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DETERGENT CAKE AND METHOD OF MAKING SAME

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8 Claims. (Cl. 252—161)

This invention relates to improvements in organic detergent cakes and more particularly to an improved homogeneous synthetic detergent cake and a process for the production thereof.

Synthetic detergents have been used for years as liquid solutions and as particulate solids. Built or filled synthetic detergents and even certain essentially unbuilt synthetic detergents have been marketed in cake or bar form. Most of these non-soap products possess performance characteristics superior to those of the fatty acid soaps. The synthetic detergents do not form objectionable soap curd because they are not precipitated by alkaline earth ions present in the wash water. Usually the synthetic detergents wash better and often they foam better than soaps.

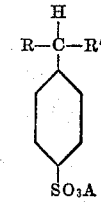
Notwithstanding these inherent advantages, soaps still account for almost all the toilet bar detergent sold in this country today. One of the reasons for this pre-eminence is the relatively easy processability of soaps into firm bars. On the other hand synthetic detergent cakes suitable for toilet use (those containing only small amounts of inorganic builders) are usually difficult to make into a homogeneous bar by milling and plodding in the absence of special adjuvants. When used alone they must often be briquetted or otherwise manufactured into tablets by methods much different from those commonly employed on soaps; consequently different processing machinery is needed. In addition, the synthetic detergents are generally more critical as far as working conditions are concerned and, once formed into bars, often the finished product has a tendency to crumble unless plasticizing or binding agents are added to the formula to improve the cohesivity of the detergent.

In the past it has been found that many synthetic organic detergents of low inorganic salt content can be manufactured in bar form if certain plasticizers are employed and processing conditions, e.g., temperature, moisture content, are kept within established limits. If such a method is followed many detergents can be milled and plodded which are extremely difficult to work otherwise. Using that process even the alkyl aryl sulfonates, whose alkyl groups are highly branched polyalkylene or keryl, can be made into detergent cakes. However, in the absence of relatively large amounts of inorganic salt filler an improvement over the mentioned process is necessary to justify commercial production of milled and plodded alkyl aryl sulfonate bars in soap-making machinery. In this specification the words, "alkyl aryl sulfonate," as used above, denote a branched polyalkylene or keryl aryl sulfonate unless otherwise indicated; "alkyl aryl sulfonate type" includes compounds having a straight chain alkyl group. This usage of "alkyl aryl sulfonate" is consistent with that generally prevalent among those skilled in the detergent art, where, for example, it is commonplace to refer to, as dodecyl benzene sulfonate, the sulfonated alkylated benzene whose alkyl group is a highly branched propylene tetramer or a keryl group of an average of about 12 carbon atoms. The word "keryl"

identifies the type of mixture of alkyl groups obtained in an alkyl aryl sulfonate made by chlorination of kerosene followed by reaction with benzene (usually in presence of aluminum chloride) and sulfonation. Keryl radicals contain relatively large amounts of straight chain hydrocarbon medially joined to the aryl radical.

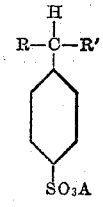
It has been found that the processing of detergents into bars and cakes can be greatly facilitated if, instead of the branched chain compounds, e.g., tetrapropylene aryl sulfonate, or varied mixtures containing high percentages of the sulfonated more centrally phenylated straight chain higher alkane, e.g., keryl benzene sulfonate, a particular straight chain alkyl aryl sulfonate type compound is employed. In addition, a bar is obtained which foams well, has excellent detersive properties and is hard but soap-like to the touch.

In accordance with the present invention a substantially wax-free homogeneous detergent cake consists essentially of 50–95% of a normally solid water soluable non-soap non-cationic organic detergent material including 10–95% of the cake weight of

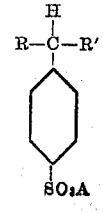


wherein R is a normal saturated alkyl radical, R' is a member of the group consisting of hydrogen and methyl, the sum of the carbon atoms of R and R' being from 7 to 17, *and* A is a salt-forming cation, and 5–25% of an organic plasticizer for the said organic detergent, the sum of the said detergent and plasticizer being at least 75% of the cake weight.

