(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 103 325**
A1

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **83201197.7**

(22) Date of filing: **16.08.83**

(51) Int. Cl.³: **C 11 D 17/00**, C 11 D 3/12

(30) Priority: **20.08.82 GB 8223997**

(43) Date of publication of application: **21.03.84 Bulletin 84/12**

(84) Designated Contracting States: **AT BE CH DE FR GB IT LI NL SE**

(71) Applicant: **UNILEVER NV, Burgemeester s'Jacobplein 1 P.O. Box 760, NL-3000 DK Rotterdam (NL)**
(84) Designated Contracting States: **BE CH DE FR IT LI NL SE AT**

(71) Applicant: **UNILEVER PLC, Unilever House Blackfriars P O Box 68, London EC4P 4BQ (GB)**
(84) Designated Contracting States: **GB**

(72) Inventor: **Brierley, John Martin, 11 Green Fields Drive, Little Neston South Wirral L64 0TX (GB)**
Inventor: **Helliwell, John Fielden, 9 Crossley Drive Heswall, Wirral Merseyside L60 9JA (GB)**
Inventor: **Scott, Melvin, 6 Kentridge Drive, Great Sutton South Wirral L66 2SY (GB)**

(74) Representative: **Tan, Bian An et al, Unilever N.V. Patent Division P.O. Box 137, NL-3130 AC Vlaardingen (NL)**

(54) **Scouring cleanser compositions.**

(57) Liquid scouring cleanser compositions are disclosed comprising a suspending liquid medium and an abrasive powder having a mean particle size of between 4 and 17.5 micrometers and containing substantially no particles with sizes above 75 micrometers. The compositions combine an improved soft and smooth consistency with good cleaning performance.

EP 0 103 325 A1

SCOURING CLEANSER COMPOSITIONS

The present invention relates to scouring cleanser compositions and more particularly to improved scouring cleanser compositions in liquid form.

For many years liquid scouring cleansers have been known in the art and have been widely used in the household for the elimination of stubborn soils, greases, burnt materials and stains which are not easily removed by ordinary abrasive-free detergent compositions.

Several problems are encountered in formulating liquid scouring cleansers. In pourable liquid detergent compositions containing solid particles of abrasive material, the latter tend to settle out on storage, which is inconvenient to the consumer, who has to re-disperse them at the time of use. In the prior art this problem has been approached by providing a medium which exhibits Bingham plastic characteristics. Examples of such media have, inter alia, been described in UK Patents 1,167,597; 1,181,607; 1,262,280; 1,303,810; 1,308,190 and 1,418,671. Other problems are related to the particular choice of the abrasive material. Such a choice often constitutes a compromise between cleaning efficacy and minimizing the risk of damage to delicate surfaces. In general hard abrasives and relatively large particles are satisfactory for the removal of difficult soils but may cause scratching, whereas softer abrasives and smaller particles cause less scratching and other abrasion of substrates from which soil has to be removed. It has long been recognized that a careful choice of the particle size range of the abrasive is of great importance for a good and effective cleanser.

The abrasive powders hitherto used in commercial household scouring cleansers have particle sizes ranging from below 1 micron to about 150 or 200 microns, with an average particle size of between 10 and 50 microns, irrespective of the material used as abrasive. In such abrasive powders there is a concentration of particles in the range from 10 to 50 microns diameter, with amounts of particles below and above this range decreasing as the difference from the average particle size increases.

As abrasive powders incorporated in scouring cleansers are in practice made by grinding or crushing minerals, the powders obtained have a wide range of particle sizes. As coarse particles tend to cause scratching and very fine particles are ineffective as abrasives, the commercial producer of abrasive powders used in household scouring cleansers operates a size reduction process in such a way as to produce an optimum average or mean particle size and as narrow a range of particle sizes centred around this optimum as can be achieved without using a costly classification step.

