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(54) **Laundry pouch**

(57) A laundry composition contained within a pouch wherein the pouch can stand on its own without the need for a reinforced base. The pouch is formed from a flexible material and contains a laundry composition in at least two phases. One of the phases, together

with the fold, forms a base upon which the pouch can stand without additional support. The phase that assists in forming the pouch base is a solid. Processes for making the inventive laundry pouch are also disclosed.

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Description**FIELD OF THE INVENTION**

5 **[0001]** A laundry pouch made of a flexible material comprising a laundry composition with at least two phases, such that one of the phases forms a base upon which the pouch can stand without additional support and a process of its manufacture.

BACKGROUND OF THE INVENTION

10 **[0002]** One convenient form for dispensing laundry products is that of a pouch. Using pouches during the washing process is an attractive alternative to conventional laundry powders and liquids since the laundry product contained in the pouch (powder, or liquid) can be deposited in the wash without possibility of contact with the users hands or clothes or with the outer aspects of the washing machine, or the floor, etc. The product typically is contained within a
15 pouch formed from a water soluble film and tossed, still in the pouch, into the washer.

[0003] While use of pouches typically is quite convenient, storage of the pouches is another matter. Unlike bottles or cartons, pouches containing detergent products do not have a single predetermined shape, but form their shape based on the distribution of product within the pouch. Moreover, unless extra effort and expense is incurred to provide the pouch with a defined structural bottom, the pouch has no base upon which it will necessarily rest and will often lie
20 on its side. Where such pouches are packaged in a tray, removal of one or more of the pouches may cause others to fall over and disturb the order of the package.

[0004] Huff, U.S. Patent No. 6,040,286 discloses a "through the washer dryer" pouch type detergent bag containing granular detergent particulate. The pouch type detergent bag is preferably made from a material that is air- and water-
25 permeable such as non-woven polyester. The detergent bag has a front panel and a rear panel and they are sealed together around their perimeters to form an inner chamber in which detergent particulate is deposited. An alternative embodiment illustrated in, e.g., Figs. 5 and 6 of Huff, includes a web of material 44 connecting the bottom edge of two chambers containing detergent particulate. When the wash cycle has been completed and the clothes are transferred to a dryer, the detergent bag is in a wadded state and is now used as an anti-static and softening sheet which is activated by the heat and the dryer to release fabric softener and anti-static agent.

30 **[0005]** Buchanan, U.S. Patent No. 5,273,362 is directed to containers produced from a sheet of flexible material having a thermally bonded inside surface. The container includes a reinforced bottom wall and is capable of standing vertically on its own.

[0006] Other patents disclosing packages of interest include Anderson, U.S. Patent No. 4,810,844, Mahler et al., U. S. Patent No. 4,223,029, Wierenga et al., U.S. Patent No. 5,002,681, Smith et al., U.S. Patent No. DES 392,559,
35 Buchanan et al., U.S. Patent No. 5,135,464, and Buchanan et al., U.S. Patent No. 6,120,183. Giessen, U.S. Patent 2,444,987; Schneider et al. U.S. Patent 3,367,489; Shaw et al., U.S. Patent 3,618,758; Guerry et al., U.S. Patent 4,176,079; Davies et al., U.S. Patent 4,410,441; Ginn, U.S. Patent 4,588,080; Ginn, U.S. Patent 4,680,916; Leigh et al., U.S. Patent 4,706,802; Gouge et al., U.S. Patent 5,224,601; Saam, U.S. Patent 5,927,498.

40 **[0007]** Current rectangular pouches in the market place usually have a fold and three edge seals and lay flat on their sides unless they are stacked tightly in a carton. Special pouch designs with reinforced bases, e.g., the Doy® pack, need to be used in order for an individual pouch to stand alone.

SUMMARY OF THE INVENTION

45 **[0008]** The present invention includes a laundry composition contained within a pouch wherein the pouch can stand on its own without the need for a reinforced base. The pouch is formed from a flexible material, preferably a film, wherein a laundry composition in at least two phases is contained within the pouch. One of the phases forms a base upon which the pouch can stand without additional support. The phase that assists in forming the pouch base is a solid. According to the present invention, the solid phase may be introduced into the pouch as a solid or it may be formed
50 after the composition is introduced into the pouch (i.e., it sets upon standing). The solid phase is insoluble in the other phases of the composition within the pouch. The solid phase separation from the other phases of the composition is attained by either ensuring that the density of the solid phase is higher than the density of the other phases; or by filling the pouch first with a liquid or a slurry that solidifies upon standing, thus forming the solid phase (which regardless of its density stays on the bottom due to the shape restriction of the pouch), and then filling the other phases of the
55 composition.

[0009] Processes for making the inventive laundry pouch are also included.

[0010] Preferably the laundry compositions are heavy duty laundry detergents. However, various other laundry products can be contained in the pouches, such as other laundry detergents, fabric softeners, bleaches, bleach precursors,

perfumes, anti-bacterial agents, anti-static agents, whitening or bluing agents, enzymes or builders. Laundry detergents generally comprise surfactants such as anionic and/or nonionic surfactants. Fabric softeners often include cationic surfactants. Laundry products which may be considered for use in the present invention include those described in U. S. Patent Nos. 5,132,036 and 4,420,441, the disclosures of which are hereby incorporated by reference.

[0011] The pouch of the invention is preferably made of a water soluble film so that upon use in the wash, the body of the pouch fully dissolves and leaves no remnant. Alternatively, various other pouch materials disclosed for use with laundry products, such as water permeable pouches or water insoluble pouches with water soluble or permeable seals, may be used.

[0012] When the pouch of the invention is used, multiple pouches can be stood upright and packed tightly in a tray or carton to keep the pouches in a vertical position. It is unnecessary in the present invention to employ a reinforced base in order to have the pouch stand upright.

[0013] The following detailed description and the examples illustrate some of the effects of the inventive compositions. The invention and the claims, however, are not limited to the following description and examples.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014]

Fig. 1 is a front elevational view of a pouch according to one embodiment of the invention.

Fig. 2 is a side elevational view of the pouch of Fig.1.

Fig. 3 is a perspective view of plural pouches vertically disposed in a tray.

Fig. 4 is a plan view of a sheet used in making the pouch according to one embodiment of the invention.