The organic detergent of the invented composition may be all



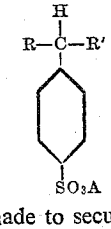
or may be partly made up of other synthetic detergents. Of the other organic synthetic detergents that may be employed in the invented compositions it is preferred to use those which are of crystalline structure, coherable by addition of suitable plasticizers, workable and capable of making a comparatively hard bar, soap-like in appearance and feel. These are straight chain compounds or are of relatively slight branching or no branching at all. Among the usable detergents are water soluable salts (usually the sodium, potassium, ammonium or alkanolamine salts, but other salts such as those of divalent metals, e.g., magnesium, may also be used) of terminally sulfated and sulfonated acyclic compounds, preferably relatively straight chain compounds, having a straight hydrocarbon chain of 8–20 carbon atoms. Generally at least 10% of this material will be used unless the bar is to contain only



as the detergent. By "relatively straight chain" compound is meant a compound having no side branching from a carbon, nitrogen or other atom, or only one low molecular weight radical, e.g., methyl, hydroxyl, branching therefrom. Carbonyl oxygen attached to a carbon of the straight chain (as in the case of an ester) is not considered to be a branch because it is not a radical independent of the chain carbon. Examples of this class of detergents are the sodium salts of the sulfuric esters, including the sulfated higher fatty alcohols and derivatives, e.g., tallow alcohol sulfate, lauryl alcohol sulfate, sulfated oxyethylated fatty alcohol, e.g., sulfated oxyethylated tallow alcohol of about 1–6 ethylene oxide groups, and the sulfated higher fatty acid monoglycerides, e.g., the monosulfated monoglyceride of coconut oil fatty acids, the monosulfated monoglyceride of tallow fatty acids, lauroyl monoglyceride monosulfate. Among the sulfonated compounds are the sodium sulfonate salts of higher fatty acid derivatives of alkane sulfonic acids, in which group are the higher fatty acid esters of lower alkane hydroxy sulfonic acids, e.g., oleic acid ester of isethionic acid, the higher fatty acid amides of lower alkane amino sulfonic acids, e.g., oleic acid amide of methyl taurine, and esters of sulfonated carboxylic acids, e.g., sodium lauryl sulfoacetate. Other normally solid water soluble detergent salts of sulfuric reaction products of higher molecular weight organic compounds of acceptable milling and plodding properties may also be employed, as may anionic synthetic detergents containing no sulfur, e.g., sodium N-lauroyl sarcosine.

Normally solid nonionic detergents, e.g., the acyclic long chain nonionic synthetic detergents can be used. Included in this latter group are essentially straight chain polymerized alkylene oxide condensates having more than five alkylene oxide groups in straight line configuration, e.g., higher fatty acid esters of polyoxethylene alcohols, ethylene oxide-propylene oxide block copolymers of molecular weight between 5,000 and 20,000, and so forth.

The non-soap non-cationic detergents of properties described above may be used individually with



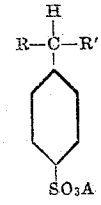
or mixtures may be made to secure desired properties.

As already mentioned, the usual branched chain alkyl aryl sulfonates (which are the compounds intended by those skilled in the art when they speak without qualification of alkyl aryl sulfonates) are not desirable constituents of detergent bars. The most prominent of this class of compounds are the highly branched alkylated benzene sulfonates, wherein the alkyl group is a polypropylene or polybutylene radical of about 12–15 carbon atoms, e.g., dodecyl benzene sulfonate. These materials make excellent heavy duty washing powders when built with inorganic salts but are tough and rubbery in low-salt content detergent bar formulas and resist normal processing more than solid detergents characterized by a crystalline structure. They require excessive power to be worked into bars and often stall the manufacturing equipment. The keryl benzene sulfonates are not as resistant to milling and plodding as the polyalkylene derivatives mentioned but they too are difficult to process.

In the detergent bar formulas of this specification, containing as they do, only small amounts of inorganic salts, no more than 10% of the highly branched alkyl aryl sulfonates (polyalkylene benzene sulfonate and keryl aryl sulfonate) should be included. If possible the amount of these materials should be held to a minimum.