Normally the abrasive powder will be included into the compositions as supplied, but it may be advantageous to decrease the amount of very fine particles in the abrasive in order to get better rinse-away properties. It is believed that especially this very fine particle fraction tends to redeposit on glossy surfaces, thus forming a dull film, if rinsing has not been sufficiently repeated after using the abrasive. Reference is made in this respect to our UK Patent 1,581,433.

The particle size of an abrasive is expressed in detail as a distribution curve on a graph, in which the nominal diameter in microns is plotted against cumulative amounts of material in percent by weight. Such a graph is illustrated in the aforesaid UK Patent 1,581,433 diagram, in which the

particle size distributions of four abrasive powders which have been used extensively in household scouring cleansers, namely silica (A), feldspar (B) and calcite (C and D), are given as curves. The mean particle sizes of the abrasives concerned are the sizes at which 50% by weight of the particles are larger and 50% are smaller, and are 22, 22, 27 and 15 microns respectively. The mean particle size is here to be understood to be the median particle size.

It has now been found that if in the formulation of a liquid scouring cleanser, a low mean particle size abrasive is used, particularly with a very sharp particle size distribution a product is obtained which, without a substantial loss in cleaning efficiency does not produce visible scratching, has good rinse-away properties and does not feel gritty, providing the consumer with a very soft and smooth touch during use.

Consequently, in its broadest aspects, the present invention provides liquid scouring cleanser compositions comprising a suspending liquid medium, a natural or synthetic detergent surfactant and an abrasive powder with a mean particle size between 4 and 17.5 microns, containing substantially no particles with sizes above 75 microns. Preferably, the particle size distribution is such that less than 10% is below 4, especially below 5 or even 7 microns. Preferably also less than 10% is above 40, 30 or even 25 microns. It is preferable for the mean particle size to be between 6 and 15 microns or even between 10 and 15 microns. Preferably at least 80% of the abrasive has a particle size in the range from 5 to 30 microns or even 6 to 25 microns. The percentages refer to percentages by weight.

Suitable for use as the abrasive material are both natural and synthetic abrasives, for example dolomite, precipitated calcium carbonate (aragonite), feldspar, alumina, silica

abrasives, such as quartz and quartzite; preferably an abrasive material is used with a hardness on Moh's scale of from 1 to 4. Particularly suitable is calcite, for instance limestone, chalk or marble, such as those forms of calcite referred to in UK Patent 1,345,119. The abrasive material is generally present in an amount of from 1 to 65 percent, preferably from 2 to 60 percent by weight of the final composition.

The liquid medium normally comprises an aqueous medium in which an anionic detergent material is present, preferably in combination with a nonionic or zwitterionic detergent material. Suitable anionic surfactants are alkali metal or alkanol amine salts of C_{12}-C_{18} branched or straight chain alkylaryl sulphonates, of C_{12}-C_{18} paraffin sulphonates, of C_8-C_{12} branched or straight chain alkyl sulphates, of C_{10}-C_{18} alkyl $(EO)_{1-10}$ sulphates, of C_{10}-C_{24} fatty acid soaps etc. In general the amount of anionic surfactant will vary between 0.5 and 15 percent, preferably between 2 and 10 percent by weight of the final composition.

It is often desirable to include also a nonionic or zwitterionic detergent material in the aqueous medium in an amount of from 0.3 to 7 percent, preferably from 0.5 to 5 percent by weight. Suitable examples of nonionic detergents are water-soluble condensation products of ethylene- and/or propylene-oxide with linear primary or secondary C_8-C_{18} alcohols, with C_8-C_{18} fatty acid amides or fatty acid alkylolamides (both mono- and di-amides), with C_9-C_{18} alkyl phenols and so on. The alkoxylated C_8-C_{18} fatty acid mono- and di-alkylolamides should contain more than one alkylene oxide unit; for example, they should be condensed with e.g. 2 - 5 moles of alkylene oxide such as ethylene oxide. Fatty acid mono- or di-alkylol amides in which the fatty acid radical contains 10 - 16 carbon atoms are also suitable nonionics, such as for instance coco fatty acid mono- or di-ethanol

amide. Suitable zwitterionic detergents are trialkyl amine oxides having one long alkyl chain (C_8-C_{18}) and two short (C_1 C_4) alkyl chains; betaines and sulphobetaines.