DETAILED DESCRIPTION OF VARIOUS NON-LIMITING EMBODIMENTS OF THE INVENTION

[0015] Except in the operating and comparative examples, or where otherwise explicitly indicated, all numbers in this description indicating amounts of material or conditions of reaction, physical properties of materials and/or use are to be understood as modified by the word "about." All amounts are by weight of the detergent composition (excluding the pouch body), unless otherwise specified.

[0016] It should be noted that in specifying any range of concentration, any particular upper concentration can be associated with any particular lower concentration.

[0017] For the avoidance of doubt the word "comprising" is intended to mean "including" but not necessarily "consisting of" or "composed of." In other words, the listed steps or options need not be exhaustive.

[0018] "Water-soluble" as used herein means soluble in cold water, i.e. soluble at 5°C and above.

[0019] "Liquid phase" as used herein includes gels and means that a continuous phase or predominant part of the phase is liquid and that a phase is fluid at 20°C (some solids (suspended or other) may be included).

[0020] "Solid phase" as used herein includes both hard and soft solids (the latter may yield or deform under pressure) and means that the phase is not fluid at 20°C.

[0021] "Seal" or "sealing" as used herein includes both heat sealing and water sealing.

[0022] "Transparent" as used herein includes both transparent and translucent and means that an ingredient, or a mixture, or a phase, or a composition, or a package according to the invention preferably has a transmittance of more than 25%, more preferably more than 30%, most preferably more than 40%, optimally more than 50% in the visible part of the spectrum (approx. 410-800 nm). Alternatively, absorbency may be measured as less than 0.6 (approximately equivalent to 25% transmitting) or by having transmittance greater than 25% wherein % transmittance equals: $1/10 \text{absorbancy} \times 100\%$. For purposes of the invention, as long as one wavelength in the visible light range has greater than 25% transmittance, it is considered to be transparent/translucent.

[0023] The term "detergent composition" or "laundry composition" or "composition" as used herein means the final composition (i.e., the composition itself, but not the pouch body), including at least two phases.

[0024] A pouch may be formed using a flexible material, e.g. film, in any suitable way, but preferably using one of the four ways as herein described. The first way involves taking a web of film off of a roll and folding it in half with the top open. This can be done using a Bartlet form/fill/seal machine where the folded web travels in a horizontal direction. Leading and trailing vertical heat-seals are made and individual pouches are cut and supported in an upright position. Product is filled through the top opening, and then a horizontal top heat-seal completes the filled/sealed pouch. A front view of the pouch (Figure 1) shows top and side flange seals, but there is no bottom seal.

[0025] The second way relates to vertical form/fill/seal equipment such as made by Hayssen or Proto-Pak Corporation. Off of a roll, the web is formed into a tube with a continuous overlap heat-seal of the edges. The tube travels vertically downward and a bottom seal is formed. A nozzle, which is below the top seal area, fills the pouch, and with intermittent motion the pouch is indexed downward. A top - seal completes the finished pouch. With this type of pouch,

there are top and bottom flange heat-seals, and a flattened, overlapped seal down the middle of the pouch.

[0026] A third way involves the use of horizontal (Hoflinger machine) or rotary (Cloud Corp.) form/fill/seal equipment which can employ either heat or water seals. In this case, a bottom web is vacuum-formed into a cavity, product is filled and a top web is either slightly wetted and compressed sealed, or heat sealed. Different pouch shapes can be achieved such as round with about 40% trim, or rectangular with virtually no trim. A top view will show a peripheral seal around the perimeter of the pouch. This third process is preferred due to the optimum production rates.

[0027] The fourth way to produce a pouch is with a continuous, extruded tube of flexible film. This would be similar to the second process described above using vertical form/fill/seal equipment. The difference is that there would be no seal in the longitudinal middle of the pouch, but there would be top/bottom flange heat-seals.

[0028] Referring to Figs. 1 and 4, pouch 10 is comprised of flexible material (e.g. sheet or film) 12 which has been folded upon itself at 14 to form a folded side, using the first process described above. Two halves 16, 18 of sheet 12 which are formed by folding at 14, are sealed to each other to form three walls 20, 22 and 24.

[0029] Folding at line 14 may be assisted, if desired, by an optional line of weakness extending along the projected fold. There is no need for any reinforcing structure and, in fact, the line of weakness may be absent. Indeed, the preferred structure is a simple fold with no reinforcing structure or lines of weakness.

[0030] In the alternative to folding, a preformed tube of the film may be used and then a segment cut-off and sealed at the two ends. Other alternative processes for forming a pouch, as described above, may be employed.

[0031] Preferably, seal side 22 is formed last, after insertion of the laundry composition into the pouch. Pouch 10 contains a bottom, base-forming component 30 which is a solid phase of the laundry composition. Pouch 10 also includes at least one other phase of a laundry composition such as liquid phase comprising for example a surfactant. The solid phase 30 combines with a side of the pouch (e.g. fold 14) to provide a base 36 for the package, which permits the pouch to stand upright unassisted, as seen in Fig. 2. In the alternative, less preferred embodiment the solid phase combines with a side seal (e.g. 20 or 24) to form the bottom base 36. Solid phase 30 may be a substance or composition which, although liquid when added to the pouch, eventually solidifies.

[0032] Pouches 10 can be disposed in tight columns and rows in tray 40, as seen in Fig. 3. Pouches 10 are disposed vertically with base 36 at the bottom. Pouches 10 are self-supporting and removal of one or more of the pouches from tray 40 will not affect the remaining pouches.

[0033] In use, pouch 10 is dropped into the washing machine at an appropriate time during the washing process, for example at the beginning of the wash cycle, and by an appropriate predetermined mechanism the product contained therein is dispersed at an appropriate time. The mechanism may involve the water solubility of the pouch 10, or pouch 10 may be water permeable. Or, pouch 10 may have one or more seals which are permeable to water.

[0034] If desired, pouches which are of a shape other than the illustrated rectangular shape could be used. For instance, two sealed walls could extend from the fold line to a point where they intersect to form a triangular-shaped pouch.

Also possible for example are pyramid and tetrahedral shape pouches. Any unneeded film could be trimmed.

