



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/US91/06752 <b>(22) International Filing Date:</b> 17 September 1991 (17.09.91) <b>(30) Priority data:</b> 0920594.9                      21 September 1990 (21.09.90) GB <b>(71) Applicant (for all designated States except US):</b> THE PROCTER & GAMBLE COMPANY [US/US]; One Protector and Gamble Plaza, Cincinnati, OH 45202 (US). <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only) :</b> WELCH, Rosemary, Jane [GB/GB]; 33 Thorncroft, Englefield Green, Surrey (GB). <b>(74) Agent:</b> REED, T., David; The Procter & Gamble Company, Ivorydale Technical Center, 5299 Spring Grove Avenue, Cincinnati, OH 45217-1087 (US).		<b>(81) Designated States:</b> AT (European patent), AU, BE (European patent), BR, CA, CH (European patent), DE (European patent), DK (European patent), ES (European patent), FI, FR (European patent), GB (European patent), GR (European patent), IT (European patent), JP, KR, LU (European patent), NL (European patent), SE (European patent), US.  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
<b>(54) Title:</b> CLEANSING COMPOSITIONS  <b>(57) Abstract</b>  <p>A personal cleansing composition comprising: a) from about 0.1 to about 16 % of an imidazolinium or ammonium amphoteric surfactant, b) from about 0.1 to about 16 % of an aminoalkanoate or iminodialkanoate amphoteric surfactant, c) optionally up to about 10 % anionic surfactant, d) from about 0.1 % to about 5 % of a dispersed insoluble silicone conditioning agent, and e) water, wherein the cleansing composition has a total surfactant concentration of from 0.2 % to 20 % of which at least 20 % comprises the mixture of a) and b). The composition provides excellent in-use and efficacy benefits including cleansing, conditioning and lathering together with improved mildness benefits to the skin, hair and ocular mucosae. It is particularly designed to be suitable for use on babies or children as a shampoo etc.</p>		

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### CLEANSING COMPOSITIONS

The present invention relates to cleansing compositions. In particular, it relates to foam-producing personal cleansing compositions suitable for simultaneously cleansing and conditioning the hair and/or the skin and which may be used, for example, in the form of shampoos, skin cleansers, foam bath preparations, shower products, etc. The cleansing compositions are particularly designed to be suitable for use by or for babies or children.

Foaming cosmetic compositions must satisfy a number of criteria including cleansing power, foaming properties and mildness/low irritancy with respect to the skin, hair and the ocular mucosae.

Skin is made up of several layers of cells which coat and protect the keratin and collagen fibrous proteins that form the skeleton of its structure. The outermost of these layers, referred to as the stratum corneum, is known to be composed of 250 Å protein bundles surrounded by 80 Å thick layers. Hair similarly has a protective outer coating enclosing the hair fibre which is called the cuticle. Anionic surfactants can penetrate the stratum corneum membrane and the cuticle and, by delipidization destroy membrane integrity. This interference with skin and hair protective membranes can lead to a rough skin feel and eye irritation and may eventually permit the surfactant to interact with the keratin and hair proteins creating irritation and loss of barrier and water retention functions.

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Ideal cosmetic cleansers should cleanse the hair or skin gently, without defatting and/or drying the hair and skin and without irritating the ocular mucosae or leaving skin taut after frequent use. Most lathering soaps, shampoos and bars fail in this respect.

Certain synthetic surfactants are known to be mild. However, a major drawback of most mild synthetic surfactant systems when formulated for shampooing or personal cleansing is poor lather performance compared to the highest shampoo and bar soap standards. Thus, surfactants that are among the mildest, such as sodium lauryl glyceryl ether sulfonate, (AGS), are marginal in lather. The use of known high sudsing anionic surfactants with lather boosters, on the other hand, can yield acceptable lather volume and quality but at the expense of clinical skin mildness. These two facts make the surfactant selection, the lather and mildness benefit formulation process a delicate balancing act.

Another factor which impacts on the mildness/lather benefit equation is that of providing hair and skin conditioning benefits. Thus in the case of shampoos, it is known to incorporate hair conditioning or grooming agents into the shampoo formula in order to improve the condition of the hair after shampooing, ie, to make the hair more manageable, to provide greater body and lustre, to prevent fly-away, to minimize static electricity in the hair, to improve the tactile impression of the hair, to improve the hair's softness etc.

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One class of hair conditioning agent which has received particular interest recently is the silicone class. See, for example, US-A-4741855, US-A-3849348, US-A-3990991, US-A-3822312 and US-A-4364837.

While the silicones as a class can provide excellent hair conditioning performance in a carefully formulated shampoo formula, they unfortunately also act to depress the lathering performance of the shampoo. Such foam suppression is disadvantageous since consumers prefer shampoos having good foam quality and volume. And while the effect of the silicone on lathering can be obviated by increasing the concentration of the detergent surface active agent, this as would be expected is again generally disadvantageous from the viewpoint of skin mildness. On the contrary, shampoo formulations designed for use primarily by or for babies or children are characterized by a relatively low level of mild surface active agent, in which situation the adverse effect of silicone on lathering becomes a particularly critical factor.

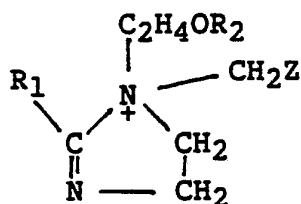
Another important factor in formulating silicone-containing shampoos and cleansers is that of product stability. In particular, it is important from the viewpoint of achieving optimum cleansing and conditioning performance that the silicone be maintained in product in the form of a dispersion which is stable to storage under varying storage conditions but which can deposit evenly onto the hair or skin during washing/shampooing and be retained thereon during subsequent rinsing. This in itself imposes formulation constraints which in turn can impact on the lathering and mildness performance of the shampoo or skin cleanser.

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Thus, these rather stringent requirements for cosmetic cleansers and shampoos limit the choice of surface-active agents, and final formulations represent some degree of compromise. Mildness is often obtained at the expense of effective cleansing, or lathering may be sacrificed for mildness, conditioning or product stability. Thus a need exists for cleansing products which will produce a foam which is abundant, stable and of high quality, which are effective hair and skin cleansers, which will condition the hair or skin, and which are very mild to the skin, hair and ocular mucosae.

