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SYNTHETIC DETERGENT MILLED FLAKES

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This invention relates to novel compositions and forms of synthetic detergents and particularly to synthetic detergents which are in the form of thin flakes.

Soaps, which are products made by the saponification of oils, fats, and fatty acids, are marketed in various forms such as cakes, bars, chips, flakes, beads and powder. Each of these forms of soap has certain advantages. Among the comminuted forms of soap the chips and flakes are particularly convenient for many uses since they present a large surface area and yet they do not contain large amounts of dust and do not tend to cake within a package or form lumps when added to warm water. Soap chips are generally about 10 to 25 thousandths of an inch or more in thickness and therefore dissolve rather slowly whereas soap flakes produced by milling soap are usually from about 1 to 5 thousandths of an inch in thickness and dissolve very quickly.

The soap compositions used in producing thin, milled soap flakes generally contain about 90% of organic material and only about 2 or 3% of inorganic salts, the remainder being moisture. Flakes produced from such compositions are sufficiently plastic and pliable to permit them to be readily handled without crumbling or breaking and they do not dry out or become dusty on long standing. On the other hand, if the inorganic salt content of the soap composition exceeds about 10% of its weight, the moisture content of the soap must be increased in order to permit milling of the soap and even then the composition cannot be reduced in thickness much below 10 thousandths of an inch. Moreover, the resulting flakes are brittle and tend to dry out or crumble into a powder or dusty product on long standing or exposure to the atmosphere.

Numerous synthetic detergents have been developed in recent years which differ from soaps in that they are composed of the salts of sulfated or sulfonated organic compounds. In their most usual commercial form such synthetic detergents contain from about 50 to 70% of inorganic salts which are produced at least in part by neutralization of the sulfation or sulfonation reaction mixture in which there is an excess of the sulfating or sulfonating agent. Only about 30% or so of such products is usually active ingredients, i. e., the neutralized sulfate or sulfonate of the organic material. For this reason synthetic detergents possess very little inherent plasticity or strength and have not heretofore been capable of being milled to produce a satisfactory thin

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flaked product. When flakes formed of synthetic detergent compositions have been produced they have always crumbled readily and broken down into small pieces or particles and dust, particularly when shaken about or tumbled during packaging and handling. When filled into a package the flakes soon settle in the package so that the user on opening the package will find it only partially filled with a product of unattractive appearance from which dust may arise to irritate the nose and mucous membranes.

It has now been discovered that synthetic detergents can be converted into flakes which are only a few thousandths of an inch in thickness and yet possess the desired flexibility or non-crumbling characteristics necessary to enable them to be handled, packaged and shipped without objectionable crumbling. Furthermore, the composition can be milled and the flakes produced have a glossy, brilliant and transparent appearance. Compositions and products of this character are produced by adding a suitable softening agent to the synthetic detergent composition. It has further been discovered that the amount of the softening agent required is extremely limited and may be no more than a small fraction of the amount of inorganic salts in the product.

One of the objects of the present invention is to produce synthetic detergents in the form of thin flakes which will not crumble readily.

Another object of the invention is to provide a synthetic detergent product having a novel composition, form and appearance.

These and other objects and features of the present invention will appear from the following description thereof in which reference is made to specific examples of products and procedure embodying the invention for the purpose of indicating the nature of the invention but without intending to limit the scope thereof.

This application is a continuation-in-part of application Serial Number 563,457, filed November 14, 1944.

The synthetic detergents which may be used in the present invention are characterized by the presence in the molecule of an alkyl radical having from 8 to 22, preferably 10 to 18, carbon atoms and a sulfate or sulfonate group. They may be described as salts of organic sulfuric acid reaction products such as are obtained by neutralizing the reaction mixtures of sulfuric acid (or other sulfonating agent) and an organic compound having an alkyl chain of the stated length and a group which is reactive with sulfuric acid. Such a group may be, for example,

an unsaturated linkage ($C=C$) preferably near a terminal carbon such as in higher olefines; a hydroxyl substituent ($C-OH$) such as in fatty alcohols, mono and diglycerides of fatty acids; an aromatic substituent such as a benzene ring which may itself be substituted as in phenols, toluene, xylene, etc.