[0035] Immediately after filling and sealing, a number of pouches may be vertically positioned into a multipack tray or carton. The packing operation presses down and flattens the pouch bottom. Generally direct pouch contact and the confines of the pack walls will keep the pouches in an upright position. As pouches are removed from the multipack, the remaining pouches will not fall over to form a mess since the product will solidify in the lower portion of the pouch over a period of time. The flat-bottom shape will be set either when the higher density solid separates to the bottom, or if the phases are introduced separately, when the bottom phase solidifies.

[0036] The pouch 10 is preferably made of a clear, sealable, cold water soluble film such as polyvinyl alcohol. Thickness could range from 25 to 100 μm , more preferably from 35 to 80 μm , most preferably from 45 to 75 μm . Other materials from which the package can be made include but are not limited to methyl hydroxy propyl cellulose and polyethylene oxide. Polyvinyl alcohol is preferred due to its ready availability and low cost. One supplier of polyvinyl alcohol film is Monosol LLC. European suppliers of suitable films include but are not limited to Monosol supplied by Monosol LLC. or PT supplied by Aicello or K-series supplied by Kurary or Hydrafilms supplied by Rainier Specialty Polymers Ltd, or QSA series by Polymer Films, Inc.

LAUNDRY COMPOSITION PHASES

[0037] The laundry composition included in the inventive pouch contains at least two phases. The phase that assists in forming the pouch base is a solid.

[0038] According to the present invention, the solid phase may be introduced into the pouch as a solid or it may be formed after being filled into the pouch (i.e., it sets upon standing). The solid phase is insoluble in the other phases of the composition within the pouch. The solid phase separation from the other phases of the composition is attained by:

ensuring that the density of the solid phase is higher than the density of the other phases; and/or by filling the pouch

first with a liquid or a slurry that solidifies upon standing, thus forming the solid phase (which regardless of its density stays on the bottom due to the shape restriction of the pouch), and then filling the other phases of the composition.

[0039] When option (1) is employed, it is preferred that the density of the product or ingredient that forms a solid phase is higher than the densities of other phases by at least 0.2 g/ml or preferably by at least 0.5 g/ml. The density of the lighter product is preferably from 0.8 to 1.5 g/ml; the density of the heavier products is preferably 1.0 to 3.5 g/ml. Suitable higher density ingredients are water-soluble solutes and water-insoluble particulates, including but not limited to inorganic or organic salts of carbonate, bicarbonate, phosphate, sulfate, silicate, sugar, sorbitol, silica, zeolite, pigment. Preferably, in order to form a solid base, carbonate is used. These ingredients are suitable as long as the density of the other phases is in the range of from 0.8 to 1.5 g/ml. The solid phase ingredient is typically included in an amount of from 1 to 75%, preferably from 5 to 60%, most preferably from 10 to 50%.

[0040] It is preferred to fill the pouch with the heavier phase together with the other phases of the laundry composition, in the form of a slurry, for ease of manufacture. The heavier phase then separates and sets upon standing, preferably within at least a few days, e.g. in a time span of within 10 days after filling the pouch, preferably within 3 days, more preferably within 24 hours, most preferably within 3 hours, and optimally within 1 hour. In the alternative, the phases may be filled individually, in which case again the heavier phase may be added as a solid or as a slurry (e.g. aqueous slurry) and may solidify upon standing.

[0041] When option (2) is employed, the densities of the at least two phases are irrelevant. In this case, the lower phase is filled into the pouch first, as a liquid or a slurry and is allowed to solidify. Once solidified, the other phases are filled. Even if the other phases are heavier than the solid phase, the solid phase will generally stay on the bottom, constrained by the walls of the pouch from moving upward. This option is particularly suitable for those pouches, which have the walls inclined toward the top, to provide for optimum constrain on the movement of the solid phase, e.g. pyramidal, tetrahedral and triangular shapes. In option (2) any ingredient may be employed for the solid phase, as long as it can be first filled as a liquid or slurry and, subsequently, solidified. One example is adding an aqueous solution (for example containing a surfactant or a builder), which is then structured with soap, e.g. sodium stearate. Other structurants include, but are not limited to polysaccharides, cross-linked polyacrylates, etc. The amount of the structurant is generally in the range of from 0.1 to 10%, preferably from 0.1 to 5%, by weight of the phase.

[0042] The second phase included into the inventive pouches is liquid, which may be hydrophilic or hydrophobic.

[0043] The hydrophilic phase employs water, typically in an amount of from 0 to 60%, preferably from 5 to 50%, most preferably from 10 to 40%, by weight of the hydrophilic phase. The amount of water in any event is such as to preserve sufficient solid base phase on the bottom: if a solid is employed which is water-soluble, too high a water amount may dissolve the solid.

[0044] The hydrophobic phase employs a hydrophobic fluid, typically in an amount of from 20 to 100%, preferably from 40 to 80%, most preferably from 50 to 70%, by weight of the hydrophobic phase. The hydrophobic fluid is generally selected from the group consisting of paraffin, wax, oil, petrolatum, a hydrophobic polymer and mixtures thereof. Natural or synthetic hydrocarbon oil or mixtures thereof may be employed. Generally, the hydrocarbon oil may be a paraffinic oil, a naphthenic oil, natural mineral oil or the like. Examples include but are not limited to mineral oil, castor oil, vegetable oil, corn oil, peanut oil, jojoba oil, 2-ethylhexyl oxystearate (and other alkyl oxystearates), acetylated lanolin alcohol, alkyl palmitates such as isopropyl palmitate, 2-ethylhexyl palmitate, glycerol triacetates, disopropyl adipate, dioctyl adipate (and other alkyl adipates), isopropyl myristate, C₁₂ to C₁₅ alcohol benzoates, and the like. Most preferably, the oil is mineral oil, because it is both economic and most easily processable.

[0045] The hydrophobic fluid may be employed in combination with a hydrophobic benefit agent and/or colorant (e.g. oil-soluble colorant), or it may form a continuous phase which surrounds a discontinuous phase. The discontinuous phase may itself be a benefit agent and/or a colorant or it may contain an additional benefit agent and/or colorant.

