

PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

Abrasive Scouring Cleanser Compositions.

We, COLGATE-PALMOLIVE COMPANY, a Corporation organised and existing under the laws of the State of Delaware, United States of America, of 300 Park Avenue, New York, New York 10022, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to abrasive scouring cleanser compositions.

An abrasive scouring cleanser composition in accordance with the present invention is in the form of a dry powder and comprises at least 45% of a water-insoluble inorganic siliceous abrasive material having a particle size of less than 0.5 mm, 0.1 to 50% by weight of a dry water-soluble compound which, on dissolution in water, liberates hypobromite ions, and 0.5 to 15% of a water-soluble organic detergent stable in the presence of the dry hypobromite liberating compound.

All percentages and parts are by weight.

The term "particle size of less than 0.5 mm" means that the largest linear dimension of all the abrasive particles in the composition is less than 0.5 mm.

Compositions embodying the invention exhibit an exceptionally high oxidation and bleaching efficacy in use in aqueous media. The hypobromite oxidizing agents of these compositions are very rapidly soluble and reactive, thus enabling the composition to exhibit a high degree of effectiveness, especially with respect to speed and extent

of stain and soil removal. The compositions are stable and maintain their high rate of activity under the strongly alkaline conditions desired for many cleaning operations, e.g. at pH 8.5 and higher. Their odour characteristics in use are satisfactory.

Example of siliceous abrasives for use in such scouring cleansing compositions are silica, feldspar, pumice, volcanic ash, diatomaceous earth, bentonite, talc and mixtures thereof. For general use, it is preferred to use either silica or feldspar of various degrees of fineness for they are relatively hard and result in a whiter product. The abrasives may vary in hardness, particle size and shape, and the choice for a particular composition is generally dependent upon the contemplated field of application. The particle size of the abrasive is less than 0.5 mm, and, preferably the maximum particle size of substantially all of the abrasive is 0.15 mm. Normally the abrasive employed will have a particle size such that at least about 85% and preferably 99% by weight thereof passes through a sieve having 0.74mm openings. On the other hand, in the interest of effective cleansing action it is appropriate for at least 8% by weight of the abrasive particles to have a diameter of 0.037 mm or larger. The abrasive is present in a proportion of at least 45%, and preferably at least 85%, of the cleanser, and scouring cleansers so formulated are highly effective in polishing tarnished metal surfaces and in removing smears or deposits of soft materials, such as aluminium, from porcelain surfaces.

[Price 5s. 0d.]

Hypobromite-liberating compounds suitable for use in the compositions of the present invention are water-soluble solid compounds which generate hypobromite ions on contact with, or dissolution in, water. These compounds are dry, that is, they are devoid of free water; but they may contain water of crystallization or hydration. Examples thereof are dry particulate N-bromoimides, such as N-bromocyanuric acid, tribromocyanuric acid, dibromocyanuric acid, and salts thereof, such as sodium dibromocyanurate and potassium dibromocyanurate. Other N-bromoimides may also be used, such as N-bromosuccinimide, N-bromomalonimide, N-bromophthalimide and N-bromonaphthalimide. Additional N-bromoimides are N-bromohydantoin, such as 1,3-dibromo-5, 5-dimethylhydantoin; N-monobromo - C₂C₂ - dimethylhydantoin; methylene - bis(N - bromo - C₂C₂ - dimethylhydantoin); 1,3 - dibromo - 5 - isobutylhydantoin; 1,3 - bromo - 5 - methyl-5 - ethylhydantoin; 1,3 - dibromo - 5,5 - diisobutylhydantoin and 1,3 - dibromo - 5-methyl - 5 - n - amylhydantoin. Other useful hypobromite-liberating agents are tribromomelamine and dry, particulate, water-soluble anhydrous inorganic salts, such as lithium hypobromite. The hypobromite-liberating agent may, if desired, be a stable, solid complex or hydrate, such as sodium p-toluenesulphonate - bromamine - trihydrate, sodium benzenesulphonate-bromamine-dihydrate or calcium hypobromite tetrahydrate. Brominated trisodium phosphate formed by the reaction of sodium hypobromite solution with trisodium phosphate (and water as necessary) may also be used. Also, if desired, compounds which yield hypochlorite ions as well as hypobromite ions may be employed, such as N-brominated-N¹-chlorinated imides, for example N-bromo, N¹-chlorocyanuric acids and salts thereof, e.g., N-monobromo-N¹,N¹¹-dichlorocyanuric acid, N-monobromo-N¹-monochlorocyanuric acid, N-monobromo-N¹ - monochlorocyanuric acid, sodium-N-monobromo - N¹-monochlorocyanurate, potassium - N-monobromo - N¹-monochlorocyanurate; and N-brominated-N¹-chlorinated hydantoin, e.g., N-bromo-N¹-chloro-5,5-dimethylhydantoin and N-bromo-N¹-chloro-5-ethyl-5-methylhydantoin.

