfobetaines and carboxobetaines are

preferred from the viewpoint of improvements in detergency and easiness of wiping, with the alkylglycosides being particularly preferred.

If these surfactants of the component (D) are blended,
5 the proportion thereof is 0.01-20%, preferably 0.05-10%, most preferably 0.05-5%. If the amount of the surfactants is less than 0.01%, the surface activity brought by the component (D) is not sufficiently exhibited, and its blending will hence mean little. On the other hand, if the
10 component (D) is blended in any proportion exceeding 20%, its effects are not expected to more heighten correspondingly. There is hence no need to blend the component (D) in an amount exceeding 20%.

In order to more improve the storage stability at low
15 temperatures, the detergent compositions of this invention may optionally contain, in addition to the above-described components, the routinely-used dispersants, chelating agents, perfume bases, dyes, pigments, antiseptics and the like within limits not impeding the effects of the present
20 invention.

The detergent compositions for hard surfaces can be prepared by mixing the above-described components and water in a method known per se in the art.

The present invention will hereinafter be described in
25 more detail by the following examples. However, it should be borne in mind that this invention is not limited to and

by these examples.

EXAMPLES

Example 1:

- 5 Evaluation of detergency, easiness of wiping and
 remaining behavior after wiping:

 Detergent compositions for hard surfaces of their
corresponding compositions shown in Tables 1-4 were
separately prepared. Each of these detergent compositions
10 was evaluated in detergency, easiness of wiping and
remaining behavior after wiping in accordance with the
following respective evaluation methods. These results are
shown in Tables 1-4.

 Evaluation methods for detergency, easiness of wiping and
15 remaining behavior after wiping:

[Detergency]

 Dirt from the hand was forcedly caused to adhere to a
10 x 10 cm glass plate, deteriorated by heat at 200°C for 30
minutes and left over further for 1 month at room
20 temperature, thereby providing model dirt.

 Each of the liquid detergent compositions was sprayed
by 1 cc on the model dirt by a commercially-available
sprayer and then wiped off with a dry towel, followed by its
organoleptic evaluation in accordance with the following
25 standard:

 A: Dirt was removed to a very good extent.

B: Dirt was removed to a good extent.

C: Dirt was not removed in some places.

D: Dirt was scarcely removed.

[Easiness of wiping]

5 Each of the liquid detergent compositions was sprayed
by 3 cc on a window pane of a dwelling in actual use by a
commercially-available sprayer and then wiped off with a dry
towel. It was then evaluated organoleptically by the degree
of foaming upon the wiping and the bursting rapidity of
10 foams in accordance with the following standard:

A: Hard to foam when wiped with the towel.

(Foams burst at once when wiped)

B: Slightly foamed when wiped with the towel.

(Foams were hard to burst at once when wiped)

15 C: Highly foamed when wiped with the towel.

(Foams did not burst while wiping)

[Remaining behavior after wiping (finishing behavior)]

After the detergent composition was evaluated in the
easiness of wiping, its remaining behavior after the wiping
20 was ranked in accordance with the following standard:

A: Scarcely left wipe streaks.

B: Slightly left wipe streaks.

C: Left wipe streaks.

THIS SHEET HAS BEEN
REPLACED

Table 1

		Invention product (%)					
		1	2	3	4	5	6
Na dodecyldiphenyl ether disulfonate		0.5	0.5	1.0	2.0	1.0	0.5
Na tetradecyldiphenyl ether disulfonate			0.5	0.5			0.4
Na didodecyldiphenyl ether disulfonate					0.3		0.1
Alkyl ($\bar{c}$ =11) diethanolamide						0.3	
Dodecylamine oxide							0.3
Alkyl ($\bar{c}$ =13) maltoside							
N,N,N-Lauryldimethyl-N-2-hydroxy-3-sulfopropyl-ammonium betaine							
Laurylamidopropyl-N,N-dimethylacetate betaine							
Na alkyl ($\bar{c}$ =12) sulfate							
Polyoxyethylene ($\bar{p}$ =10) alkyl ($\bar{c}$ =12) ether							
Propylene glycol monomethyl ether		10					
Diethylene glycol dimethyl ether			10				
1,3-Dimethyl-2-imidazolidinone				10			
3-Methoxy-3-methylbutanol					10		
2,2,4-Trimethyl-1,3-pentanediol						10	
Isopropanol							10
Monoethanolamine		1	0.5	3			
N-(β -Aminoethyl)ethanolamine					1	1	3
Morpholine							
Na carbonate							
Na metasilicate							
Na tertiary phosphate							
Water		Bal	Bal	Bal	Bal	Bal	Bal
Properties evaluated	Detergency	B	B	A	A	B	A
	Easiness of wiping	A	A	A	A	A	A
	Remaining behavior	A	A	A	A	A	A