A typical synthetic detergent from which compositions and products embodying the present invention may be produced is that comprising from about 30 to 50% by weight of the sodium salt of coconut oil monoglyceride monosulfate and from 50 to 70% of sodium sulfate. Similar products containing the ammonium salt of coconut oil monoglyceride monosulfate also may be used and the invention is applicable to products in which the synthetic detergent is an alkali metal (e. g., sodium or potassium), alkaline earth metal (e. g., calcium or magnesium), ammonium or other water-soluble salt of the sulfuric acid reaction product. Other specific examples of synthetic detergents contemplated by the present invention are sodium lauryl sulfate, the sodium salts of sulfated fatty alcohols produced from coconut oil, palm kernel oil, tallow, and other related oils and fats, sodium monolaurin monosulfate, ammonium dilaurin monosulfate, sodium salts of esters of 1,2 dihydroxy propane-3 sulfonic acid with higher fatty acids derived from fats and oils of the stated types, water soluble salts of alcyated aromatic sulfonic acids such as sodium dodecyl benzene sulfonate, the sodium salts of the sulfonated alkane produced by condensing a paraffin fraction of predominately 12 carbon atom chain length with benzene, alkyl sulfoacetates such as sodium lauryl sulfoacetate, fatty acid esters of taurine such as the ammonium salt of oleic acid amide of N-methyl taurine, fatty acid esters of hydroxy alkyl sulfonic acids such as the sodium salt of oleic acid ester of isethionic acid, the magnesium salt of the mixed sulfates of monoglycerides of coconut oil and tallow, etc. It is to be understood that these specific examples are given by way of illustration and not limitation and that any normally solid water-soluble salt of a sulfated or sulfonated organic compound having pronounced deterative properties may be used in the present invention.

Each of the foregoing synthetic detergents may be used in combination with from 30 to 70% or more of inorganic salts produced as an incident to the manufacture of the detergent or added thereto as a builder, or for other purposes. Compositions of this character are in no case capable of use by themselves to produce a thin, bright, non-crumbling synthetic detergent flake. They are difficult to mill and when attempts are made to reduce the composition to the form of thin flakes the product invariably is brittle or crumbles readily and tends to break down into dust or small particles.

In accordance with the present invention small amounts of suitable softening agents are added to these compositions and as a result a new type of composition is produced which differs markedly from the composition treated and may be milled readily and formed into flakes which are from .001 to .005 inch in thickness. Furthermore, the flakes produced possess sufficient strength or cohesion to withstand considerable jarring, vibration and agitation such as that incident to packaging and shipping of the product. The flakes do not crumble readily or break down into dust to an objectionable extent, and

they have a brilliant, glossy and in some cases even transparent appearance that renders the product most attractive.

The amount and character of the softening agent used may be varied considerably but the quantity required to produce a satisfactory flaked synthetic detergent is very small and generally is no more than about 5% of the total weight of the finished composition and less than 15% of the weight of the inorganic salts in the composition. In the preferred form of the composition only about 1% by weight of the softening agent is used.

Typical softening agents employed in the milled flakes of the invention are polyhydric alcohols such as glycerine, sorbitol, and ethylene glycol; fatty acids having at least 6 carbon atoms and up to 22 carbon atoms per molecule, preferably the higher saturated acids such as myristic, palmitic and stearic acids, either alone or admixed with other fatty acids, e. g., as in hydrolyzed natural oils and fats, or in synthetic mixtures of such fatty acids; and monoesters of polyhydric alcohols with such fatty acids, e. g., monoglyceryl stearate, monoglycol palmitate, monoglyceryl laurate, monoglycerides of coconut oil, palm oil and olive oil fatty acids, etc.