The hypobromite-liberating compound is employed in an amount of from 0.1 to 50% by weight of the composition, and preferably in an amount of from 0.1 to 15% by weight thereof.

The water-soluble organic detergent of the compositions is one which is stable in the presence of the hypobromite-liberating component. These organic detergents may be anionic, cationic, amphoteric or non-ionic in character, provided that they are

compatible with the compositions as a whole in the proportions employed. Where they are liquids under normal conditions, such as the non-ionic agents generally, they may be prepared in particulate solid form after adsorption upon diatomaceous earth or other similar agents by known procedures.

Examples of suitable anionic detergents are soaps and sulphated and sulphonated synthetic detergents, especially those anionic detergents having 8 to 26 and preferably 12 to 22 carbon atoms in the molecule. The soaps are generally water-soluble salts of saturated higher fatty acids or mixtures thereof.

The sulphated and sulphonated detergents may be prepared from suitable organic materials which are amenable to "sulphonation" (true sulphonation and/or sulphonation). Of the vast variety of sulphates and sulphonates suitable, it is preferred to use aliphatic sulphates and sulphonates of 8 to 2 carbon atoms and alkyl aromatic sulphonates.

The alkyl aromatic sulphonate detergents referred to may be mononuclear or polynuclear in structure. More particularly, the aromatic nucleus may be derived from benzene, toluene, xylene, phenol, cresols, phenol ethers, naphthalene or derivatives containing a phenanthrene nucleus. The alkyl group may also vary. Thus, the alkyl group may be straight or branch chained and may be, for example, dodecyl, pentadecyl, octyl, nonyl, decyl, keryl, or mixed alkyls derived from fatty materials, cracked paraffin wax olefins and polymers of lower mono olefins. While the number of sulphonic acid groups present on the nucleus may vary, it is usual to have only one such group present in order to preserve as much as possible a balance between hydrophilic and hydrophobic portions of the molecule.

More specific examples of suitable alkyl aromatic sulphonate detergents are propyl naphthalene sulphonates, mixed butyl naphthalene sulphonates, tetrahydronaphthalene sulphonates, butyl diphenyl sulphonates and butyl phenyl-phenol sulphonates. It is preferred, however, to use higher alkyl aromatic sulphonates rather than lower alkyl substituted detergents. Typical examples of this preferred class are sulphonated and alkylated benzenoid compounds wherein the alkyl group has at least 8 and preferably 10 to 16 carbon atoms. The benzene ring may possess other substituents, for instance alkyl or hydroxy groups.

Other suitable anionic detergents are surface-active sulphated or sulphonated aliphatic compounds, preferably having 8 to 22 carbon atoms. Examples are sulphuric acid esters of polyhydric alcohols incompletely esterified with higher fatty acids, e.g.

coconut oil monoglyceride monosulphate and tallow diglyceride monosulphate; long chain pure or mixed alkyl sulphates, e.g. lauryl sulphate, and cetyl sulphate; hydroxy sulphonated higher fatty acid esters, e.g. higher fatty acid esters of low molecular weight alkylol sulphonic acids such as fatty acid esters of isethionic acid; fatty acid ethanolamide sulphates; and fatty acid amides of amino alkyl sulphonic acids, e.g. lauric amide of taurine. It is preferred to use sulphated aliphatic compounds containing at least 8 carbon atoms, especially those having 12 to 22 carbon atoms in the molecule.

Although anionic detergents are preferred, cationic non-ionic and amphoteric detergents may be employed as all or part of the detergent component, provided they are compatible with the other components of the composition under the conditions of storage and use thereof.

Examples of cationic detergents are long chain alkyl quaternary ammonium compounds, e.g. cetyl quaternary ammonium salts, such as cetyl trimethyl ammonium chloride and cetyl pyridinium chloride.

Non-ionic detergents include polyoxyethylene ethers of alkyl aromatic hydroxy compounds (e.g. alkylated polyoxyethylene phenols), polyoxyethylene ethers of long chain aliphatic alcohols, polyoxyethylene ethers of hydrophobic propylene oxide polymers, and higher alkyl amine oxides such as lauryl dimethyl amine oxide.

Examples of amphoteric detergents are salts of higher alkyl beta amino propionic acids, e.g. sodium N-lauryl beta alanine; higher alkyl substituted betaines such as lauryl dimethylammonium acetic acid; and imidazoline type detergents exemplified by the disodium salt of 1-(2 hydroxyethyl)-1-(carboxymethyl)-2-(undecyl)-4,5 dihydroimidazolinium hydroxide.