Bal: Balance

This Sheet Has Been Replaced



Table 2

		Invention product (%)				
		7	8	9	10	11
Na dodecyldiphenyl ether disulfonate		0.5	0.5	1.0	0.5	1.5
Na tetradecyldiphenyl ether disulfonate		0.5	0.5		0.5	
Na didodecyldiphenyl ether disulfonate						
Alkyl ($\bar{C}=11$) diethanolamide						
Dodecylamine oxide					0.3	0.3
Alkyl ($\bar{C}=13$) maltoside		0.3				
N,N,N-Lauryldimethyl-N-2-hydroxy-3-sulfopropyl-ammonium betaine			0.3			
Laurylamidopropyl-N,N-dimethylacetate betaine				0.3		
Na alkyl ($\bar{C}=12$) sulfate					0.3	
Polyoxyethylene ($\bar{P}=10$) alkyl ($\bar{C}=12$) ether						0.3
Propylene glycol monomethyl ether		10				
Diethylene glycol dimethyl ether			10			
1,3-Dimethyl-2-imidazolidinone				10		
3-Methoxy-3-methylbutanol					10	
2,2,4-Trimethyl-1,3-pentanediol						10
Isopropanol						
Monoethanolamine					1	1
N-(β -Aminoethyl)ethanolamine						
Morpholine		0.5	1	3		
Na carbonate						
Na metasilicate						
Na tertiary phosphate						
Water		Bal	Bal	Bal	Bal	Bal
Properties evaluated	Detergency	B	B	A	A	A
	Easiness of wiping	A	A	A	A	A
	Remaining behavior	A	A	A	A	A

Bal: Balance

Table 3

		Comparative product (%)					
		1	2	3	4	5	6
Na dodecyldiphenyl ether disulfonate		1.0					0.5
Na tetradecyldiphenyl ether disulfonate			1.0				0.5
Na didodecyldiphenyl ether disulfonate							1.0
Alkyl ($\bar{C}=11$) diethanolamide							
Dodecylamine oxide				1.0			0.3
Alkyl ($\bar{C}=13$) maltoside							
N,N,N-Lauryldimethyl-N-2-hydroxy-3-sulfopropyl-ammonium betaine							
Laurylamidopropyl-N,N-dimethylacetate betaine							
Na alkyl ($\bar{C}=12$) sulfate					1.0		
Polyoxyethylene ($\bar{P}=10$) alkyl ($\bar{C}=12$) ether						1.0	
Propylene glycol monomethyl ether			10				
Diethylene glycol dimethyl ether				10			
1,3-Dimethyl-2-imidazolidinone					10		
3-Methoxy-3-methylbutanol						10	
2,2,4-Trimethyl-1,3-pentanediol							10
Isopropanol							
Monoethanolamine		1		1			
N-(β -Aminoethyl)ethanolamine					1		
Morpholine						1	
Na carbonate							1
Na metasilicate							
Na tertiary phosphate							
Water		Bal	Bal	Bal	Bal	Bal	Bal
Properties evaluated	Detergency	D	D	B	B	B	C
	Easiness of wiping	A	A	C	C	B	C
	Remaining behavior	A	A	B	C	C	C

Bal: Balance

Table 4

		Comparative product (%)	
		7	8
Na dodecyldiphenyl ether disulfonate		1.0	
Na tetradecyldiphenyl ether disulfonate			1.0
Na didodecyldiphenyl ether disulfonate			
Alkyl ($\bar{C}=11$) diethanolamide			
Dodecylamine oxide			
Alkyl ($\bar{C}=13$) maltoside		0.3	
N,N,N-Lauryldimethyl-N-2-hydroxy-3-sulfopropyl-ammonium betaine			0.3
Laurylamidopropyl-N,N-dimethylacetate betaine			
Na alkyl ($\bar{C}=12$) sulfate		0.3	
Polyoxyethylene ($\bar{p}=10$) alkyl ($\bar{C}=12$) ether			0.3
Propylene glycol monomethyl ether			
Diethylene glycol dimethyl ether			
1,3-Dimethyl-2-imidazolidinone			
3-Methoxy-3-methylbutanol			
2,2,4-Trimethyl-1,3-pentanediol			
Isopropanol		10	10
Monoethanolamine			
N-(β -Aminoethyl)ethanolamine			
Morpholine			
Na carbonate			
Na metasilicate		1	
Na tertiary phosphate			1
Water		Bal	Bal
Properties evaluated	Detergency	B	B
	Easiness of wiping	B	C
	Remaining behavior	C	C

Bal: Balance

Example 2:

Evaluation of detergency, easiness of wiping and remaining behavior after wiping:

Detergent compositions for hard surfaces of their
5 corresponding compositions shown in Table 5 were separately prepared. Each of these detergent compositions was evaluated in detergency, easiness of wiping and remaining behavior after wiping in accordance with the following respective evaluation methods. These results are shown in
10 Table 5.