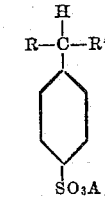
In no case should so much of these branched chain mononuclear hydrocarbon sulfonates be employed as to cause the detergent bar formulas to become tough and rubbery. More than 10% of these alkyl aryl sulfonates will usually sufficiently antagonistically affect a detergent bar formula to seriously decrease its commerical importance. In addition to processing difficulties the finished bar containing alkyl aryl sulfonate will often be soft and tacky to the skin.

In contrast to the considerable difficulty encountered in manufacturing a detergent bar containing more than 10% of the usual branched chain alkyl aryl sulfonates it has been found that two particular alkyl aryl sulfonate type compounds can be incorporated in detergent bars without any adverse reaction. These specific materials are water soluable salts of para sulfonated 1-phenyl normal higher alkane and para sulfonated 2-phenyl normal higher alkane. The latter compound, having only a terminal methyl branch, is considered relatively straight chain and not a member of the class of branched alkyl aryl sulfonates. The salt forming radical is preferably sodium but others such as potassium, ammonium, alkylolamine and magnesium also find use. A detergent bar having



present possesses the detergency attributable to the alkyl aryl class of compounds but can be milled and plodded almost as easily as a soap bar. In addition, the finished bars resulting are firm and are of a soap-like appearance. They even possess the glossy surface characteristic of soap.

To obtain a balance of detergency and foaming power a mixture of



compounds may be employed. In a typical mixture of this type the sum of R and R′ varies from 7–17 carbon atoms. By regulating the proportions of constituents in such a mixture a range of detergent solubilities and other properties can be obtained.

The superior processing and product characteristics noted in the invented detergent composition are specific to the parasulfonated compounds. Ortho sulfonated 1-phenyl- and 2-phenyl-n-dodecanes are less crystalline and more likely to be rubbery and excessively soft. 3-phenyl, 4-phenyl-, and other similar more medially phenylated n-dodecane compounds, sulfonated either ortho or para, are also too tough for commercial processing in soap equipment. Therefore, ortho sulfonates and the more centrally phenylated compounds, being similar to highly branched alkyl aryl compounds in processing characteristics, should not be present in detergent bar formulas in excess of 10% of the cake weight and the total of these compounds and the usual alkyl aryl sulfonates should not exceed that 10%.

Organic substances which can cause synthetic detergents to coalesce or cohere to form a firm homogeneous bar or cake are used as plasticizers. These compounds must possess both hydrophilic and lipophilic groups in proper balance to satisfactorily plasticize the synthetic

detergents into a homogeneous bar and to facilitate ultimate emulsification by the wash water. The hydrophilic and lipophilic groups increase the mutual solubility of detergent and plasticizer and so allow production of a homogeneous product. The plasticizers should not have an adverse effect on the foaming characteristics or other properties of the detergent cake. Usually the plasticizers used will be saturated compounds not easily subject to oxidation or rancidification. They are often firm solids at about room temperature and liquid or pastry or soft at temperatures from 100°–150° F.

Organic compounds which are satisfactory plasticizing agents are the saturated higher fatty alcohols and acids such as lauryl, myristyl, cetyl, and stearyl alcohols and acids. Of these the preferred plasticizers are cetyl and stearyl alcohols because of their relatively low softening and melting points, solidity at room temperature, excellent emollient action on the skin, and freedom from inherent undesirable odor. Also among the present plasticizers are the higher fatty acid partial esters of low molecular weight polyhydric alcohols such as the glycerol mono- and diesters of coconut oil acids or higher fatty acids of 12 to 18 carbon atoms, the monostearate of ethylene glycol, the monoesters of coconut oil fatty acids and other higher fatty acids of 12–18 carbon atoms with diethylene glycol and propylene glycol and the like. These esters are normally solids or resemble oily liquids and dissolve or disperse in water at a relatively slow rate (so that they do not leach out of soap too rapidly). The normally solid polyethylene glycols, e.g., carbowaxes of the order of molecular weight of Carbowax 6000, are satisfactory plasticizers, where quick solubility is desired.

Of the classes of plasticizers recited the higher fatty alcohols are doubly desirable because minor amounts thereof enhance and stabilize the foam of many snythetic organic detergents. Fatty acids and the disclosed partial esters are also foam stabilizers but not of as extensive applicability.