The subject of the present invention is a foam-producing cleansing product suitable for personal cleansing of the skin or hair and which may be used as shampoos, skin cleansers, foam bath and shower products, etc. According to the invention, there is provided a cleansing composition comprising:

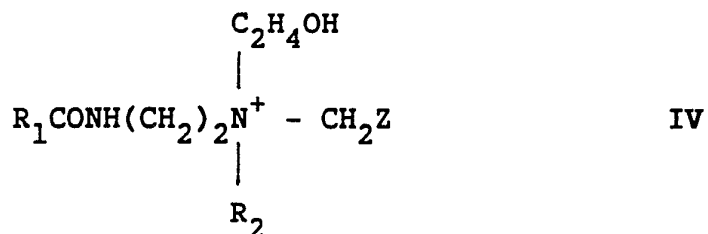
- (a) from about 0.1% to about 16% by weight of a first amphoteric surfactant selected from imidazolinium derivatives of formula I



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wherein  $\text{R}_1$  is  $\text{C}_7$ - $\text{C}_{22}$  alkyl or alkenyl,  $\text{R}_2$  is hydrogen or  $\text{CH}_2\text{Z}$ , each Z is independently  $\text{CO}_2\text{M}$  or  $\text{CH}_2\text{CO}_2\text{M}$ , and M is H, alkali metal, alkaline earth metal, ammonium or alkanolammonium; and/or ammonium derivatives of formula IV

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wherein  $\text{R}_1$ ,  $\text{R}_2$  and  $\text{Z}$  are as defined above;

- (b) from about 0.1% to about 16% by weight of a second amphoteric surfactant selected from aminoalkanoates of formula II



iminodialkanoates of formula III



and mixtures thereof, wherein  $n$  and  $m$  are numbers from 1 to 4, and  $\text{R}_1$  and  $\text{M}$  are independently selected from the groups specified in (a) above;

- (c) optionally up to about 10% of anionic surfactant;  
 (d) from about 0.1% to about 5% by weight of a dispersed insoluble silicone conditioning agent;  
 and  
 (e) water;

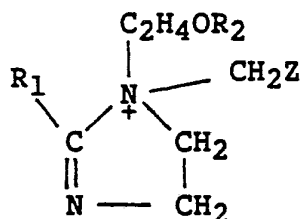
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wherein the cleansing composition has a total surfactant concentration of from about 0.2% to about 20% by weight and wherein the combined concentration of the first and second amphoteric surfactants comprises at least 20% by weight of the total surfactant concentration.

All concentrations and ratios herein are by weight of the cleansing composition, unless otherwise specified.

In a first aspect, the invention relates to a foam-producing cleansing composition with superior lathering characteristics (creaminess, abundance, stability) combined with excellent mildness to the hair, skin and ocular mucosae together with good stability, cleansing ability and conditioning performance. In a second aspect, the invention relates to a cleansing product comprising the defined cleansing composition packaged within a so-called "squeeze foamer" container - a compressible dispenser equipped with a dispensing head and liquid/air mixing means, from which the cleansing composition can be easily dispensed in the form of an aqueous foam by squeezing. The essential and optional features of the compositions and products of the invention are indicated below.

The cleansing compositions preferred for use herein comprise a mixture of two amphoteric surfactants, a first amphoteric surfactant being selected from imidazolinium surfactants of formula I

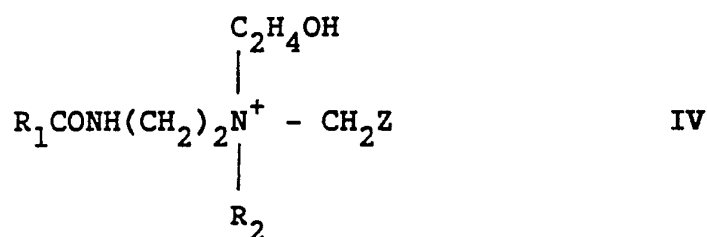


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wherein  $R_1$  is  $C_7$ - $C_{22}$  alkyl or alkenyl,  $R_2$  is hydrogen or  $CH_2Z$ , each  $Z$  is independently  $CO_2M$  or  $CH_2CO_2M$ , and  $M$  is H, alkali metal, alkaline earth metal, ammonium or alkanolammonium; and/or ammonium derivatives of formula IV



wherein  $R_1$ ,  $R_2$  and  $Z$  are as defined above;

and a second amphoteric surfactant being selected from:

aminoalkanoates of formula II



iminodialkanoates of formula III



and mixtures thereof, wherein  $n$  and  $m$  are numbers from 1 to 4, and  $R_1$  and  $M$  are independently selected from the groups specified above.

The cleansing compositions for use herein can also comprise other, preferably mild, surfactant components, notably, anionic surfactants. Preferred herein, however, are compositions in which the combined concentration of

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the first and second amphoteric surfactants is at least about 20%, and preferably at least about 50% by weight of the total surfactant concentration, this being desirable from the viewpoint of achieving optimum lathering characteristics. In preferred compositions, the mixture of the first and second amphoteric surfactants comprises at least about 60%, more preferably at least about 75% by weight of the total surfactant.

Suitable amphoteric surfactants of the first type are marketed under the trade name Miranol and are understood to comprise a complex mixture of species. Traditionally, the Miranols have been described as having the general formula I, although the CTFA Cosmetic Ingredient Dictionary, 3rd Edition indicates the non-cyclic structure IV. In practice, a complex mixture of cyclic and non-cyclic species is likely to exist and both definitions are given here for sake of completeness. Preferred for use herein, however, are the non-cyclic species.