[0046] Some of the preferred embodiments of laundry products within the inventive pouch are outlined below:

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OPTION 1					
No.	Solid Base Phase Ingredients	Range % by weight of phase	Liquid Phase Ingredients	Range % by weight of phase	Volume ratio of solid to liquid phase
1	Water	10-75	Water	0-60	From
	Sodium	10-90	Propylene Glycol	0-25	10:90
	Carbonate	0-80	Surfactant	5-100	to
	Zeolite	0-15	Miscellaneous	0-10	90:10
	Miscellaneous				
2	Water	10-75	Water	0-60	From
	Sodium	0-90	Propylene Glycol	0-25	10:90
	Carbonate	0-90	Alcohol	1-95	to
	Sodium	0-80	ethoxylate	1-75	90:10
	Sulfate	0-60	Sodium		
	Zeolite		Alkylbenzene	0-10	
	Sodium		sulfonate	0-10	
	Silicate		Soap		
			Miscellaneous		
3	Water	10-75	Water	0-60	From
	Sodium	0-90	Propylene Glycol	0-25	10:90
	Carbonate	0-90	Xylene Sulfonate	0-15	to
	Sodium	0-90	Alcohol	0-95	90:10
	Sulfate		ethoxylate Sodium	0-75	
	Sodium		Alkylbenzene	0-80	
	Citrate		sulfonate		
			Sodium Alcohol	0-10	
			ethoxylate		
			sulfate		
			Miscellaneous		
4	Water	10-75	Water	0-60	From
	Sodium	0-90	Propylene Glycol	0-25	10:90
	Bicarbonate		Xylene sulfonate	0-15	to
	Sodium	0-90	Alcohol	0-95	90:10

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(continued)

OPTION 1					
No.	Solid Base Phase Ingredients	Range % by weight of phase	Liquid Phase Ingredients	Range % by weight of phase	Volume ratio of solid to liquid phase
	borate	0-90	ethoxylate Sodium	0-75	
	Sodium		Alkylbenzene	0-80	
	Sulfate		sulfonate		
			Sodium Alcohol	0-10	
			ethoxylate		
			sulfate		
			Miscellaneous		
5	Water	10-75	Water	0-60	From
	Sodium	0-90	Monoethanolamine	0-30	10:90
	Bicarbonate	0-90	Propylene glycol	0-25	to
	Sodium	0-90	Alcohol	1-95	90:10
	Citrate		ethoxylate	1-80	
	Sodium		Monoethanolamine		
	Sulfate		alkylbenzene	0-10	
			sulfonate		
			Miscellaneous		

OPTION 2					
No.	Solid Base Phase Ingredients	Range % by weight of phase	Liquid Phase Ingredients	Range % by weight Of phase	Volume ratio of solid to liquid phase
1	Water	20-60	Water	0-60	From
	Zeolite	0-60	Propylene Glycol	0-25	10:90
	Sodium	0-30	Xylene Sulfonate	0-15	to
	borate	0-30	Slcohol ethoxylate	0-95	90:10
	Sodium	0.2-10	Sodium	0-75	
	sulfate		Alkylbenzene		
	Sodium		sulfonate	0-80	
	stearate		Sodium Alcohol		
			ethoxylate sulfate	0-10	
			Miscellaneous		

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(continued)

OPTION 2					
No.	Solid Base Phase Ingredients	Range % by weight of phase	Liquid Phase Ingredients	Range % by weight Of phase	Volume ratio of solid to liquid phase
2	Water	5-50	Water	0-60	From
Xylene	0-15	Monoethanolamine	1-40	10:90	
sulfonate	0-15	Monoethanolamine	5-70	to	
Propylene	1-30	citrate		90:10	
glycol	0-30				
Alcohol					
ethoxylate	0-30				
Sodium					
Alkylbenzen	0.2-10				
e sulfonate	0-10				
Sodium					
Alcohol					
ethoxylate					
sulfate					
Sodium					
Stearate					
Miscellan- eous					
3	Water	20-60	Water	0-60	From
Sodium	0-20	Propylene Glycol	0-25	10:90	
citrate	0-40	Xylene Sulfonate	0-15	to	
Zeolite	0-20	Alcohol ethoxylate	0-95	90:10	
Sorbitol	0.02-1	Sodium	0-75		
K-		Alkylbenzene			
carrageenan		sulfonate	0-80		
		Sodium Alcohol			
		ethoxylate sulfate	0-10		
		Miscellaneous			

[0047] It should be noted that in the final composition, the compositions of the resultant phases do not necessarily correspond with the compositions of the phases prior to their being combined into a single composition. This is because of reaction between ingredients, in particular the acidic ingredients and the basic ingredients (e.g., sodium hydroxide) and also, because of possible migration of material between the two phases, or emulsification of some of the phases within each other.

[0048] The volume ratio of the two phases in the final composition is generally in the range of from 10:90 to 90:10, more preferably from 20:80 to 80:20, most preferably from 70:30 to 30:70, and optimally from 40:60 to 60:40, in order to provide the most pleasing appearance and optimum laundry benefits.

[0049] More than two phases may be present. The additional third and further phases may for example be a capsule, dispersion or emulsion layer, as described below under Optional Ingredients. Furthermore, a if the second layer is

aqueous, it may be desirable to include a hydrophilic layer, with a benefit ingredient, such as an enzyme, a bleach, a perfume entrapped therein.

PREFERRED LAUNDRY COMPOSITION INGREDIENTS

[0050] These ingredients may be distributed in either or both phases of the composition.

Surfactant

[0051] The compositions of the invention contain one or more surface active agents (surfactants) selected from the group consisting of anionic, nonionic, cationic, ampholytic and zwitterionic surfactants or mixtures thereof. The preferred surfactant detergents for use in the present invention are mixtures of anionic and nonionic surfactants although it is to be understood that any surfactant may be used alone or in combination with any other surfactant or surfactants. The surfactant should comprise at least 5%, e.g., 5% to 80%, preferably at least 10% to 80%, more preferably 15% to 40%; even more preferably 15% to 35% of the composition.

Nonionic Surfactant

[0052] Nonionic synthetic organic detergents which can be used with the invention, alone or in combination with other surfactants, are described below. Nonionic surfactants are typically included.

[0053] Preferred nonionic surfactants are nonionic surfactants which are pourable liquids, gels or pastes at 25°C. Nonionic detergent surfactants normally have molecular weights of from about 300 to about 11,000. Mixtures of different nonionic detergent surfactants may also be used, provided the mixture is a liquid gel or paste at 25°C. Optionally, the composition may comprise one or more nonionic surfactants which are solid at 25°C. These dissolved and/or dispersed in either or both liquid layers.