It is important that the plasticizer used should be emulsifiable by the detergent employed and the specific plasticizers mentioned above, having a satisfactory hydrophile-lipophile balance, are emulsifiable in usual washing concentrations. Consequently they do not leave objectionable scales or deposits of waxy material on the skin of the consumer. Paraffin waxes and the higher ester animal and vegetable waxes, e.g., carnauba, montan waxes, spermacetti, and other similar materials lacking a hydrophilic radical are not readily emulsified under normal use conditions and so are not useful as plasticizing ingredients of the present bars. In addition, because waxy materials are not possessed of hydrophile groups they do not promote, and do inhibit the blending of the detergent composition ingredients into a homogeneous cake. They should not be used in the present bar formulas.

Normally liquid plasticizers may be employed but amounts of such materials in the bar composition must be kept low enough so that the finished bar is not excessively soft, and can be processed easily. Correspondingly, "short" detergent bar compositions can often be made more workable by use of softer or liquid plasticizers. Experimentation has shown that at least 5% of plasticizer must be used to cause the present detergent bars to cohere sufficiently. No more than 25% can be incorporated in a detergent cake formula without seriously modifying detergent properties or harming foam. More than this amount often adversely affects the foaming power of the detergent cake and makes it excessively soft. Generally 5–15%, preferably about 10% of plasticizer is used.

Because, as shown below, the total of inorganic salts, water and adjuvants should be kept at 25% of cake weight or lower, when less than 25% plasticizer is employed the lower limit of total amount of organic detergent must be correspondingly raised.

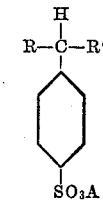
Inorganic salts (water soluble) should not exceed 10% of the cake weight (exclusive of water of hydration). More than this amount will tend to make the bar hard and unlike soap in tactile characteristics. Some salts when present in excess of 10% will impair detergent solubility characteristics and decrease foam. Frequently the salt, especially if it is sodium sulfate, will crystallize on the bar surface leading to an unsalable product of unsightly appearance. As examples of the salts used or found in detergent bars may be named sodium chloride, sodium sulfate, borax, soda ash and sodium tripolyphosphate.

In detergent bars of low salt content water is undesirable. More than 5% hinders milling, plodding and pressing of these detergents and normally less than 2% of water should be found in a detergent cake formula. It is preferred that the water and inorganic salt contents of the present detergent bars should be held to a minimum.

Other adjuvants, excluding plasticizer, water and inorganic salts, may be added up to a maximum total of such adjuvants of 10% to modify bar properties. More than this amount is undesirable and usually is also uneconomic. Thus sodium carboxymethyl cellulose in small amounts increases detergency and soil suspension action of a detergent. It is preferred to employ this particular stable cellulose derivative rather than those which discolor on aging, e.g., those derived from seaweeds. Higher fatty acid alkylolamides improve detergent foaming power. Glycerine enhances bar gloss. Compatible bactericides, e.g., hexachlorophene, may be added to make a germicidal detergent. Opacificers and whiteners, e.g., titanium dioxide, perfumes, coloring agents, preservatives, if desired, and so forth may also find use.

Of the synthetic detergents the higher fatty alcohol sulfates and higher fatty acid monoglyceride monosulfates are especially preferred because of their excellent detergency and overall suitability for use as toilet preparations. The fatty alcohol sulfates containing a predominant amount of stearyl alcohol sulfate, e.g., sulfates of tallow alcohol and hydrogenated tallow alcohol, are firmer than many of the detergents whose alkyl groups are of less than 18 carbon atoms and consequently are favored when a firm bar is desired. Softer detergents can be blended with such stearyl sulfate detergents to make a bar of an acceptable hardness. Thus a blend of sodium salts of higher fatty alcohol sulfate and coco fatty acid monoglyceride monosulfate makes a very satisfactory bar formula when plasticized properly. A good detergent bar very often is a blend of various component detergents because it has been found that the various types of such compounds each possesses a superior detersive power specific to a special type of soil, apparently dependent on the related molecular structures of the soil and detergent. A binary composition of detergent salts of higher fatty alkyl sulfuric acid or higher fatty acid monoglyceride monosulfate and alkyl aryl sulfonic acid type or a ternary mixture of all three is a good blended detergent so far as detergency is concerned.