Examples of suitable amphoteric surfactants for use as the first amphoteric surfactant include compounds of formula I and/or IV in which  $R_1$  is  $C_8H_{17}$  (especially iso-capryl),  $C_9H_{19}$  and  $C_{11}H_{23}$  alkyl. Especially preferred are the compounds in which  $R_1$  is  $C_9H_{19}$ ,  $Z$  is  $CO_2M$  and  $R_2$  is  $H$ ; the compounds in which  $R_1$  is  $C_{11}H_{23}$ ,  $Z$  is  $CO_2M$  and  $R_2$  is  $CH_2CO_2M$ ; and the compounds in which  $R_1$  is  $C_{11}H_{23}$ ,  $Z$  is  $CO_2M$  and  $R_2$  is  $H$ .

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In CTFA nomenclature, materials preferred for use in the present invention include cocoamphocarboxypropionate, cocoamphocarboxy propionic acid, and especially cocoamphocarboxyglycinate (otherwise referred to as cocoamphodiacetate). Specific commercial products include those sold under the trade names of Miranol C2M Conc. N.P., Miranol C2M Conc. O.P., Miranol C2M SF, Miranol CM Special (Miranol, Inc.); Alkateric 2CIB (Alkaril Chemicals); Amphoterger W-2 (Lonza, Inc.); Monateric CDX-38, Monateric CSH-32 (Mona Industries); Rewoteric AM-2C (Rewo Chemical Group); and Schercotic MS-2 (Scher Chemicals).

It will be understood that a number of commercially-available amphoteric surfactants of this type are manufactured and sold in the form of electroneutral complexes with, for example, hydroxide counterions or with anionic sulfate or sulfonate surfactants, especially those of the sulfated  $C_8$ - $C_{18}$  alcohol,  $C_8$ - $C_{18}$  ethoxylated alcohol or  $C_8$ - $C_{18}$  acyl glyceride types. Preferred from the viewpoint of mildness and product stability, however, are compositions which are essentially free of anionic sulfate or sulfonate surfactants or wherein the equivalent ratio of the first amphoteric surfactant to anionic sulfate and/or sulfonate surfactant is less than about 1:1.

Examples of suitable amphoteric surfactants for use as the second amphoteric surfactant include salts, especially the triethanolammonium salts and salts of N-lauryl-beta-amino propionic acid and N-lauryl-imino-dipropionic acid. Such materials are sold under the tradename Deriphath by General Mills and Mirataine by Miranol Inc.

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The cleansing compositions preferably contain from about 0.5% to about 10% by weight, more preferably from about 0.5% to about 4% by weight of each of the first and second amphoteric surfactants. The weight ratio of first amphoteric surfactant : second amphoteric surfactant is preferably from about 10:1 to about 1:10, more preferably from about 5:1 to about 1:5, especially from about 3:1 to about 1:3, the concentrations and weight ratios of said amphoteric surfactants being based herein on the uncomplexed form of said species.

The compositions of the invention can comprise or be supplemented by surfactants other than the amphoteric surfactants specified above. However, the total level of surfactant in the compositions herein should generally lie in the range from about 0.2% to about 20% by weight, preferably from about 1% to about 16%, more preferably from about 1% to about 8% and especially from about 2% to about 6% by weight. It is a feature of the products of the invention that they can provide excellent foam stability and creaminess, even at low levels of cleansing surfactant.

A preferred optional surfactant in the compositions herein is an anionic surfactant. This is preferably present in a level of from about 0.1 to 10%, more preferably from about 0.5 to 5% and especially from about 1% to about 3% by weight. Preferred anionic surfactants for inclusion herein are the fatty acid condensation products of proteins, degraded proteins or amino acids or mixtures of such condensation products. In highly preferred embodiments, the fatty acid condensation products are selected from:

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- (i) condensation products of  $C_8-C_{12}$ , preferably  $C_{10}-C_{18}$  fatty acids with hydrolysed proteins,
- (ii) fatty acid sarcosinates derived from  $C_8-C_{22}$ , preferably  $C_{10}-C_{18}$  fatty acids, and
- (iii) mixtures thereof.

Other suitable mild synthetic detergent surfactants useful in the cleansing compositions include methyl acyl taurates; fatty acyl glycinate; N-acyl glutamates; alkyl glucosides; alkyl glycerides and ethoxylated glycerides; acyl isethionates; alkyl sulfosuccinates; alpha-sulfonated fatty acids, their salts and/or their esters; alkyl phosphate esters; ethoxylated alkyl phosphate esters; alkyl ether sulfates; glucose esters and alkylated, e.g., methyl glucose esters; mixtures of alkyl ether sulfates and alkyl amine oxides; betaines; sultaines; and mixtures thereof. Included in the surfactants are the alkyl ether sulfates with up to 12 ethoxy groups, especially ammonium and sodium lauryl ether sulfates. Alkyl and/or acyl chain lengths for these surfactants are  $C_8-C_{22}$ , preferably  $C_{10}-C_{18}$ .

Suitable mild synthetic detergent surfactants of these types include:

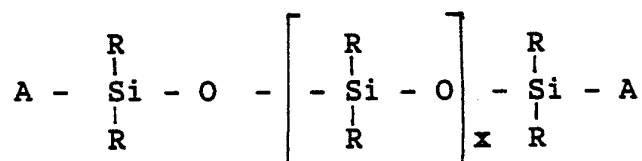
$C_8-C_{18}$  monoalkyl phosphate salts, preferably at least partly in the form of their polyalkanol, e.g., N,N,N',N'-tetraethanol-(ethylenediamine) (Quadrol) salts; N-( $C_8-C_{18}$  fatty acyl) glutamates;  $C_8-C_{18}$  fatty acyl glycinate and/or their mixtures with additional anionic synthetic detergent surfactant, and/or mixtures thereof.

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The cleansing compositions of the invention also contain a dispersed, insoluble silicone conditioning agent, the term "insoluble" herein meaning that the silicone is insoluble in the matrix of the cleansing composition under ambient (25°C) conditions. The level of silicone in the compositions of the invention is from about 0.1% to about 5%, preferably from about 0.2% to about 3%, more preferably from about 0.5% to about 1.5% by weight. It is a feature of the compositions of the invention that they can provide fully effective hair conditioning at levels of silicone as much as 50% or more below those levels which have traditionally been utilised in the art. The silicone is especially valuable herein from the viewpoint of reducing eye-sting and providing enhanced mildness to the ocular mucosae.