Evaluation methods for detergency, easiness of wiping and remaining behavior after wiping:

[Detergency]

After tempura oil was heated at 200-220°C for 18
15 hours, air was blown in the oil at 100°C to treat it for 8 hours, thereby deteriorating the oil. The thus-deteriorated oil was applied to the surface of a stainless steel plate. The thus-coated stainless steel plate was left over for 2 months at room temperature. Each of the liquid detergent
20 compositions was spread on the oil smear adhered on the surface of the stainless steel plate, left over for 3 minutes and then wiped off with a dry towel, followed by its organoleptic evaluation in accordance with the following standard:

25 A: Smear was removed to a very good extent.

B: Smear was removed to a good extent.

C: Smear was not removed in some places.

D: Smear was scarcely removed.

[Easiness of wiping]

Each of the liquid detergent compositions was spread
5 by 3 cc on a kitchen range (made of a stainless steel) in
actual use and then wiped off with a dry towel. It was then
evaluated organoleptically by the degree of foaming upon the
wiping and the bursting rapidity of foams in accordance with
the following standard:

10 A: Hard to foam when wiped with the towel.

(Foams burst at once when wiped)

B: Slightly foamed when wiped with the towel.

(Foams were hard to burst at once when wiped)

C: Highly foamed when wiped with the towel.

15 (Foams did not burst while wiping)

[Remaining behavior after wiping (finishing behavior)]

After the detergent composition was evaluated in the
easiness of wiping, its remaining behavior after the wiping
was ranked in accordance with the following standard:

20 A: Scarcely left wipe streaks.

B: Slightly left wipe streaks.

C: Left wipe streaks.

Table 5

		Invention product (%)				Comparative product (%)			
		12	13	14	15	9	10	11	12
Na dodecyldiphenyl ether disulfonate		5	5	10	10	5			
Na tetradecyldiphenyl ether disulfonate			3			3			
Alkyl ($\bar{C}=12$) glucoside		3		3	10		5		
Tetradecylamine oxide		1				1	3	5	5
Na alkyl ($\bar{C}=12$) benzenesulfonate			1				5	3	10
Polyoxyethylene ($\bar{p}=4$) polyoxypropylene ($\bar{p}=2$) alkyl ($\bar{C}=12$) ether				1				1	
Diethylene glycol monobutyl ether		10	20		10	20	20	20	10
Propylene glycol monobutyl ether		10		20	10				10
Monoethanolamine		5	5	10	5		5		
Na carbonate						10	5	10	15
Water		Bal	Bal	Bal	Bal	Bal	Bal	Bal	Bal
Properties evaluated	Detergency	B	B	A	A	C	B	C	B
	Easiness of wiping	A	A	A	A	C	C	C	C
	Remaining behavior	A	A	A	A	C	B	C	C

Bal: Balance



WHAT IS CLAIMED IS:

1 1. A detergent composition for hard surfaces, which
2 comprises the following components (A), (B) and (C):

3 (A) a diphenyl ether disulfonate type anionic
4 surfactant,

5 (B) a water-soluble solvent, and

6 (C) an amine compound.

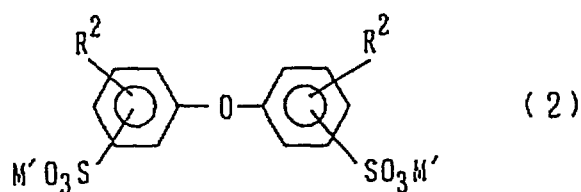
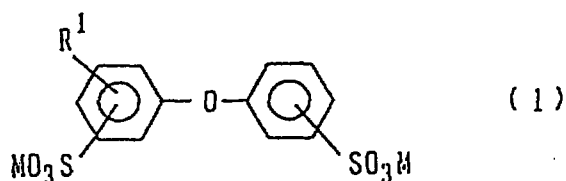
1 2. A detergent composition for hard surfaces, which
2 comprises the following components (A), (B) and (C):

3 (A) 0.01-20 wt.% of a diphenyl ether disulfonate type
4 anionic surfactant,

5 (B) 0.1-50 wt.% of a water-soluble solvent, and

6 (C) 0.01-30 wt.% of an amine compound.