When plasticized with higher fatty alcohol or higher fatty acid alkyl benzene sulfonate becomes soft, and even when present in a detergent bar in relatively small amounts, e.g., 20% sodium alkyl benzene sulfonate with 10% cetyl alcohol, it will soften the bar. If the alkyl benzene sulfonate is replaced with sodium para sulfonated 1- or 2-phenyl n-dodecane or other compound of the type



a firm bar formula, readily milled and plodded, is ob-

tained, while the advantages of a sulfonated alkylated benzene type detergent is retained. Such a formula should contain at least 10% of the particular sulfonated phenyl n-dodecane compound mentioned, a total of 50–95% synthetic detergent (including the sulfonated n-dodecane compounds) and 5–25% higher fatty alcohol as a plasticizer. The 50–95% may comprise a mixture of the particular sulfonated n-dodecane compounds and other acceptable synthetic detergents, e.g., tallow alcohol sulfate, coco fatty acid monoglyceride monosulfate. If desired or necessary adjuvant materials up to 10%, water up to 5% and inorganic salts up to 10% may be used. No more than a total of 10% alkyl aryl sulfonate (highly branched alkylene polymer or keryl type) and salt of ortho sulfonated 1- or 2-phenyl n-dodecane and salts of more medially phenylated n-alkane sulfonate may be used since these tend to soften the finished bar and cause processing difficulty.

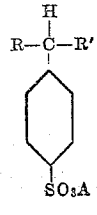
The detergent bars according to this invention contain all the constituent materials in a homogeneous mass. Thus, they are not mixtures of visibly discrete detergent particles surrounded by binder; rather the plasticizer, detergent and other components are intimately combined in a homogeneous mixture. This assures that the finished bar will be uniform in quality, decreases the likelihood of a preferential leaching out of certain ingredients and resulting sponginess of the bar and allows production of a dense well compacted firm bar having a smooth soap-like appearance. In short these bars will have the advantages of a French-milled soap.

The homogeneous substantially wax-free detergent composition may be prepared by various practicable homogeizing techniques. It is preferred to mill the mixture of components on standard soap mills until the resulting chips show no visible over-concentration of any ingredient.

After milling the chips may be compacted, preferably by plodding in a soap plodder of the usual commercial type. This plodder may be equipped with a vacuum chamber to remove all air from the bar. After plodding or a compacting extrusion the resulting bar is cut into blanks and shaped by a soap press. Under favorable conditions the chips may even be pressed without plodding. Very high pressures (often over 1000 pounds per square inch) should be used when pressing chips without previously plodding them into bars. Usually slightly more plasticizer than usual (but no more than 25%) and preheating of the detergent chips will promote true coherence of the pressed chips. In any case the chips must be formed into a homogeneous cake for the process to be successful.

It is of great importance that the detergent bar formula of this invention can be processed on the normal soap-making equipment at present in use in most major soap nizing techniques. It is preferred to mill the mixture of factories. This equipment comprises (1) amalgamator (a mixer), (2) mill (a homogenizer), (3) plodder (to compact and extrude the milled chips), and (4) a press to stamp the soap in final form. Much money has already been invested in these machines and this equipment cannot be replaced with special machines adapted to process only detergents because soap bars are still in great demand.

The procedure followed in processing the present detergent compositions on soap machinery is in general similar to that employed in soap making. Dried detergent chips,



(and A is preferably sodium), plasticizer and adjuvants are mixed in a soap amalgamator. Alternatively they may be mixed in a liquid or wet state and then may be solidified or dried by tunnel drier, drum drier or other device or process. After mixing the dry ingredients, they are made into a homogeneous product by vigorous shearing and working. This is best accomplished by the use of a soap mill.

The homogeneous dispersion of ingredients in particle or chip form is then plodded in a conventional plodder into uniform homogeneous plodder bars of good coherence and coalescence. The plodder bar is cut into lengths or blanks and is pressed in conventional soap-pressing equipment.