[0054] As is well known, the nonionic detergents are characterized by the presence of an organic hydrophobic group and an organic hydrophilic group and are typically produced by the condensation of an organic aliphatic or alkyl aromatic hydrophobic compound with ethylene oxide (hydrophilic in nature). Typical suitable nonionic surfactants are those disclosed in U.S. Pat. Nos. 4,316,812 and 3,630,929 and applicants' published European specification EP-A-225,654.

[0055] Usually, the nonionic detergents are polyalkoxylated lipophiles wherein the desired hydrophile-lipophile balance is obtained from addition of a hydrophilic polyalkoxy group to a lipophilic moiety. A preferred class of nonionic detergent is the alkoxylated alkanols wherein the alkanol is of 9 to 18 carbon atoms and wherein the number of moles of alkylene oxide (of 2 or 3 carbon atoms) is from 3 to 12. Of such materials it is preferred to employ those wherein the alkanol is a fatty alcohol of 9 to 11 or 12 to 15 carbon atoms and which contain from 5 to 8 or 5 to 9 alkoxy groups per mole.

[0056] Exemplary of such compounds are those wherein the alkanol is of 12 to 15 carbon atoms and which contain about 7 ethylene oxide groups per mole, e.g. Neodol® 25-7 and Neodol® 23®-6.5, which products are made by Shell Chemical Company, Inc. The former is a condensation product of a mixture of higher fatty alcohols averaging about 12 to 15 carbon atoms, with about 7 moles of ethylene oxide and the latter is a corresponding mixture wherein the carbon atoms content of the higher fatty alcohol is 12 to 13 and the number of ethylene oxide groups present averages about 6.5. The higher alcohols are primary alkanols.

[0057] Other useful nonionics are represented by the commercially well-known class of nonionics sold under the trademark Plurafac®. The Plurafacs® are the reaction products of a higher linear alcohol and a mixture of ethylene and propylene oxides, containing a mixed chain of ethylene oxide and propylene oxide, terminated by a hydroxyl group. Examples include C₁₃-C₁₅ fatty alcohol condensed with 6 moles ethylene oxide and 3 moles propylene oxide, C₁₃-C₁₅ fatty alcohol condensed with 7 moles propylene oxide and 4 moles ethylene oxide, C₁₃-C₁₅ fatty alcohol condensed with 5 moles propylene oxide and 10 moles ethylene oxide, or mixtures of any of the above.

[0058] Another group of liquid nonionics are commercially available from Shell Chemical Company, Inc. under the Dobanol® trademark: Dobanol® 91-5 is an ethoxylated C₉-C₁₁ fatty alcohol with an average of 5 moles ethylene oxide and Dobanol® 23-7 is an ethoxylated C₁₂-C₁₃ fatty alcohol with an average of 7 moles ethylene oxide per mole of fatty alcohol. In the compositions of this invention, preferred nonionic surfactants include the C₁₂-C₁₅ primary fatty alcohols with relatively narrow contents of ethylene oxide in the range of from about 7 to 9 moles, and the C₉ to C₁₁ fatty alcohols ethoxylated with about 5-6 moles ethylene oxide.

[0059] Another class of nonionic surfactants which can be used in accordance with this invention are glycoside surfactants. Glycoside surfactants suitable for use in accordance with the present invention include those of the formula:



wherein R is a monovalent organic radical containing from about 6 to about 30 (preferably from about 8 to about 18) carbon atoms; R' is a divalent hydrocarbon radical containing from about 2 to 4 carbons atoms; 0 is an oxygen atom; y is a number which can have an average value of from 0 to about 12 but which is most preferably zero; Z is a moiety derived from a reducing saccharide containing 5 or 6 carbon atoms; and x is a number having an average value of from 1 to about 10 (preferably from about 1.5 to about 10).

[0060] A particularly preferred group of glycoside surfactants for use in the practice of this invention includes those of the formula above in which R is a monovalent organic radical (linear or branched) containing from about 6 to about 18 (especially from about 8 to about 18) carbon atoms; y is zero; z is glucose or a moiety derived therefrom; x is a number having an average value of from 1 to about 4 (preferably from about 1 to 4).

[0061] Nonionic surfactants particularly useful for this application include, but are not limited to: alcohol ethoxylates (e.g. Neodol® 25-9 from Shell Chemical Co.), alkyl phenol ethoxylates (e.g. Tergitol® NP-9 from Union Carbide Corp.), alkylpolyglucosides (e.g. Glucapon® 600CS from Henkel Corp.), polyoxyethylenated polyoxypropylene glycols (e.g. Pluronic® L-65 from BASF Corp.), sorbitol esters (e.g. Emsorb® 2515 from Henkel Corp.), polyoxyethylenated sorbitol esters (e.g. Emsorb® 6900 from Henkel Corp.), alkanolamides (e.g. Alkamide® DC212/SE from Rhone-Poulenc Co.), and N-alkylpyrrolidones (e.g. Surfadone® LP-100 from ISP Technologies Inc.).

[0062] Mixtures of two or more of the nonionic surfactants can be used.

Anionic Surfactant

[0063] Anionic surface active agents which may be used in the present invention are those surface active compounds which contain a long chain hydrocarbon hydrophobic group in their molecular structure and a hydrophilic group, i.e.; water solubilizing group such as sulfonate, sulfate or carboxylate group. The anionic surface active agents include the alkali metal (e.g. sodium and potassium) water soluble higher alkyl benzene sulfonates, alkyl sulfonates, alkyl sulfates and the alkyl polyether sulfates. They may also include fatty acid or fatty acid soaps. The preferred anionic surface active agents are the alkali metal, ammonium or alkanolamide salts of higher alkyl benzene sulfonates and alkali metal, ammonium or alkanolamide salts of higher alkyl sulfonates. Preferred higher alkyl sulfonates are those in which the alkyl groups contain 8 to 26 carbon atoms, preferably 12 to 22 carbon atoms and more preferably 14 to 18 carbon atoms. The alkyl group in the alkyl benzene sulfonate preferably contains 8 to 16 carbon atoms and more preferably 10 to 15 carbon atoms. A particularly preferred alkyl benzene sulfonate is the sodium or potassium dodecyl benzene sulfonate, e.g. sodium linear dodecyl benzene sulfonate.