It is highly desirable that the liquid medium should exhibit Bingham plastic characteristics, thus forming a stable suspending medium for the abrasive material. Such media using the above-mentioned surfactants, possibly in combination with other surfactants, are described in British patent specifications 1 167 597, 1 181 607, 1 262 280, 1 303 810, 1 308 190 and 1 418 671. It is often desirable that a liquid abrasive cleanser also comprises an electrolyte or mixture of electrolytes,such as alkalimetal-chlorides, -nitrates, -silicates, -borates, -carbonates, -sulphates, -orthophosphates, -pyro- and -poly-phosphates, -citrates, -nitrilotriacetates and mixtures thereof. The level of electrolyte will range from 0 to 25 percent, preferably from 5 to 20 percent by weight of the liquid medium without the abrasive materials.

Other adjuncts for liquid abrasive cleansers may be included, such as colouring agents, perfumes, fluorescers, hydrotropes, soil-suspending agents, bleaching agents, bleach precursors, enzymes, opacifiers, germicides, humectants, etc.

The invention will further be described by way of example.

In the following tests the following liquid scouring composition was used:

	% by weight
sodiumalkylbenzenesulphonate	3.2
C_9-C_{11} alcohol 6EO	0.9
coconutmonoethanolamide	0.9
sodiumtriphosphate	1.25
sodiumcarbonate	1.25
preservative	0.01
perfume	0.3
ammonia solution	0.16
abrasive	X
water	to 100

The abrasive materials used were four different calcite abrasive materials I, II, III and IV, having a median particle size of 5, 7, 13 and 27μ respectively. Their particle size distributions are represented in the accompanying drawing.

These abrasive materials were used at a level of 50% by weight in the liquid compositions, with the exception of I, which was used at a level of 45% by weight. IV is a material according to the prior art, and is included in the tests as comparison standard.

The following tests were carried out:

FEEL OF GRITTINESS

Neat liquid scourer is placed on a 4" perspex square. The product is covered with an identical piece of perspex. Holding the two squares between thumb and finger, they are moved over each other and the grittiness of the product between them assessed on a scale. This is from 0 - smooth to 4 - considerably gritty. A series of products were tested in this way against a standard product, viz. current JIF as sold in the UK.

TACTILE FEEL OF GRITTINESS

The fingers can readily feel gritty particles when a cream scourer is rubbed between the thumb and fingers. By asking a panel of people to feel product between their fingers and ranking them as smooth, slightly gritty - to considerably gritty, on a 0 - 4 scale, a Tactile Grittiness score can be obtained.

IN-USE FEEL OF GRITTINESS

A thin layer of Carbon Black is smeared onto pieces of white formica (9" x 4") and panel members are requested to clean a section of the formica surface using product on a piece of moist Terry Towelling.

Panellists are then asked to rank each product tested on a 0 - 4 (nil-considerable) grittiness scale.

SURFACE DAMAGE

Testing was carried out on the W.I.R.A. using 64 rubs, with no head weight and a terry towelling head cover.

Assessments were made by specular reflection at an angle of 45°C using the Solartron.

RINSING

20 mls of the product was squirted around a stainless steel sink and rinsed away with a constant flow of water at 25°C.