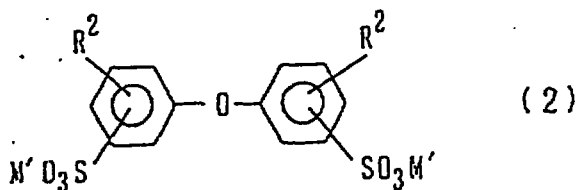
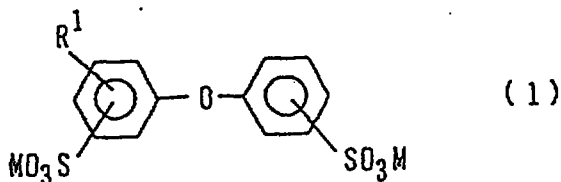
1 3. The detergent composition as claimed in claim 1 or
2 2, wherein the component (A) comprises one or more anionic
3 surfactants selected from compounds represented by the
4 following general formulae (1) and (2):





7 wherein R^1 and R^2 mean individually a linear or branched
8 alkyl or alkenyl group having 5-15 carbon atoms, and M and
9 M' denote individually an alkali metal atom, an ammonium
10 group or an alkanol-substituted ammonium group.

1 4. The detergent composition as claimed in claim 1 or
2 2, wherein the component (A) comprises one or more anionic
3 surfactants selected from compounds represented by the
4 following general formulae (1) and (2):

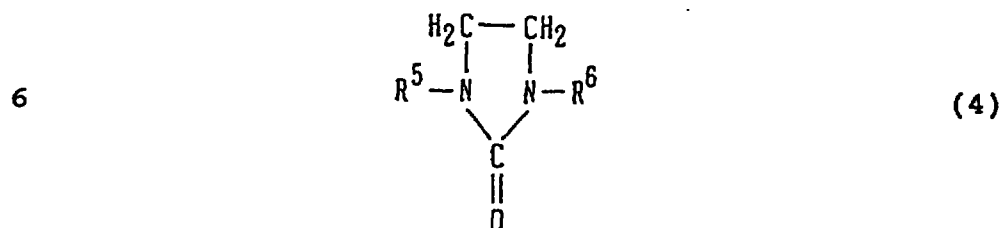
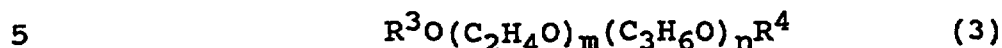


7 wherein R^1 and R^2 mean individually a linear or branched
8 alkyl or alkenyl group having 5-15 carbon atoms, and M and
9 M' denote individually an alkali metal atom, an ammonium
10 group or an alkanol-substituted ammonium group, the
11 proportion of the compounds represented by said general
12 formulae (1) and (2) being within a range of from 100/0 to
13 25/75 by weight.

1 5. The detergent composition as claimed in claim 1 or

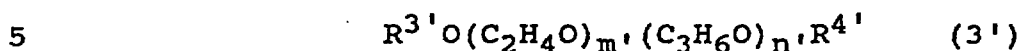


2 2, wherein the component (B) comprises one or more water-
3 soluble solvents selected from compounds represented by the
4 following general formulae (3) through (5):



8 wherein R^3 and R^4 mean individually a hydrogen atom or an
9 alkyl group having 1-8 carbon atoms, with the proviso that
10 both groups R^3 and R^4 do not mean hydrogen atoms at the same
11 time, m and n stand individually for an integer of 0-3, with
12 the proviso that both m and n do not stand for integers of 0
13 at the same time, R^5 and R^6 denote individually an alkyl
14 group having 1-3 carbon atoms, and R^7 means an alkyl group
15 having 1-3 carbon atoms, dihydric alcohols having 4-12
16 carbon atoms and monohydric alcohols having 1-5 carbon
17 atoms.