[0064] The primary and secondary alkyl sulfonates can be made by reacting long chain alpha-olefins with sulfites or bisulfites, e.g. sodium bisulfite. The alkyl sulfonates can also be made by reacting long chain normal paraffin hydrocarbons with sulfur dioxide and oxygen as described in U.S. Pat. Nos. 2,503,280, 2,507,088, 3,372, 188 and 3,260,741 to obtain normal or secondary higher alkyl sulfonates suitable for use as surfactant detergents.

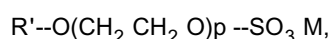
[0065] The alkyl substituent is preferably linear, i.e. normal alkyl, however, branched chain alkyl sulfonates can be employed, although they are not as good with respect to biodegradability. The alkane, i.e. alkyl, substituent may be terminally sulfonated or may be joined, for example, to the carbon atom of the chain, i.e. may be a secondary sulfonate. It is understood in the art that the substituent may be joined to any carbon on the alkyl chain. The higher alkyl sulfonates can be used as the alkali metal salts, such as sodium and potassium. The preferred salts are the sodium salts. The preferred alkyl sulfonates are the C₁₀ to C₁₈ primary normal alkyl sodium and potassium sulfonates, with the C₁₀ to C₁₅ primary normal alkyl sulfonate salt being more preferred.

[0066] Mixtures of higher alkyl benzene sulfonates and higher alkyl sulfonates can be used as well as mixtures of higher alkyl benzene sulfonates and higher alkyl polyether sulfates.

Also normal alkyl and branched chain alkyl sulfates (e.g., primary alkyl sulfates) may be used as the anionic component).

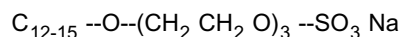
[0067] The higher alkyl polyether sulfates used in accordance with the present invention can be normal or branched chain alkyl and contain lower alkoxy groups which can contain two or three carbon atoms. The normal higher alkyl polyether sulfates are preferred in that they have a higher degree of biodegradability than the branched chain alkyl and the lower poly alkoxy groups are preferably ethoxy groups.

[0068] The preferred higher alkyl poly ethoxy sulfates used in accordance with the present invention are represented by the formula:



where R' is C₈ to C₂₀ alkyl, preferably C₁₀ to C₁₈ and more preferably C₁₂ to C₁₅; p is 2 to 8, preferably 2 to 6, and more preferably 2 to 4; and M is an alkali metal, such as sodium and potassium, or an ammonium cation. The sodium and potassium salts are preferred.

[0069] A preferred higher alkyl poly ethoxylated sulfate is the sodium salt of a triethoxy C₁₂ to C₁₅ alcohol sulfate having the formula:



[0070] Examples of suitable alkyl ethoxy sulfates that can be used in accordance with the present invention are C₁₂₋₁₅ normal or primary alkyl triethoxy sulfate, sodium salt; n-decyl diethoxy sulfate, sodium salt; C₁₂ primary alkyl diethoxy sulfate, ammonium salt; C₁₂ primary alkyl triethoxy sulfate, sodium salt; C₁₅ primary alkyl tetraethoxy sulfate, sodium salt, mixed C₁₄₋₁₅ normal primary alkyl mixed tri- and tetraethoxy sulfate, sodium salt; stearyl pentaethoxy sulfate, sodium salt; and mixed C₁₀₋₁₈ normal primary alkyl triethoxy sulfate, potassium salt.

[0071] The normal alkyl ethoxy sulfates are readily biodegradable and are preferred. The alkyl poly-lower alkoxy sulfates can be used in mixtures with each other and/or in mixtures with the above discussed higher alkyl benzene, alkyl sulfonates, or alkyl sulfates.

[0072] The alkali metal higher alkyl poly ethoxy sulfate can be used with the alkylbenzene sulfonate and/or with an alkyl sulfonate or sulfonate, in an amount of 0 to 70%, preferably 10 to 50% and more preferably 10 to 20% by weight of entire composition.

[0073] Anionic surfactants particularly useful for this application include, but are not limited to: linear alkyl benzene sulfonates (e.g. Vista® C-500 from Vista Chemical Co.), alkyl sulfates (e.g. Polystep® B-5 from Stepan Co.), polyoxyethylenated alkyl sulfates (e.g. Standapol® ES-3 from Stepan Co.), alpha olefin sulfonates (e.g. Witconate® AOS from Witco Corp.), alpha sulfo methyl esters (e.g. Alpha-Step® MC-48 from Stepan Co.), alkyl ether sulfates and isethionates (e.g. Jordapon® CI from PPG Industries Inc.).

[0074] Anionic surfactants may be added pre-neutralized or, preferably, may be formed in situ, by neutralizing a precursor acid (fatty acid in the case of soaps). Further, the anionic precursor or fatty acid should be over-neutralised (i.e. there should be an excess of the alkaline material used to form the counter-ion). Inorganic salt, preferably, sodium or potassium salt of the anionic precursor acid is preferred to improve detergency, but organic salt results in improved transparency.

Cationic Surfactants

[0075] Many cationic surfactants are known in the art, and almost any cationic surfactant having at least one long chain alkyl group of about 10 to 24 carbon atoms is suitable in the present invention. Such compounds are described in "Cationic Surfactants", Jungermann, 1970, incorporated by reference. Specific cationic surfactants which can be used as surfactants in the subject invention are described in detail in U.S. Pat. No. 4,497,718, hereby incorporated by reference.

[0076] As with the nonionic and anionic surfactants, the compositions of the invention may use cationic surfactants alone or in combination with any of the other surfactants known in the art. Of course, the compositions may contain no cationic surfactants at all.

Amphoteric Surfactants

[0077] Ampholytic synthetic detergents can be broadly described as derivatives of aliphatic or aliphatic derivatives of heterocyclic secondary and tertiary amines in which the aliphatic radical may be a straight chain or a branched and wherein one of the aliphatic substituents contains from about 8 to 18 carbon atoms and at least one contains an anionic water-solubilizing group, e.g. carboxylate, sulfonate, sulfate. Examples of compounds falling within this definition are sodium 3(dodecylamino)propionate, sodium 3-(dodecylamino)propane-1-sulfonate, sodium 2-(dodecylamino)ethyl sulfate, sodium 2-(dimethylamino)octadecanoate, disodium 3-(N-carboxymethyldodecylamino)propane 1-sulfonate, disodium octadecyl- imminodiacetate, sodium 1-carboxymethyl-2-undecylimidazole, and sodium N, N-bis(2-hydroxyethyl)-2-sulfato-3-dodecoxypropylamine. Sodium 3-(dodecylamino)propane-1-sulfonate is preferred.