Milling should be conducted at a temperature below that at which formula ingredients deteriorate and at a temperature below that of liquefaction of the formula. Thus the milling should never be at a temperature over 170° F. Preferably the first mill roll or rolls should be heated slightly (to about 110–130° F.) to cause softening of the plasticizer and promote its intimate mixture with the other formula components. However, the latter rolls should either not be heated or should be cooled to keep the detergent chips from being too soft for proper feeding, plodding or pressing. Thus, latter mill roll temperatures of 60°–80° F. are desirable. Because the energy of working also raises the chip temperature it will be higher than the temperature of the latter chill rolls.

In plodding, the temperature of the plodding mass should never exceed the maximum allowable milling temperature, 170° F. or lower temperature at which the formula becomes too soft for proper plodding. Neither should the temperature be below 60° F. Temperature may be controlled by use of a water jacketed plodder. Generally an extruded bar should be between 100° F. and 130° F. for good coherence and pressing ease. Temperature regulation of the plodding head helps control the bar temperature. Use of a heated nozzle plate (about 10–15° F. above the bar temperature) smoothens the bar surface.

The vigorous working and pressure extrusion of the plodding operation compact the detergent chips into a firm homogeneous bar. As a plodder feed it is preferred to use a chip milled from a mixture of all the detergent bar ingredients. It is also possible to feed the individual components or mixture thereof into the plodder and plod at a suitable temperature between 100° F. and 170° F., the plodding operation providing the shearing action necessary to obtain a homogeneous product. The amount of plodding and the type thereof must be sufficient to produce a homogeneous bar. To facilitate production of a uniform bar it is desirable to use finely divided plodder feed if the feed is not already in a homogeneous condition.

The following examples are given for purposes of illustration only and are not to be regarded as limiting the scope of the invention. All amounts and percentages given in the specification and claims are by weight unless otherwise indicated.

Example I

A series of detergent cakes is made of the following general formula:

	Percent
Alkyl aryl sulfonate type detergent	45
Sodium salt of monosulfated monoglyceride of coconut oil acids (containing 10% sodium sulfate and 8% ether soluble material)	45
Tallow alcohol (Siponol T)	10

The following compounds are used as the alkyl aryl sulfonate type detergent in the above formula:

(1) Sodium salt of para sulfonated 1-phenyl n-dodecane
(2) Sodium salt of para sulfonated 1-phenyl n-octane
(3) Sodium salt of para sulfonated 2-phenyl n-tridecane
(4) Sodium salt of para sulfonated 2-phenyl n-heptadecane

The powdered ingredients are mixed together and milled by repeatedly passing through a three roll soap mill at room temperature until the chip exhibits no heterogeneity. The chip made is about .003 inch thick. The detergent chips are compressed into briquettes under high pressure or, preferably, are plodded in a soap plodder into a homogeneous plodder bar, which is cut and pressed at 110° F. in a conventional soap press. During milling and plodding the detergent temperature is kept between 80° F. and 120° F.

The processing characteristics of each formulation are noted and the cakes made are tested for foam, firmness, tactile properties and water solubility. All the above compositions are satisfactory in all such respects.

Example II

A detergent cake is made of the following formula:

	Percent
Sodium salt of para sulfonated 1-phenyl n-dodecane	25
Sodium salt of monosulfated monoglyceride of coconut oil acids (containing 10% sodium sulfate and 8% ether solubles)	43
Tallow alcohol sulfate (Sipex TS)	20
Solid polyethylene glycol (Carbowax 6000)	10
Perfume	1
Titanium dioxide	1

The powdered and liquid formula components are mixed, milled at a roll temperature of 75° F. until a homogeneous .004 inch chip is obtained, plodded at 130° F. (the plodder bar temperature), and pressed into cakes. This formula is readily processed into a lustrous smooth bar of satisfactory performance characteristics. Instead of the sodium salt of para sulfonated 1-phenyl n-dodecane other salts may also be used, e.g., potassium, lithium, ammonium, magnesium.

Example III

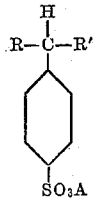
	Percent
Sodium salt of para sulfonated 1-phenyl n-dodecane	75
Sodium salt of sulfonated alkylated benzene, the alkyl being propylene tetramer (Ultrawet K, 85% active ingredient, 15% Na_2SO_4)	10
Tallow alcohol	15

The above formula is mixed, milled at 80° F. and plodded at 130° F. and the plodder bar is immediately cut and pressed into cake form in a soap press. The formula processes well, does not stick to soap dies or mill surfaces and is not tough. The finished product is a satisfactory toilet bar of good tactile properties, foam and cleansing power.