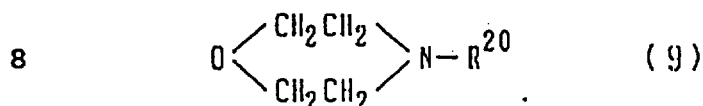
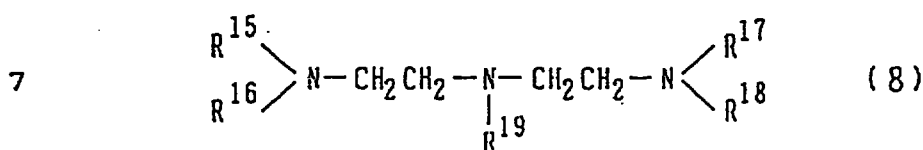
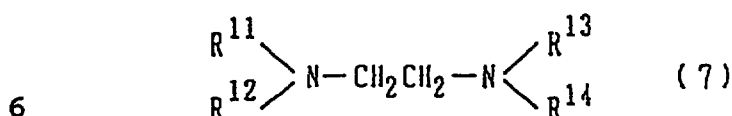
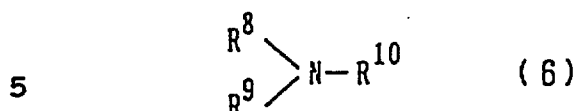
1 6. The detergent composition as claimed in claim 1 or
2 2, wherein the component (B) comprises one or more water-
3 soluble solvents selected from compounds represented by the
4 following general formula (3'):





6 wherein $R^{3'}$ and $R^{4'}$ mean individually a hydrogen atom or an
7 alkyl group having 1-4 carbon atoms, with the proviso that
8 both groups $R^{3'}$ and $R^{4'}$ do not mean hydrogen atoms at the
9 same time, and m' and n' stand individually for an integer
10 of 0-3, with the proviso that both m' and n' do not mean 0
11 at the same time, m' does not denote 1 and n' does not mean
12 0.

1 7. The detergent composition as claimed in claim 1 or
2 2, wherein the component (C) comprises one or more amine
3 compounds selected from compounds represented by the
4 following general formulae (6) through (9):

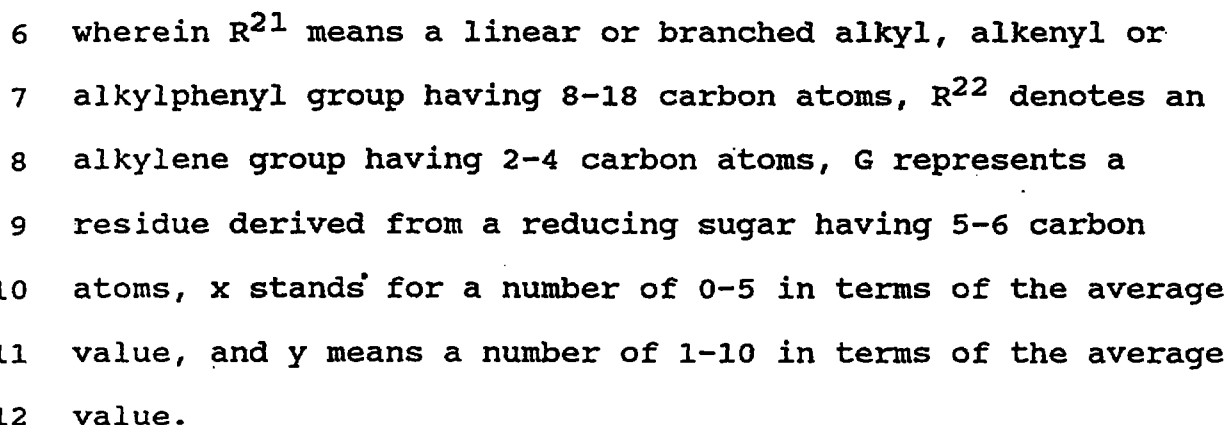


9 wherein R^8 , R^{11} , R^{13} , R^{15} , R^{17} , R^{19} and R^{20} mean
10 individually a hydrogen atom or an alkyl group having 1-4
11 carbon atoms, and R^9 , R^{10} , R^{12} , R^{14} , R^{16} and R^{18} denote

1 8. The detergent composition as claimed in any one of
2 claims 1-6, which further comprises, as a component (D),
3 0.01-20 wt.% of at least one surfactant other than the
4 component (A).

1 9. The detergent composition as claimed in claim 8,
2 wherein the component (D) comprises one or more surfactants
3 selected from higher fatty acid alkanolamides or their
4 addition products with alkylene oxides, amine oxides,
5 alkylglycosides, sulfobetaines and carbobetaines.

1 10. The detergent composition as claimed in claim 8,
2 wherein the component (D) comprises one or more
3 alkylglycosides represented by the following general formula
4 (10):





- 31 -

THIS SHEET HAS BEEN
REPLACED

11. Detergent composition substantially as
described in the Examples.

This Sheet Has Been Replaced