[0078] Zwitterionic surfactants can be broadly described as derivatives of secondary and tertiary amines, derivatives of heterocyclic secondary and tertiary amines, or derivatives of quaternary ammonium, quaternary phosphonium or tertiary sulfonium compounds. The cationic atom in the quaternary compound can be part of a heterocyclic ring. In all of these compounds there is at least one aliphatic group, straight chain or branched, containing from about 3 to 18 carbon atoms and at least one aliphatic substituent containing an anionic water solubilizing group, e. g., carboxy, sulfonate, sulfate, phosphate, or phosphonate.

[0079] Specific examples of zwitterionic surfactants which may be used are set forth in U.S. Pat. No. 4,062,647, hereby incorporated by reference.

[0080] Preferably, the surfactant in the laundry compositions of the invention is anionic and/or nonionic, especially

linear alkylbenzene sulfonate, alkyl ether sulfate, alcohol ethoxylates and mixtures thereof.

[0081] For higher foaming formulations (top-loading washing machines), mixtures of anionic and nonionic surfactants are especially preferred, for optimum greasy stain and particulate soil removal. When mixtures are used, the most effective mixtures employ anionic to nonionic ratio of from 10: 1 to 1:10, preferably from 5:1 to 1:5, most preferably from 3:1 to 1:3.

[0082] When low foaming formulations are desired, e.g., for front-loading machines, nonionic surfactants are employed, in the absence of, or lower levels of, anionic surfactants, alone or in combination with cationic surfactants and/or antifoams.

Dye

[0083] Preferably, one or both of the phases is colored. Suitable dyes include but are not limited to:

Family Structure

Acridine

Acridone (including Anthraquinone and Pyrene)

Arylmethane

Azo

Diazonium

Nitro

Phthalocyanine

Quinone Imine

Tetrazolium

Thiazole

Xanthene

[0084] The inventive compositions generally include from 0.0001 to 1%, more preferably from 0.0005 to 0.1%, most preferably from 0.0001 to 0.1% of the dye, in order to provide a pleasing appearance (% by weight of the composition).

Capsules

[0085] The compositions may include encapsulated ingredients, preferably in the form of transparent or colored capsules or an emulsion, or a dispersion. These capsules, emulsion, or dispersion, may be distributed in one or more layers of the inventive compositions, or may be present as an additional layer. Preferred ingredients to be encapsulated are enzymes, bleaches, colorants, perfumes, and mixtures thereof to minimize the damage to these ingredients from water or surfactant, or alkaline ingredients, and/or to enhance the appearance of the product. Preferred inventive compositions comprise from 0.5 to 20%, more preferably from 0.1 to 10%, most preferably from 0.3 to 6%, and optimally from 0.5 to 5%, in order to attain optimum performance and/or appearance (% by weight of the composition).

[0086] The preferred laundry composition may further include one or more well-known laundry ingredients, such as builders (from 0.1 to 20%), anti-redeposition agents, fluorescent dyes, perfumes, soil-release polymers, colorant, enzymes, buffering agents, antifoam agents, UV-absorber, a bleach, a bleach precursor, a whitening agent, a fabric softener, an anti-wrinkle compound, a dye fixative, dye transfer inhibitors, a perfume, a silicone oil, and mixtures thereof. The preferred enzymes include proteases, lipases, cellulase, amylase, bleaching enzymes and the like.

[0087] The packages of the invention may be prepared from polyvinyl alcohol film, or other suitable material, which is filled, then sealed, preferably heat-sealed or water-sealed.

[0088] The following specific examples further illustrate the invention, but the invention is not limited thereto.

EXAMPLE 1

[0089]

Ingredient	supplier	%
<i>Top liquid layer</i>		
Water		3.73
Propylene glycol	Eastman Chemical	3.73

(continued)

Ingredient	supplier	%
<i>Top liquid layer</i>		
Xylene Sulfonate, 25% active	Stepan	6.22
Alcohol ethoxylate nonionic surfactant Neodol®25-9	Shell Chemical	9.95
Linear alkylbenzene sulfonic acid	Stepan	9.95
Alcohol Ethoxylate Sulfate, 59.39%	Stepan	16.76
50% NaOH	Pioneer, Petro Product	2.82
Fluorescent dye	Ciba-Geigy	0.22
Miscellaneous		2.00
<i>Bottom solid layer</i>		
Zeolite 4A	Unichema	13.81
soda ash	FMC	9.50
Water		21.31

[0090] The formulation was prepared in two parts and the order of addition was followed by the order of listed ingredients. The bottom layer was prepared and agitated at about 46°C. A polyvinyl alcohol pouch was prepared by heat-sealing three sides. The bottom layer was filled first and followed by the top liquid layer component. Subsequently, the top opening was also heat-sealed. The pouch was standing due to the lower center of mass contributed by the higher density of bottom layer. The bottom layer of this formulation was setup into a piece of solid block between 30 minutes to three hours. Once the block was formed, the pouch was standing up by itself, having the appearance substantially as depicted in Figures 1 and 2.

[0091] It should be understood, of course, that the specific forms of the invention herein illustrated and described are intended to be representative only as certain changes may be made therein without departing from the clear teachings of the disclosure. Accordingly reference should be made to the following appended claims in determining the full scope of the invention.

Claims

1. A pouch comprising:

- (a) a body made of a flexible material,
- (b) a laundry composition, the composition comprising at least two phases, one phase of the composition being solid and forming a base upon which said pouch can stand without additional support.

2. The pouch of claim 1 wherein the pouch is made at least in part of a water-soluble film.

3. The pouch of claim 1 or claim 2, wherein the pouch body comprises a fold made of the flexible material folded on itself to form a folded side of the pouch, the flexible material being sealed to itself to form at least two further sides of the pouch.

4. The pouch of claim 3 wherein the solid phase rests on the folded side of the pouch.

5. The pouch of any preceding claim wherein the sides of the pouch are inclined toward each other.

6. The pouch of any preceding claim wherein the pouch comprises at least two sealed edges.

7. The pouch of claim 6 wherein the solid phase rests on the side of the pouch having a sealed edge.

8. The pouch of any preceding claim wherein the solid phase rests on the side of the pouch which does not have a

sealed edge.