Silicones which are suitable for use herein include non-volatile polyalkyl and polyaryl siloxane gums and fluids, volatile cyclic and linear polyalkylsiloxanes, polyalkoxylated silicones, amino and quaternary ammonium modified silicones, rigid cross-linked and reinforced silicones and mixtures thereof.

Nonvolatile silicone gums and fluids are particularly useful as the conditioning agent component in the compositions of the present invention. Examples of such materials include polyalkyl or polyaryl siloxanes with the following structure:



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wherein R is alkyl or aryl, and x is an integer from about 7 to about 8,000. A represents groups which block the ends of the silicone chains.

The alkyl or aryl groups substituted on the siloxane chain (R) or at the ends of the siloxane chains (A) may have any structure as long as the resulting silicones remain fluid at room temperature, are hydrophobic, are neither irritating, toxic nor otherwise harmful when applied to the hair or skin, are compatible with the other components of the composition, are chemically stable under normal use and storage conditions, and are capable of being deposited on and of conditioning hair or skin.

Suitable A groups include methyl, methoxy, ethoxy, propoxy, and aryloxy. The two R groups on the silicone atom may represent the same group or different groups. Preferable, the two R groups represent the same group. Suitable R groups include methyl, ethyl, propyl, phenyl, methylphenyl and phenylmethyl. The preferred silicones are polydimethylsiloxane, polydiethylsiloxane, and polymethylphenylsiloxane. Polydimethylsiloxane is especially preferred.

Polyalkylsiloxanes that may be used herein include, for example, polydimethylsiloxanes with viscosities ranging from 5 to 100,000  $\text{mm}^2 \cdot \text{s}^{-1}$  (centistokes) at 25°C. These siloxanes are available, for example, from the General Electric Company as the Vicasil (RTM) series and from Dow Corning as the Dow Corning 200 series. The viscosity can be measured by means of a glass capillary viscometer as set forth in Dow Corning Corporate Test Method CTM0004, July 20, 1970.

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Polyalkylaryl siloxanes that may be used herein include, for example, polymethylphenylsiloxanes having viscosities of 15 to 65  $\text{mm}^2.\text{s}^{-1}$  (centistokes) at 25°C. These siloxanes are available, for example, from the General Electric Company as SF 1075 methyl phenyl fluid or from Dow Corning as 556 Cosmetic Grade Fluid.

Other silicones suitable for use herein, albeit less preferred, include the volatile cyclic and linear polyalkylsiloxanes, especially the methylated cyclic silicones having four and five ring siloxane moieties and the linear polydimethylsiloxanes having less than nine siloxane moieties.

Polyalkoxylated silicones that can be used herein include, for example, a dimethyl polyoxyalkylene ether copolymer fluid having a nominal viscosity of 1200 to 1500  $\text{mm}^2.\text{s}^{-1}$  (centistokes) at 25°C. Preferred compounds of this type are polypropylene oxide modified dimethylpolysiloxanes (e.g. Dow Corning DC-1248) although ethylene oxide or mixtures of ethylene oxide and propylene oxide can also be used.

Silicones suitable herein also include cationic (e.g. amino and quaternary ammonium modified) silicones.

Suitable cationic silicones include:

- 1) those referred to in the CTFA Dictionary, 3rd edition 1982 under the name of Amodimethicone, for example, the polymer sold under the trade name Dow Corning DC 929;
- 2) trimethylsilylamodimethicone described in EP-A-95238 and which is sold by Dow Corning under the trade name Dow Corning Q2 7224;



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3) the compounds described in US-A-4185017 and which are sold by Union Carbide under the trade name Ucar Silicone ALE 56.

Silicone conditioning agent materials also useful in the compositions of the present invention are silicone polymer materials which provide both style retention and conditioning benefits to the hair. These materials comprise rigid silicone polymers.

Some examples of such materials include filler reinforced polydimethylsiloxane gums including those having end groups such as hydroxyl; cross linked siloxanes, such as organic substituted silicone elastomers; organic substituted siloxane gums, including those having end groups such as hydroxyl; and resin reinforced siloxanes.

The rigid silicone polymers useful in the present invention have complex viscosities of at least  $2 \times 10^5$  poise (P), preferably about  $1 \times 10^7$  poise, where complex viscosity is measured by subjecting a sample to oscillatory shear at a fixed frequency of 0.1 rad/sec at 25°C using a Rheometric Fluids Spectrometer measuring films having a thickness of about 1 millimeter. The resulting viscous and elastic force responses are combined to determine the complex modulus which is divided by the imposed frequency to compute the complex viscosity.

Preferably the silicone conditioning agent comprises a polydimethylsiloxane gum, having a viscosity greater than about 1,000,000 centipoise and a dimethicone fluid having

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a viscosity of from about 10 centipoise to about 100,000 centipoise, wherein the ratio of gum to fluid is from about 30:70 to about 70:30, preferably from about 40:60 to about 60:40.

The compositions herein preferably also contain from about 0.1% to about 5%, preferably from about 0.5% to about 2% by weight of a silicone suspending agent. The suspending agent can be selected from long chain acyl derivatives and long chain alkylamine oxides, said acyl derivative or amine oxide being present in the cleansing composition in crystalline form, xanthan gum, hydrophobically-modified acrylic acid polymers and mixtures thereof.

Suitable suspending agents of the long chain acyl and amine oxide varieties are described in US-A-4,741,855 to Grote et al, issued May 3, 1988. Included are esters, especially ethylene glycol esters of fatty acids having from about 16 to about 22 carbon atoms, as well as other fatty acid esters (e.g. polyethyleneglycol esters having up to about 3 ethylene oxide moieties in the glycol chain) which can be formulated in the cleansing composition in crystalline form.