The following results were obtained:

Feel of grittiness ranking (average of 8 assessments)

Product	Average ranking	% control
IV (control)	3.3	100
I	0.2	6
II	0.3	9
III	0.5	15

(scale: 0 = nil to 4 = considerable grittiness)

Tactile feel of grittiness ranking (average of 8 assessments)

Product	Average ranking	% control
IV (control)	3.25	100
I	0.43	13
III	0.65	20
IV (control)	2.35	100
II	0.1	4

(scale: 0 = nil to 4 = considerable grittiness)

In-use feel of grittiness

Product	Average ranking	% control
IV (control)	2.2	100
I	0.6	27
III	1.0	45
IV (control)	2.45	100
II	0.4	16

Surface Damage

Product	Black Gloss Perspex		Black Gloss Formica	
	Gloss loss	% loss	Gloss loss	% loss
I	1.86	19.3	0.85	8.1
II	1.08	11.1	1.13	13.7
III	1.90	19.7	0.66	6.3
IV (control)	2.81	29.1	0.91	8.7
reflectance value before testing	9.65		10.45	

Rinse-away properties

Product	Time to rinse away grit
I	- (no grit)
II	- (no grit)
III	23 secs
IV (control)	113 secs

The products were also assessed by a panel as to their overall cleaning performance, and no significant loss in perceived efficiency was obtained between products I - III as compared with IV.

CLAIMS

1. A liquid scouring cleanser composition comprising a suspending liquid medium, a detergent surfactant and an abrasive powder, characterized in that the abrasive powder has a mean particle size of between 4 and 17.5 micrometers and contains substantially no particles with sizes above 75 micrometers.

2. A cleanser composition according to claim 1, characterized in that less than 10% by weight of the particles of the abrasive are of size below 4 micrometers.

3. A cleanser composition according to claim 1 or 2, characterized in that less than 10% by weight of the particles of the abrasive are of size above 40 micrometers.

4. A cleanser composition according to any preceding claim, characterized in that less than 10% by weight of the particles of the abrasive are of size below 5 micrometers.

5. A cleanser composition according to any preceding claim, characterized in that less than 10% by weight of the particles of the abrasive are of size above 30 micrometers.

6. A cleanser composition according to any preceding claim, characterized in that at least 80% by weight of the particles of the abrasive are of size between 5 and 30 micrometers.

7. A cleanser composition according to any preceding claim, characterized in that less than 10% by weight of the particles of the abrasive are of size above 25 micrometers.

8. A cleanser composition according to any preceding claim, characterized in that at least 80% by weight of the particles of the abrasive are of size between 6 and 25 micrometers.

9. A cleanser composition according to any preceding claim, characterized in that less than 10% by weight of the particles of the abrasive are of size below 7 micrometers.

10. A cleanser composition according to any preceding claim, characterized in that the abrasive powder has a mean particle size of between 6 and 15 micrometers.