The above invention has been described in conjunction with various illustrative examples. It will be obvious to those skilled in the art that other variations and modifications of the invention can be made without departing from the principles disclosed or going outside the scope of the specification and the purview of the claims.

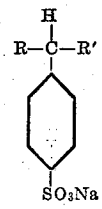
What is claimed is:

1. A substantially wax-free homogeneous detergent cake consisting essentially of 50–95% of normally solid water soluble non-soap non-cationic organic detergent material including 10–95% of the cake weight of at least one material having the formula



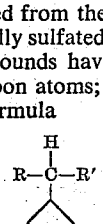
wherein R is a normal saturated alkyl radical, R' is a member of the group consisting of hydrogen and methyl, the sum of the carbon atoms of R and R' being 7–17, and A is a salt-forming cation, and 5–25% of an organic plasticizer selected from the group consisting of the normally solid polyethylene glycols and compounds possessing aliphatic groups of about 12–18 carbon atoms, said latter compounds having hydrophilic and lipophilic groups so as to be emulsifiable in washing solutions, the sum of the organic detergent material and plasticizer being at least 75% of the cake weight.

2. A substantially wax-free homogeneous milled, plodded and pressed detergent cake consisting essentially of 50–95% of a normally solid water soluble non-soap anionic detergent selected from the group consisting of salts of sulfated and sulfonated organic detergent materials having a straight hydrocarbon chain of 8–20 carbon atoms, the said anionic detergent including 10–95% of the cake weight of at least one material having the formula

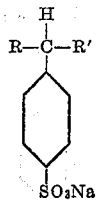


wherein R is a normal saturated alkyl radical, R' is a member of the group consisting of hydrogen and methyl, the sum of the carbon atoms of R and R' being 7–17 and 5–25% of a substantially saturated aliphatic plasticizer compound for the said organic detergent, having an aliphatic chain of 12–18 carbon atoms, with hydrophilic and lipophilic groups in balance in the plasticizer molecule so as to be emulsifiable in usual washing solutions of the detergent cake, the sum of said organic detergent and plasticizer being from 75–100% of the cake weight.

3. A substantially wax-free homogeneous plodded and pressed detergent cake consisting essentially of: 10–85% of a normally solid water soluble non-soap anionic detergent material selected from the group consisting of detergent salts of terminally sulfated and sulfonated relatively straight chain compounds having a straight hydrocarbon chain of 8–20 carbon atoms; 10–85% of at least one material having the formula



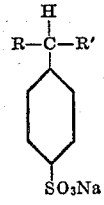
wherein R is a normal saturated alkyl radical, R' is a member of the group consisting a hydrogen and methyl, the sum of the carbon atoms of R and R' being from 7–17, the sum of relatively straight chain detergent salt and at least one material having the formula



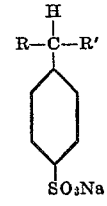
being from 50–95% of the cake weight; and 5–25% of a substantially saturated aliphatic organic plasticizer for the organic detergent, having a straight aliphatic chain of 12–18 carbon atoms, with hydrophilic and lipophilic groups in balance in the plasticizer molecule so as to be emulsifiable in usual washing solutions of the detergent cake, the sum of the said organic detergents and plasticizer being at least 75% of the cake weight.

4. A substantially wax-free homogeneous plodded and pressed detergent cake consisting essentially of: 10–85%

of a normally solid water soluble non-soap anionic detergent material selected from the group consisting of detergent salts of sulfated and sulfonated relatively straight chain compounds having a straight hydrocarbon chain of 8–20 carbon atoms; 10–85% of at least one material having the formula

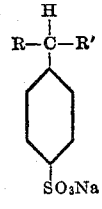


wherein R is a normal saturated alkyl radical, R′ is a member of the group consisting of hydrogen and methyl, the sum of the carbon atoms of R and R′ being from 7–17, the sum of relatively straight chain detergent salt and at least one material having the formula

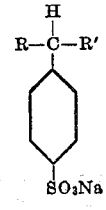


being from 50–95% of the cake weight; and 5–25% of a higher fatty alcohol, of about 12–18 carbon atoms, the sum of the said organic detergents and higher fatty alcohol being at least 75% of the cake weight.