Preferred are the ethylene glycol stearates, both mono and distearate, but particularly the distearate containing less than about 7% of the mono stearate. Other suspending agents found useful are alkanolamides of fatty acids, having from about 16 to 22 carbon atoms, preferably from 16 to 18 carbon atoms. Preferred alkanolamides are stearic monoethanolamide, stearic diethanolamide, stearic monoisopropanolamide and stearic monethanolamide

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stearate. Other long chain acyl derivatives include long chain esters of long chain fatty acids (e.g., stearyl stearate, cetyl palmitate, etc.); glyceryl esters (e.g. glyceryl distearate) and long chain esters of long chain alkanolamides (e.g. stearamide DEA distearate, stearamide MEA stearate). Still other suitable suspending agents are alkyl ( $C_{16-22}$ ) dimethylamine oxides such as stearyl dimethylamide oxide.

Interestingly, although a number of long chain acyl derivatives such as ethylene glycol distearate, may suppress lather in shampoo compositions, it has now been found that inclusion of this material in the present mild compositions surprisingly does not suppress lather. This is yet another exhibition of the unique robustness of the lathering properties of the present compositions.

Another useful suspending agent for the silicones of the present compositions is xanthan gum as described in U.S. Patent 4,788,006, Bolich et al., issued June 5, 1984. The combination of long chain acyl derivatives and xanthan gum as a suspending system for silicone is described in U.S. Patent 4,704,272, Oh et al., issued November 3, 1987, and may also be used in the present compositions.

Preferred for use herein from the viewpoint of reducing eye-sting and providing enhanced mildness to the ocular mucosae is a hydrophobically-modified cross-linked polymer of acrylic acid having amphipathic properties as marketed by B.F. Goodrich under the trade name Carbopol 1342, Penulem TR1 and Penulem TR2. Combinations of these polymers with xanthan gum and/or a crystalline long chain acyl derivative such as ethylene glycol distearate can also be used, although is less preferred.

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The compositions of the invention preferably also contain a hydrophilic (non-amphipathic) polymeric thickener at a level from about 0.01% to about 5%, preferable from about 0.04% to about 2% and especially from about 0.05% to about 1%. The polymeric thickener is found to be valuable for enhancing the creaminess and quality of the foam without adversely affecting product dispensing characteristics. The polymers may also have a hair or skin conditioning utility.

Suitable polymers are high molecular weight materials (mass-average molecular weight determined, for instance, by light scattering, being generally from about 2,000 to about 3,000,000 preferably from about 5,000 to about 1,000,000).

The viscosity of the final composition (Brookfield RVT, Cone Speed 1 rpm, 25°C) is preferably at least about 150 cps, more preferably from about 500 to 12,000 cps, especially from about 1,000 to about 10,000 cps. Highly preferred compositions herein, however, especially those based on hydrophobically modified polyacrylic acids as silicone suspending agent, have a viscosity in the range from about 4,000 to about 9,000 cps.

Useful polymers are the cationic, nonionic, amphoteric, and anionic polymers useful in the cosmetic field. Preferred are cationic and nonionic polymers used in the cosmetic fields as hair or skin conditioning agents.

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Representative classes of polymers include cationic and nonionic polysaccharides; cationic and nonionic homopolymers and copolymers derived from acrylic and/or methacrylic acid; cationic and nonionic cellulose resins; cationic copolymers of dimethyldiallylammonium chloride and acrylic acid; cationic homopolymers of dimethyldiallylammonium chloride; cationic polyalkylene and ethoxypolyalkylene imines; quaternized silicones, and mixtures thereof.

By way of exemplification, cationic polymers suitable for use herein include cationic guar gums such as hydroxypropyl trimethyl ammonium guar gum (d.s. of from 0.11 to 0.22) available commercially under the trade names Jaguar C-14-S(RTM) and Jaguar C-17(RTM, and also Jaguar C-16 (RTM), which contains hydroxypropyl substituents (d.s. of from 0.8 - 1.1) in addition to the above-specified cationic groups, and quaternized cellulose ethers available commercially under the trade names Ucare Polymer JR and Celquat. Other suitable cationic polymers are homopolymers of dimethyldiallylammonium chloride available commercially under the trade name Merquat 100, copolymers of dimethyl aminoethylmethacrylate and acrylamide, copolymers of dimethyldiallylammonium chloride and acrylamide, available commercially under the trade names Merquat 550 and Merquat S, quaternized vinyl pyrrolidone acrylate or methacrylate copolymers of amino alcohol available commercially under the trade name Gafquat, and polyalkyleneimines such as polyethylenimine and ethoxylated polyethylenimine.

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Preferred polymeric thickeners for the use herein include hydroxyethyl cellulose (e.g. Natrasol 250MXR, Natrasol 250HHR); methyl cellulose; hydroxypropyl methyl cellulose; polymers of saccharides or oligosaccharides with compatible synthetic monomers; quaternized polycarboxylates; and starches and starch derivatives.

The cleansing compositions can optionally include a hair or skin moisturizer. The preferred level of moisturizer is from about 3% to about 40% by weight. In preferred embodiments, the moisturizer is nonocclusive and is selected from:

1. water-soluble liquid polyols;
2. essential amino acid compound found naturally occurring in the stratum corneum of the skin; and
3. water-soluble nonpolyol nonocclusives and mixtures thereof.

Some examples of more preferred nonocclusive moisturizers are glycerine, polyethylene glycol, propylene glycol, sorbitol, polyethylene glycol and propylene glycol ethers of methyl glucose (e.g. methyl glucan-20), polyethylene glycol and propylene glycol ethers of lanolin alcohol (e.g. Solulan-75), sodium pyrrolidone carboxylic acid, lactic acid, urea, L-proline, guanidine, pyrrolidone and mixtures thereof. Of the above, glycerine is highly preferred.

Examples of other water-soluble nonocclusive moisturizers include water-soluble hexadecyl, myristyl, isodecyl or isopropyl esters of adipic, lactic, oleic, stearic, isostearic, myristic or linoleic acids, as well as many of their corresponding alcohol esters (sodium

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isostearyl-2-lactylate, sodium capryl lactylate), hydrolyzed protein and other collagen-derived proteins, aloe vera gel and acetamide MEA.