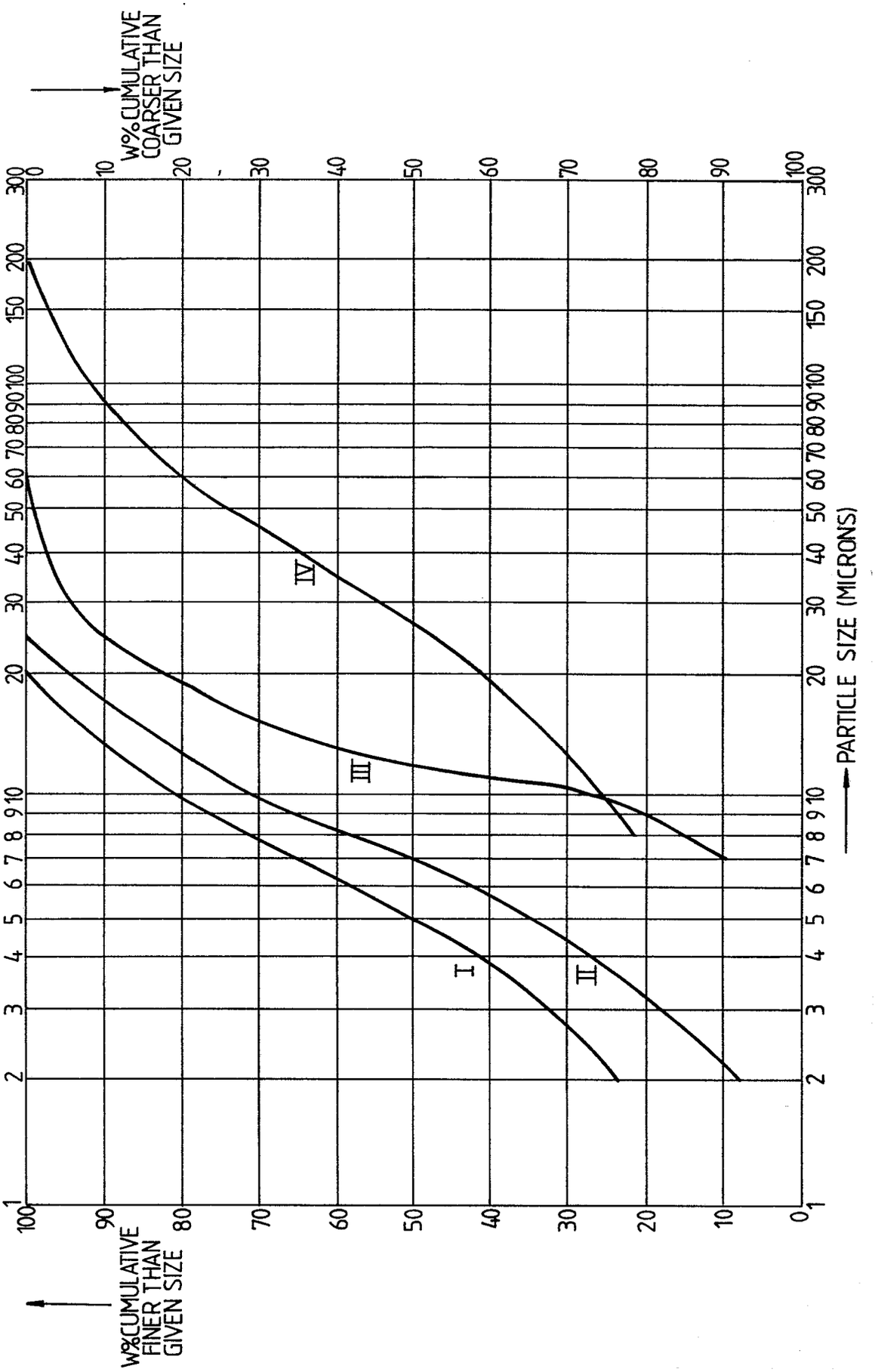
11. A cleanser composition according to any preceding claim, characterized in that the abrasive powder has a mean particle size of between 10 and 15 micrometers.

12. A cleanser composition according to any preceding claim, characterized in that the abrasive powder has a Mohs hardness in the range from 1 to 4.

13. A cleanser composition according to any preceding claim, characterized in that the abrasive is calcite.

14. A cleanser composition according to any preceding claim, characterized in that it comprises 1 to 65% by weight of the total composition of the abrasive powder.

15. A cleanser composition according to any preceding claim, characterized in that it comprises 2 to 60% by weight of the total composition of the abrasive powder.


W% CUMULATIVE COARSER THAN GIVEN SIZE
W% CUMULATIVE FINER THAN GIVEN SIZE
PARTICLE SIZE (MICRONS)
I
II
III
IV

0103325

European Patent Office

Application number

EP 83 20 1197

EUROPEAN SEARCH REPORT

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
X	US-A-4 181 633 (D. COLODNEY et al.) * Claims 1, 11 *	1,14, 15	C 11 D 17/00 C 11 D 3/12
X	GB-A-1 534 680 (COLGATE-PALMOLIVE CO.) * Page 3; example 1 *	1,13-15	
A	GB-A-2 055 118 (POLYMER TECHNOLOGY CORP.) * Page 2; example 1 *		
A	DE-A-2 402 225 (UNILEVER N.V.) * Page 17; examples 1-61; claims 1, 17, 29, 30 *		

TECHNICAL FIELDS SEARCHED (Int. Cl. ³)

C 11 D 3/00
C 11 D 17/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	15-11-1983	SCHULTZE D

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO Form 1503. 03.82