5. A substantially wax-free homogeneous plodded and pressed detergent cake consisting essentially of: 10–85% of a normally solid water soluble non-soap anionic detergent salt having a straight hydrocarbon chain of 8–20 carbon atoms of the group consisting of sulfated higher fatty alcohols of 8–20 carbon atoms and monosulfated monoglycerides of fatty acids, the acids having 8–20 carbon atoms; 10–85% of at least one material having the formula



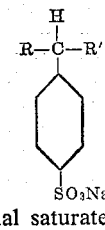
wherein R is a normal saturated alkyl radical, R′ is a member of the group consisting of hydrogen and methyl, the sum of the carbon atoms of R and R′ being from 7–17, the sum of relatively straight chain detergent salt and at least one material having the formula



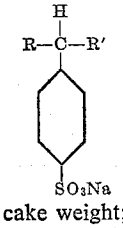
being from 50–95% of the cake weight; and 5–25% of a higher fatty alcohol of about 12–18 carbon atoms, the sum of the said organic detergents and higher fatty alcohol being at least 75% of the cake weight.

6. A substantially wax-free homogeneous plodded and pressed detergent cake consisting essentially of: 10–85% of the sodium salt of a monosulfated monoglyceride of a fatty acid, the said fatty acid having 12–18 carbon atoms;

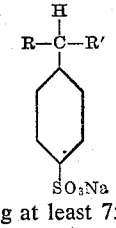
and 10–85% of at least one material having the formula



wherein R is a normal saturated alkyl radical, R′ is a member of the group consisting of hydrogen and methyl, the sum of the carbon atoms of R and R′ being from 7–17, the sum of the said sodium salt of monosulfated monoglyceride of higher fatty acid and at least one material having the formula

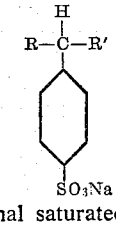


being 60–95% of the cake weight; and 5–15% of a fatty alcohol of 12–18 carbon atoms, the total of monosulfated monoglyceride salt, at least one material having the formula

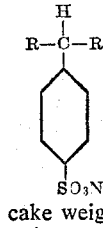


and fatty alcohol being at least 75% of the cake weight.

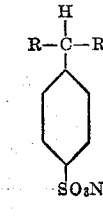
7. A substantially wax-free homogeneous milled, plodded and pressed detergent cake consisting essentially of: 10–85% of the sodium salt of the monosulfated monoglyceride of coconut fatty acids; 10–85% of at least one material having the formula



wherein R is a normal saturated alkyl radical of 6–17 carbon atoms and R′ is a member of the group consisting of hydrogen and methyl, the sum of the carbon atoms of R and R′ being from 7–17, the sum of the said sodium coco monoglyceride monosulfate and at least one material having the formula

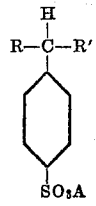


being 60–95% of the cake weight; and 5–15% of tallow alcohol, the total of said monosulfated monoglyceride salt, at least one material having the formula



and tallow alcohol being at least 75% of the cake weight.

8. A process for the manufacture of a substantially wax-free homogeneous detergent cake which comprises admixing the components of a detergent composition consisting essentially of 50–95% of a normally solid water soluble non-soap non-cationic organic detergent including 10–95% of the cake weight of at least one material having the formula



wherein R is a normal saturated alkyl radical, R′ is a member of the group consisting of hydrogen and methyl, the sum of the carbon atoms of R and R′ being from 7–17, and A is a salt-forming cation, and 5–25% of an organic plasticizer selected from the group consisting of the normally solid polyethylene glycols and compounds possessing aliphatic groups of 12–18 carbon atoms, said latter compounds having hydrophilic and lipophilic groups so as to be emulsifiable in washing solutions, the sum of the organic detergent material and plasticizer being at least 75% of the cake weight; forming a homogeneous solid composition from said mixture by exerting shearing actions thereon at a temperature between 60° F. and 170° F. while the mixture being sheared is under compression; and compressing the said homogeneous solid into a form-retaining homogeneous detergent cake.

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