A number of additional optional materials can be added to the cleansing compositions. Such materials include proteins and polypeptides and derivatives thereof; water-soluble or solubilizable preservatives such as Germall 115, methyl, ethyl, propyl and butyl esters of hydroxybenzoic acid, EDTA, Euxyl (RTM) K400, Bronopol (2-bromo-2-nitropropane-1,3-diol); other moisturizing agents such as hyaluronic acid, chitin, and starch-grafted sodium polyacrylates such as Sanwet (RTM) IM-1000, IM-1500 and IM-2500 available from Celanese Superabsorbent Materials, Portsmouth, VA, USA and described in USA-A-4,076,663; solvents such as hexylene glycol and propylene glycol; low temperature phase modifiers such as ammonium ion sources (e.g.  $\text{NH}_4\text{Cl}$ ); colouring agents; pearlescers such as  $\text{TiO}_2$ -coated mica; perfumes and perfume solubilizers etc. Conventional nonionic emollients can be included as additional skin and hair conditioning agents at levels up to about 10%, preferably from about 1% to about 6%. Such materials include, for example, mineral oils, fatty sorbitan esters (see US-A-3988255, Seiden, issued October 26th 1976), lanolin and lanolin derivatives, esters such as isopropyl myristate and triglycerides such as coconut oil. Water is also present at a level of from about 60% to about 99% preferably at least about 75% by weight of the compositions herein.

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The pH of the compositions is preferably from about 4 to about 9, more preferably from about 4.5 to about 8.5, pH being controlled, for example, using a citrate buffer system.

The cleansing compositions herein can be packaged in conventional bottle or sachet form or alternatively in a compressible, non-aerosol dispenser of the so-called "squeeze-foamer" type which comprises a reservoir, a dispensing head, liquid/air mixing means and preferably, homogenizing means and non-return valve means. In squeeze foamer product executions, however, the compositions are preferably formulated with a lower viscosity in the range from about 1 to about 1 cps (Brookfield LVT, UL adaptor, 70°F, 60 rpm, spindle speed corrected).

Squeeze foamer packages are well known as exemplified by the disclosures in the following patents:  
US-A-3,709,437 (Wright, issued January 9th, 1973);  
US-A-3,937,364 (Wright, issued February 10th, 1976);  
US-A-4,022,351 (Wright, issued May 10th, 1977);  
US-A-4,147,306 (Bennett, issued April 3rd, 1979);  
US-A-4,184,615 (Wright, issued January 22nd 1980);  
US-A-4,598,862 (Rice, issued July 8th, 1986);  
US-A-4,615,467 (Grogan et al., issued October 7th, 1986);  
and FR-A-2,604,622 (Verlhulst, published April 8th, 1988).

The above packages do not use any propellant and are therefore safe for the consumer and the environment. The cleansing composition is placed in the container reservoir which may for instance, take the form of a plastic squeeze bottle. Squeezing the container reservoir with the hand




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forces the composition through liquid/air mixing means where the composition is mixed with air and then preferably through a homogenizing means that makes the foam more homogeneous and controls the consistency of the foam. The foam is then discharged as a uniform, non-pressurized aerated foam through the dispensing head of the dispenser.

The minimum force to activate the squeeze foamer is about 1 psig, preferably from about 2 psig to about 15 psig. The minimum force is related to the size of the channels in the dispenser, the viscosity of the composition, etc.

In general, the density of the foam should be between about 0.002 and about 0.25 g/cc, preferably between about 0.01 and about 0.07 g/cc. Foam density is inversely related to foam creaminess so lower foam densities are preferred.



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The invention is illustrated by the following non-limiting examples.

In the examples, all concentrations are on a 100% active basis and the abbreviations have the following designation:

Amphoteric A	Miranol CM - the amphoteric of formula I and/or IV in which $R_1$ is coconut alkyl, $R_2$ is H, and Z is $CO_2Na$ .
Amphoteric B	Miranol C2M Conc. N.P.- the amphoteric of formula I and/or IV in which $R_1$ is coconut alkyl, $R_2$ is $CH_2CO_2Na$ and Z is $CO_2Na$ (cocoamphocarboxyglycinate)
Amphoteric C	Sodium N-lauryl-beta-amino propionate.
Amphoteric D	Sodium N-lauryl-beta-iminodipropionate.
Carbopol 1342	Hydrophobically-modified acrylic acid polymer marketed by B.F. Goodrich.
Polymer 1	Hydroxyethylcellulose (HEC) Gum [Natrasol 250 HHR] Molecular weight about 1,000,000.
EGDS	Ethyleneglycol distearate
Anionic 1	Potassium Coco Hydrolysed Animal Protein.
Anionic 2	Palm kernal oil fatty acid sarcosinate.
Silicone	Dimethicone gum/fluid blend
Preservative	DMDM Hydantoin
Pearlescer	$TiO_2$ -coated mica

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EXAMPLES I to V

The following are mild shampoo compositions which are representative of the present invention

	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>
Amphoteric A	-	5.0	-	-	1.5
Amphoteric B	1.4	-	1.8	1.8	-
Amphoteric C	-	2.0	-	-	4.4
Amphoteric D	4.2	-	2.2	5.2	-
Anionic 1	-	-	5.4	-	3.0
Anionic 2	-	-	2.5	-	3.0
Carbopol 1342	0.2	0.2	0.4	0.2	-
Polymer 1	1.0	0.8	-	1.0	0.8
EGDS	-	-	1.0	-	1.0
Xanthan Gum	-	-	0.3	-	0.5
Silicone	1.0	1.5	2.0	1.0	1.5
EDTA	0.1	0.1	0.1	0.1	0.1
Preservative	0.15	0.15	0.1	0.2	0.2
Pearlescer	0.2	-	-	0.2	0.2
Perfume	1.0	1.0	1.0	1.0	1.0
Water	-----To 100-----				
pH	-----7-----				

Compositions I, II and IV are prepared by forming a cold (80°F) premix of the silicone with a portion of Amphoteric C or D and adding the premix and the perfume to a cold (80°F) main mix of all remaining components.