The anionic and cationic detergents are commonly used in the form of their water-soluble salts. For the synthetic anionic detergents, the alkali metal (e.g. sodium or potassium) salts are preferred, though other salts such as ammonium, amine, alkylolamine and alkaline earth metal (e.g. calcium or magnesium) salts may be used if desired. For the cationic detergents the chloride, sulphate and acetate are examples of salts which may be employed satisfactorily.

The amount of organic detergent to be used in the compositions is from 0.5% up to 15%, preferably from 1% to 5%. Commercial detergent compositions in which these organic detergents are the active ingredients and are compounded with other materials such as sodium sulphate and various phosphates may be employed with satisfactory results.

The compositions may also contain inorganic water-soluble builder salts, such as alkali metal silicates, nitrates, chlorides, carbonates, bicarbonates, phosphates and borates in suitable amounts, usually up to 25% and preferably not more than 15% by weight. The preferred builders are alkaline water-soluble buffer salts, examples being sodium carbonate, sodium bicarbonate, sodium metasilicate, trisodium phosphate, tetrasodium pyrophosphate, sodium tripolyphosphate and the corresponding potassium salts. These buffer salts are employed in amounts within the range specified and preferably such that the final product exhibits a pH in water of from 8.5 to 13, preferably at least 11. There may also be present minor amounts, e.g. 0.01 to 5% by weight of sequestering agents such as nitrilotriacetic acid or ethylene diaminetetraacetic acid, fillers such as wood pulp, sawdust, magnesite or whiting, sodium carboxymethylcellulose, anticaking agents and optical brighteners.

In the preparation of scouring cleansers in accordance with the present invention it is desirable that all constituents be of the same fine particle size as the abrasive constituent. They may be ground in an attrition mill if necessary in order to ensure the preparation of a uniform product of smooth appearance.

The following examples illustrate the present invention. All the solid constituents employed in the compositions of these examples had a particle size of less than 0.5 mm, and at least 8% by weight of the abrasive particles had a diameter in the range of 0.037 to 0.15 mm.

EXAMPLE I

Part i: Preparation of brominated trisodium phosphate.

A solution of 30 parts of sodium hydroxide and 100 parts of water was chilled to a temperature of about 0°C. Forty parts of bromine were added thereto slowly with mixing adequate to ensure that the pH of the system was continually above 13. The temperature of the reaction mixture was maintained between 0°C and -10°C. The final solution contained about 17.5% sodium hypobromite by analysis, and 15.1% sodium bromide, 5.9% sodium hydroxide and 61.5% water by calculation.

72.8 parts of anhydrous trisodium orthophosphate were added slowly to 25 parts of the foregoing sodium hypobromite solution diluted with 72.4 parts of water. The addition was carried out at a temperature below 20°C. A solid product was formed which contains approximately 1.28% sodium hypobromite (by analysis) in the form of brominated trisodium phosphate.

Part ii: Abrasive scouring cleanser.

An abrasive scouring cleanser was prepared by mixing intimately the following dry constituents:

	%
Silica (at least 99% by weight passed through a wire sieve in which the openings between the wires were 0.074 mm)	48.3
10 Brominated trisodium phosphate (prepare as above)	42.0
Sodium dodecyl benzene sulphonate	3.0
This composition exhibited a pH of about 11.7 when surried with water.	

EXAMPLES II, III, IV, V and VI

In these Examples, summarized in Table I, the same silica and sodium dodecyl benzene sulphonate (SDBS) were used as in Example I. The calcium hypobromite of Example V was prepared by chilling a slurry of 14 parts of calcium hydroxide and 50 parts of water to a temperature of about 0°C, adding 20 parts of bromine thereto slowly with rapid stirring while the temperature was maintained near 0°C, filtering the reaction mixture and recovering a bright yellow solid. The solid was dried and analyzed. It is found to contain 22.9% calcium hypobromite and 1.82% calcium bromate (by analysis), the remaining solids consisting principally of calcium hydroxide and some calcium bromide.

TABLE I

EXAMPLE	Silica %	SDBS %	Sodium Sulphate %	Sodium Silicate %	Hypobromite %	See Footnote
II	89.8	4.0	2.3	0.7	0.2	(1)
III	92.2	4.0	2.3	0.7	0.8	(2)
IV	80.0	3.5	3.1	1.5	6.4	(3)
40 V	89.12	3.0	2.45		0.91	(4)
VI	87.05	3.0	2.45		3.5	(5)

Footnotes

(1) Tribromocyanuric acid. Also contained 3% trisodium phosphate.

(2) Potassium monobromo monochloro cyanurate.

45 (3) N - monobromo - N¹ - monochloro - 5,5 - dimethyl hydantoin. Also contained 5.5% pentasodium tripolyphosphate.

(4) Tribromocyanuric acid. Also contained 3.95% trisodium phosphate, 0.25% inert coloured pigments.