5 9. The pouch of any preceding claim wherein the density of the solid phase is higher than the density of the other phase of the composition.

10. The pouch of claim 9 wherein the densities of the two phases differ by at least about 0.2 g/l.

11. The pouch of any preceding claim, comprising at least three sealed edges.

10 12. The pouch of any preceding claim wherein the solid phase comprises an ingredient selected from water-soluble solute, water-insoluble particulate and mixtures thereof.

13. The pouch of any preceding claim wherein the sides of the pouch are inclined toward the top of the pouch.

15 14. The pouch of any preceding claim wherein the pouch is in the shape a tetrahedron.

15. The pouch of any preceding claim wherein the pouch has a square or a rectangular planar view.

16. The pouch of any preceding claim wherein the solid phase is formed from a structured aqueous solution.

20 17. The pouch of claim 16 wherein the solid phase is formed from an aqueous surfactant solution structured with soap.

18. The pouch of any preceding claim wherein the sides of the pouch are inclined toward the top of the pouch.

25 19. The pouch of any preceding claim wherein one of the at least two phases is a hydrophilic or hydrophobic liquid.

20. The pouch of any preceding claim wherein the composition comprises at least three phases.

30 21. A process of making the pouch of any of claims 1-20, wherein the process comprises filling the pouch with a laundry composition comprising a high density ingredient, which forms the solid phase upon standing.

22. A process of making the pouch of any of claims 1-20, wherein the process comprises filling the pouch with a liquid and, subsequently, structuring the liquid, to form the solid phase.

Fig.1

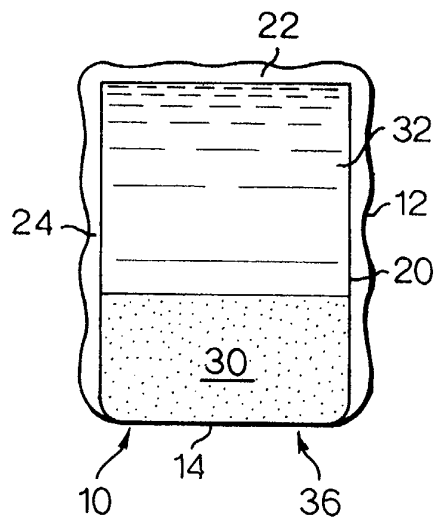


Fig.2.

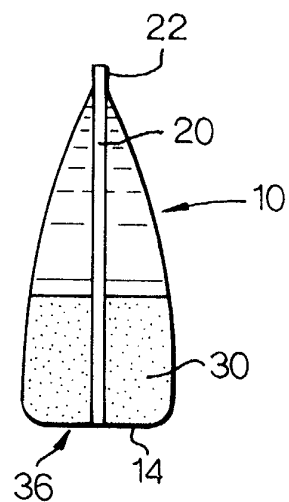


Fig.3.

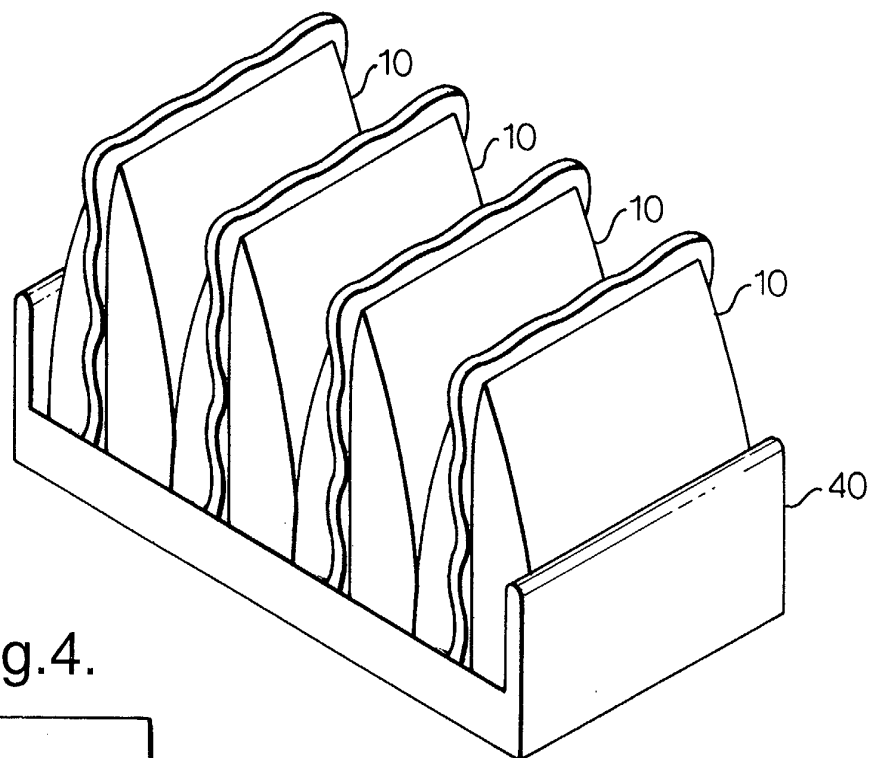
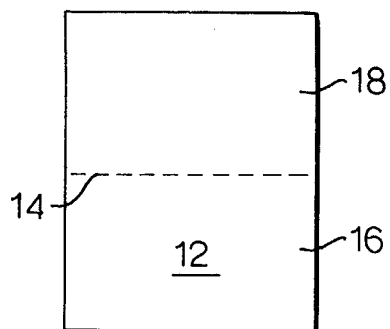


Fig.4.





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 02 25 8562

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.7)
A	EP 0 626 319 A (PROCTER & GAMBLE) 30 November 1994 (1994-11-30) * figures 1,8,9 * * claims 1-8 * * page 5, line 4 - line 6 * ---	1-22	C11D17/04
A	EP 0 654 418 A (PROCTER & GAMBLE) 24 May 1995 (1995-05-24) * claims 1-3,5 * ---	1-22	
A	EP 0 321 179 A (UNILEVER PLC) 21 June 1989 (1989-06-21) * figures * * claims * -----	1-22	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7) C11D B65D
Place of search THE HAGUE		Date of completion of the search 19 March 2003	Examiner Neys, P
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 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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