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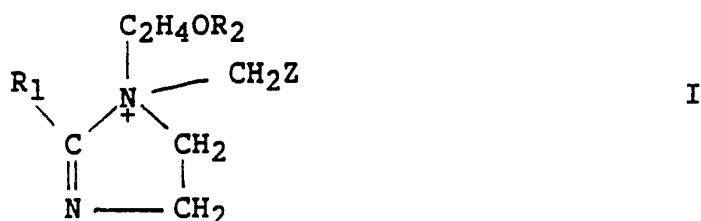
Compositions III and V are made similarly but the Carbopol and xanthan gum are dissolved in the main mix at 75° - 80° C prior to cooling to ambient temperature, the EGDS is predissolved in an aqueous solution of the anionic surfactant at 75° - 80° C and allowed to cool to ambient temperature with rapid stirring to form a crystalline EGDS dispersion, and the EGDS and silicone premix are then added to the main mix.

The products provide excellent in-use and efficacy benefits including cleansing, conditioning and lathering together with improved mildness benefits to the skin, hair and ocular mucosae.

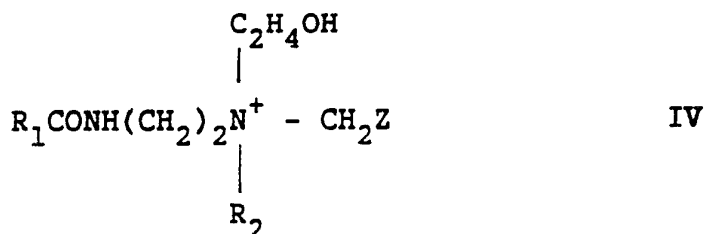
CLAIMS

1. A personal cleansing composition comprising:

- (a) from about 0.1% to about 16% by weight of a first amphoteric surfactant selected from imidazolinium derivatives of formula I



wherein  $\text{R}_1$  is  $\text{C}_7\text{-C}_{22}$  alkyl or alkenyl,  $\text{R}_2$  is hydrogen or  $\text{CH}_2\text{Z}$ , each Z is independently  $\text{CO}_2\text{M}$  or  $\text{CH}_2\text{CO}_2\text{M}$ , and M is H, alkali metal, alkaline earth metal, ammonium or alkanolammonium; and/or ammonium derivatives of formula IV



wherein  $\text{R}_1$ ,  $\text{R}_2$  and Z are as defined above;

- (b) from about 0.1% to about 16% by weight of a second amphoteric surfactant selected from aminoalkanoates of formula II



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iminodialkanoates of formula III



and mixtures thereof, wherein n and m are numbers from 1 to 4, and  $R_1$  and M are independently selected from the groups specified in (a) above;

- (c) optionally up to about 10% of anionic surfactant;
- (d) from about 0.1% to about 5% by weight of a dispersed insoluble silicone conditioning agent; and,
- (e) water;

and wherein the cleansing composition has a total surfactant concentration of from about 0.2% to about 20% by weight and wherein the combined concentration of the first and second amphoteric surfactants comprises at least 20% by weight of the total surfactant concentration.

2. A cleansing composition according to Claim 1 wherein the mixture of first and second amphoteric surfactants comprises at least about 50%, preferably at least about 60%, and more preferably at least about 75% by weight of the total surfactant.

3. A cleansing composition according to Claim 1 or 2 wherein the total surfactant concentration is from about 1% to about 16%, preferably from about 1% to about 8% and more preferably from about 2% to about 6% by weight of the cleansing composition.

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4. A cleansing composition according to any of Claims 1 to 3 comprising from about 0.5% to about 10%, preferably from about 0.5% to about 4% of each of the first and second amphoteric surfactant by weight of the cleansing composition.

5. A cleansing composition according to any of Claims 1 to 4 wherein the weight ratio of first amphoteric surfactant:second amphoteric surfactant is from about 10:1 to about 1:10, preferably from about 5:1 to about 1:5, more preferably from about 3:1 to about 1:3.

6. A cleansing composition according to any of Claims 1 to 5 additionally comprising from about 0.1% to about 10%, preferably from about 0.5% to about 5%, more preferably from about 1% to 3% of anionic surfactant by weight of the cleansing composition.

7. A cleansing composition according to Claim 6 wherein the anionic surfactant is a fatty acid condensation product of a protein, degraded protein or amino acid or a mixture of said fatty acid condensation products.

8. A cleansing composition according to Claim 7 wherein the fatty acid condensation product is selected from

- (i) condensation products of  $C_8$ - $C_{12}$ , preferably  $C_{10}$ - $C_{18}$  fatty acids with hydrolysed proteins,
- (ii) fatty acid sarcosinates derived from  $C_8$ - $C_{22}$ , preferably  $C_{10}$ - $C_{18}$  fatty acids, and
- (iii) mixtures thereof.

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9. A cleansing composition according to any of Claims 6 to 8 which is essentially free of anionic sulfate or sulfonate surfactant or wherein the first amphoteric surfactant and anionic sulfate or sulfonate anionic surfactant are in an equivalent ratio of no more than about 1:1

10. A cleansing composition according to any of Claims 1 to 9 wherein the silicone conditioning agent is selected from non-volatile polyalkyl and polyaryl siloxane gums and fluids, volatile cyclic and linear polyalkylsiloxanes, polyalkoxylated silicones, amino and quaternary ammonium modified silicones, rigid cross-linked and reinforced silicones and mixtures thereof.

11. A cleansing composition according to any of Claims 1 to 10 wherein the silicone conditioning agent is selected from polydimethylsiloxane fluids having a viscosity of from about 10 cps to about 100,000 cps at 25°C, polydimethylsiloxane gums having a viscosity of greater than 1,000,000 cps at 25°C, and mixtures thereof.

12. A cleansing composition according to any of Claims 1 to 11 which additionally comprises from about 0.1% to about 5% of a suspending agent selected from long chain acyl derivatives and long chain alkylamine oxides, said acyl derivative or amine oxide being present in the cleansing composition in crystalline form, xanthan gum, hydrophobically-modified acrylic acid polymers and mixtures thereof.