(5) Calcium hypobromite. Also contained 4% trisodium phosphate.

50 EXAMPLE VII

	%
Feldspar (at least 99% by weight passed through a wire sieve in which the openings between the wires pere 0.74 mm.)	90.7
55 Trisodium phosphate	0.4
Sodium chloride	0.1
Sodium carbonate	0.6
60 Sodium soap (mixed tallow and coconut oil soaps in 50—50 proportion)	3.2
N-bromosuccinimide	5.0

EXAMPLE VIII

	%
Silica of Example I	88.92
Sodium lauryl sulphate	3.55
65 Sodium sulphate	2.2
Pentasodium tripolyphosphate	3.7
Sodium silicate	1.1
Dibromocyanuric acid	0.25
Melamine	0.20
70 Perfume	0.08

EXAMPLE IX

Example VIII was repeated, replacing the dibromocyanuric acid by an equal weight of potassium dibromocyanurate.

5 WHAT WE CLAIM IS:—

1. A abrasive scouring cleanser composition in the form of a dry powder, comprising at least 45% of a water-insoluble inorganic siliceous abrasive material having a particle size of less than 0.5 mm, 0.1 to 50% of a dry water-soluble compound which, on dissolution in water, liberates hypobromite ions, and 0.5 to 15% of a water-soluble organic detergent stable in the presence of the hypobromite liberating compound.

2. An abrasive scouring cleanser composition as claimed in Claim 1 which has a pH in water of at least 11.

3. An abrasive scouring cleanser composition as claimed in Claim 1 or Claim 2 phate as hereinbefore defined, as the dry which contains brominated trisodium phosphate water-soluble compound.

4. An abrasive scouring cleanser composition as claimed in Claim 1 or Claim 2 which contains brominated cyanuric acid as the dry water-soluble compound.

5. An abrasive scouring cleanser composition as claimed in Claim 1 or Claim 2 in which there is at least 85% of the water-

insoluble inorganic siliceous abrasive material, the water-soluble compound is an N-bromoisimide within the range of 0.1 to 15% and the water-soluble organic detergent is anionic. 35

6. An abrasive scouring cleanser composition as claimed in Claim 1 or Claim 2 in which the dry water-soluble compound liberates both hypobromite ions and hypochlorite ions and the water-soluble organic detergent is stable in the presence of the hypobromite and hypochlorite liberating compound. 40

7. An abrasive scouring cleanser composition as claimed in Claim 6 in which the hypobromite and hypochlorite liberating compound is an N-bromo-N¹-chloroisimide. 45

8. An abrasive scouring cleanser composition as claimed in Claim 7 in which the imide is an N-bromo-N¹-chlorocyanuric acid. 50

9. An abrasive scouring cleanser composition as claimed in Claim 1 and substantially as described. 55

10. An abrasive scouring cleanser composition substantially as described in any of the Examples.

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Chartered Patent Agents,
Agents for the Applicants.

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%

38.92

3.55 65

2.2

3.7

1.1

0.25

0.20 70

0.08

EXAMPLE IX

Example VIII was repeated, replacing the dibromocyanuric acid by an equal weight of potassium dibromocyanurate.

5 WHAT WE CLAIM IS:—

1. A abrasive scouring cleanser composition in the form of a dry powder, comprising at least 45% of a water-insoluble inorganic siliceous abrasive material having a particle size of less than 0.5 mm, 10 0.1 to 50% of a dry water-soluble compound which, on dissolution in water, liberates hypobromite ions, and 0.5 to 15% of a water-soluble organic detergent stable in the presence of the hypobromite liberating compound.

2. An abrasive scouring cleanser composition as claimed in Claim 1 which has a pH in water of at least 11.

20 3. An abrasive scouring cleanser composition as claimed in Claim 1 or Claim 2 phate as hereinbefore defined, as the dry which contains brominated trisodium phospho-water-soluble compound.

25 4. An abrasive scouring cleanser composition as claimed in Claim 1 or Claim 2 which contains brominated cyanuric acid as the dry water-soluble compound.

30 5. An abrasive scouring cleanser composition as claimed in Claim 1 or Claim 2 in which there is at least 85% of the water-

insoluble inorganic siliceous abrasive material, the water-soluble compound is an N-bromoimide within the range of 0.1 to 15% and the water-soluble organic detergent is anionic. 35

6. An abrasive scouring cleanser composition as claimed in Claim 1 or Claim 2 in which the dry water-soluble compound liberates both hypobromite ions and hypochlorite ions and the water-soluble organic detergent is stable in the presence of the hypobromite and hypochlorite liberating compound. 40

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9. An abrasive scouring cleanser composition as claimed in Claim 1 and substantially as described. 55

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* C L M S *

%

88.92

3.55 65

2.2

3.7

1.1

0.25

0.20 70

0.08