These agents may be added to the synthetic detergent compositions in any suitable way and blended therewith by mixing, kneading or similar operations and by means of any preferred type of equipment.

In order to illustrate typical practice in accordance with the present invention the following example is cited:

100 parts of a synthetic detergent containing 35 parts of the sodium salt of coconut oil monoglyceride monosulfate and 65 parts of sodium sulfate, are mixed with 1 part of coconut oil monoglyceride in apparatus such as a conventional soap amalgamator or dry powder mixer. If desired a perfume may be added to the mixture during this operation. The product is then milled on a conventional 5-roll mill at a temperature of from about 110° to 150° F. until a sheet of the desired thickness, say 1½ to 5 thousandths of an inch in thickness is produced. The flakes produced from this sheet are bright, glossy and semi-transparent and do not crumble or break down into dust or small particles even when vigorously shaken. The product does not cake on standing and dissolves quickly in warm water without lumping, producing a thick foam even in hard or salt water.

Another composition which is typical of the present invention may be produced by blending 1 part by weight of glycerine with 100 parts by weight of a synthetic detergent containing 32 parts by weight of potassium salt of coconut oil monoglyceride monosulfate and 68 parts by weight of potassium sulfate.

In producing a further composition 5 parts by weight of stearic acid are blended with 100 parts by weight of a synthetic detergent containing 40 parts of the sodium salt of lauryl sulfate and 60 parts of sodium sulfate.

Similarly, other synthetic detergents and other softening agents which are water dispersible, non-volatile and capable of blending with or dissolving in the synthetic detergent may be employed. The amount of the softening agent used should not be sufficient to render the product sticky or to impair the detergent properties of the product but preferably is sufficient to permit the composition to be milled to produce flakes

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which are no more than about 1 to 5 thousandths of an inch in thickness. In most cases an amount of softening agent not exceeding about 5% of the total weight of the synthetic detergent composition is preferred.

If desired the softened synthetic detergent composition may be converted into forms other than flakes and it may be mixed or blended with other compositions, builders, fillers, detergents, or the like to produce novel products. In view thereof it should be understood that the particular and preferred forms, compositions and procedures described above are intended to be illustrative of the present invention and are not intended to limit the scope thereof as defined in the following claims:

What is claimed is:

1. Milled synthetic detergent flakes consisting by weight essentially of about 30% to 50% water-soluble salt of an organic sulfuric acid reaction product having in its molecular structure an alkyl radical of 8 to 22 carbon atoms, about 50% to 70% of inorganic sulfate salt having the same cation as said organic salt, and about 1% to 5% of a softening agent from the group consisting of polyhydric alcohols, fatty acids having 6 to 22 carbon atoms and monoesters of polyhydric alcohols with fatty acids having 6 to 22 carbon atoms.

2. Milled synthetic detergent flakes as set forth in claim 1 in which the water-soluble salt is sodium alkyl sulfate.

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3. Milled synthetic detergent flakes as set forth in claim 1 in which the water-soluble salt is sodium monoglyceride monosulfate.

4. Milled synthetic detergent flakes as set forth in claim 1 in which the water-soluble salt is sodium benzene sulfonate.

5. Milled synthetic detergent flakes as set forth in claim 1 in which the water-soluble salt is sodium alkyl sulfonate.

6. Milled synthetic detergent flakes as set forth in claim 1 in which the softening agent is a monoglyceride.

7. Milled synthetic detergent flakes as set forth in claim 1 in which the softening agent is a higher saturated fatty acid.

8. Milled synthetic detergent flakes as set forth in claim 1 in which the softening agent is glyc-
erine.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,166,315	Martin	July 18, 1939
2,236,628	Muncie	Apr. 1, 1941
2,298,650	Samaras et al.	Oct. 13, 1942
2,364,767	Zizinia	Dec. 17, 1944
2,391,087	Donlan	Dec. 18, 1945