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13. A cleansing composition according to any of Claims 1 to 12 wherein the cleansing composition has a viscosity (Brookfield RVT, Cone speed 1 rpm, 25°C) of at least about 150 cps.

14. A cleansing composition according to claim 13 wherein the cleansing composition has a viscosity (same conditions) of from about 500 to about 12,000, preferably from about 1,000 to about 10,000, more preferably from about 4,000 to about 9,000 cps.

15. A cleansing composition according to any of Claims 1 to 14 comprising from 0.01% to 5%, preferably from about 0.04% to about 2% and more preferably from 0.05% to 1% of hydrophilic polymeric thickener, by weight of the cleansing composition.

16. A cleansing composition according to any of Claims 1 to 15 wherein the aqueous cleansing composition comprises from about 3% to about 40% of a hair or skin moisturiser.

17. A cleansing composition according to Claim 16 wherein the moisturiser is nonocclusive and is selected from:

1. water-soluble liquid polyols;
2. essential amino acid compounds found naturally occurring in the stratum corneum of the skin; and
3. water-soluble nonpolyol nonocclusives and mixtures thereof.

18. A cleansing composition according to Claim 17 wherein the moisturiser is selected from glycerin, polyethylene glycol, propylene glycol, sorbitol, polyethylene glycol and propylene glycol ethers of methyl glucose, polyethylene glycol and propylene glycol ethers of lanolin alcohol, sodium pyrrolidone carboxylic acid, lactic acid, L-proline and mixtures thereof.

19. A cleansing composition according to Claim 15 wherein the polymeric thickener is selected from cationic and nonionic polysaccharides; cationic and nonionic homopolymers and copolymers derived from acrylic and/or methacrylic acid; cationic and nonionic cellulose resins; cationic copolymers of dimethyldiallylammonium chloride and acrylic acid; cationic homopolymers of dimethyldiallylammonium chloride; cationic polyalkylene and ethoxypolyalkylene imines; quaternized silicones, and mixtures thereof.

20. A foam producing cleansing product comprising a compressible non-aerosol dispenser equipped with a reservoir, dispensing head and liquid/air mixing means, wherein the reservoir contains a quantity of a cleansing composition according to any one of claims 1 to 19.

# INTERNATIONAL SEARCH REPORT

International Application No. PCT/US91/06752

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (If several classification symbols apply, indicate all) *		
Applicable to International Patent Classification (IPC) or to both National Classification and IPC IPC(5): C11D 1/10;1/32;1/88;1/94;3/37;9/36 US CL: 252/544;546;547;548;174.15;174.17;174.23;Dig. 2, Dig.5,Dig.7,Dig.13		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched *		
Classification System	Classification Symbols	
US	252/544;546;547;548;174.15;174.17;174.23;Dig. 2, Dig. 5. Dig. 7. Dig 13 239/343	
Documentation Searched other than Minimum Documentation to the extent that such documents are included in the Fields Searched *		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT *</b>		
Category *	Citation of Document, * with indication, where appropriate, of the relevant passages *	Relevant to Claim No. 1
Y	US, A, 3,709,437 (WRIGHT) 09 JANUARY 1973 (See abstract).	20
A	US, A, 3,822,312 (SATO ET AL.) 02 JULY 1974 (See abstract).	1-19
A	US, A, 3,849,348 (HEWITT) 19 NOVEMBER 1974 (See abstract).	1-19
Y	US, A, 3,937,364 (WRIGHT) 10 FEBRUARY 1976 (See abstract).	20
A	US, A, 3,990,991 (GERSTEIN) 09 NOVEMBER 1976 (See abstract).	1-19
Y	GB 1,470,234 (UNION CARBIDE) 14 APRIL 1977 (See pg. 1, lines 42-pg. 2, line 11, page 2, lines 26-32; page 3, lines 11-36; pg. 4, lines 4-44; Example 1; table 1; and claims 1,10 and 12).	1-20
Y	US, A, 4,022,351 (WRIGHT) 10 MAY 1977 (See abstract).	20
<p>* Special categories of cited documents: 10</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&amp;" document member of the same patent family</p>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search		Date of Mailing of this International Search Report
18 DECEMBER 1991		28 JAN 1992
International Searching Authority		Signature of Authorized Officer
ISA/US		ERIN M. HIGGINS

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
Y	US, A, 4,147,306 (BENNETT) 03 APRIL 1979 (See abstract).	20
Y	US, A, 4,184,615 (WRIGHT) 22 JANUARY 1980 (See abstract).	20
A	US, A, 4,364,837 (PADER) 21 DECEMBER 1982 (See abstract).	1-19
Y	EP 0153435A1 (FAUCHER) 04 SEPTEMBER 1985 (See pg. 2, lines 19-29; pg. 8, lines 11-19; pg. 9, line 24-pg. 10, line 13; pg. 13, lines 16-24; pg. 15, line 12-pg. 16, line 18; Table 1 and claims 1,2,7 & 8.	1-20
Y	US, A, 4,598,862 (RICE) 08 JULY 1986 See abstract.	20
Y	US, A, 4,615,467 (GROGAN ET AL.) 07 OCTOBER 1986 See abstract.	20
A	US, A, 4,704,272 (OH ET AL.) 03 NOVEMBER 1987 See abstract.	1-19
A	US, A, 4,741,855 (GROTE ET AL.) 03 MAY 1988 See abstract.	1-19
Y	US, A, 4,788,006 (BOLICH, JR. ET AL.) 29 NOVEMBER 1988 (See col. 1, lines 11-14; col. 2, lines 13-24; col. 4, line 56- col. 6, line 2).	1-20
Y	US, A, 4,837,005 (BRODE, II ET AL.) 06 JUNE 1989 See col. 11, lines 4-7 and lines 33-36.	16-18
Y	US, A, 4,931,216 (IGARASHI ET AL.) 05 JUNE 1990 See col. 6, lines 42-68.	15-19