UNITED STATES PATENT OFFICE

JOSEPH NUSSLEIN, OF LUDWIGSHAFEN-ON-THE-RHINE, GERMANY, ASSIGNOR TO L. G. FARBIENINDUSTRIE AKTIENGESSELLSCHAFT, OF FRANKFORT-ON-THE-MAIN, GERMANY

SOAP PREPARATION

No Drawing. Application filed March 26, 1931, Serial No. 525,603, and in Germany April 7, 1930.

The present invention relates to new and improved soap preparations.

I have found that particularly efficient soaps in different forms, such as curd soaps, soap powders, soap flakes, soap shreds or similar soap preparations, preferably in the form of shaped products, can be obtained by working into soaps, derived from a water-soluble base, i.e. from an alkali metal or from ammonia or amines, at least 5 per cent of their weight of the water-soluble acid or neutral esters prepared from polybasic oxygen-containing mineral acids, as for example sulphuric acid or phosphoric acid, and non-aromatic, i.e. aliphatic or cycloaliphatic alcohols or olefins or olefinic alcohols having more than 8 carbon atoms, or of the true sulphonic acids, or their salts, of any non-aromatic, i.e. aliphatic or hydroaromatic compounds containing at least 8 carbon atoms, preferably from 10 to 16 carbon atoms, as for example acids of fats or oils of vegetable or animal origin, fatty acid esters, amides, or alcohols, ethers or hydrocarbons, in which esters or amides or other derivatives the sulphonic group may be contained in the component of low molecular weight. Such products are obtainable, for example, by the condensation of hydroxylated or halogenated derivatives of ethane, mono- or di-sulphonic acid or of ethionic acid, carbonyl sulphate or aminosulphonic acids with higher fatty acids, such as the fatty acids of vegetal origin or their synthetic equivalents, or their derivatives or salts of these compounds. These last-mentioned esters and amides correspond to the general formula R—CO—X—R—SO₃-Me, in which R denotes an aliphatic radicle, —X—R denotes an oxalylene (—O—R,—) or an amino-alkylene radicle and Me denotes an alkali radicle. Thus, for example, acid sulphuric esters of high molecular alcohols which have been obtained by the treatment of esters of fatty acids with hydrogen in the presence of catalysts or by the oxidation of paraffin hydrocarbons, may be very advantageously employed.

The sulphuric esters employed according to the present invention may be obtained by treating the alcohols or olefins with sulphonating agents, such as concentrated sulphuric acid, at a temperature up to about 35°C. sulphonic acids being obtained on working at about 100°C. or in the presence of agents removing water such as anhydrides of strong inorganic polybasic acids or with the aid of sulphuric anhydride.

The conversion of the said alcohols with the oxygen-containing polybasic mineral acids may be carried out for the production of the sulphuric esters by treating the alcohols with sulphuric acid, or chlorosulphonic acid in the presence of organic inert diluents, and for the production of the phosphoric esters by acting with phosphorus pentoxide on the alcohols in the presence of organic inert diluents. Small portions of the initial materials which have not been converted with the mineral acids, as for example fatty acids, neutral fats, paraffins and the like may be present in the finished product before it is incorporated with the soaps.

The quality of the aforesaid esters employed is at least 5 per cent by weight of the soaps but in most cases considerably above 5 per cent will be used, especially as the sensitivity of the preparations to hard water is thus diminished; the esters may be employed, for example, in quantities of from 10, 20, 30, or 60 per cent of the soap but for the aforesaid reasons quantities of from 100 to about 1000 per cent are preferred in order to render the preparations particularly valuable for any purpose and in water of a high degree of hardness.

If desired, soap substitutes may be added as well as salts of all kinds and the soap preparations may be adulterated with protective colloids, as for example albuminous substances, vegetable gums, starch and the like. For many purposes, especially for the dissolution and removal of fat, oil or like stains, an addition of organic solvents to the soap preparations is advantageous. In order to produce special cosmetic pharmaceutical, insecticidal or germicidal effects, the known and approved substances.
for this purpose, as for example glycerine, perfumes, tar, sulphur, nicotine and the like, may be added.

The external form in which the soaps or soap preparations are introduced into commerce depends on the purpose for which they are intended. Solutions, powder, stick or bar preparations may be prepared without difficulty.

The following examples will further illustrate the nature of this invention, but the invention is not restricted to these examples. The parts are by weight.

**Example 1**

80 parts of the sodium salt of the acid sulphuric ester of cetyl alcohol are intimately worked up with 10 parts of potassium and/or sodium stearate and 10 parts of glycerine and pressed into moulds. The product is eminently suitable as a bath soap.

**Example 2**

70 parts of the disodium salt of the sulphonic acid of stearic acid are ground with 10 parts of Glauber's salt, 10 parts of sodium palmitate and 10 parts of trisodium phosphate. A soap powder is obtained which has an excellent cleansing action.

**Example 3**

80 parts of the neutral sodium salt of the condensation product of oleic acid chloride and ethionic acid

$\text{(C}_1\text{H}_{22}\text{COO.C}_6\text{H}_{4}\text{SO}_3\text{H})$

are intimately mixed with 15 parts of sodium palmitate and 5 parts of sodium perborate.

The product obtained has an excellent cleansing and bleaching action even in hard water. Similar results are obtained by employing taurine instead of ethionic acid.

**Example 4**

30 parts of the neutral ammonium salt of the acid sulphuric ester of stearyl alcohol together with 30 parts of ammonium oleate and 40 parts of water are kneaded into a homogeneous paste. The preparation possesses a good cleansing action which may be increased by the addition of 5 parts of cyclohexanol.

**Example 5**

100 parts of a normal grain soap paste containing about 65 per cent of fatty acid is kneaded with a concentrated solution of 10 parts of the neutral sodium salt of the sulphuric ester of lauryl alcohol. The mixture is worked up in the usual manner into shreds or flakes which are distinguished by their high solubility. 1/2 per cent by weight of the mass of purified lemon grass oil may be added in order to give a fresh smell to the soap.

**Example 6**

60 parts of a 14 per cent aqueous paste of the neutral salt of triethanolamine with the acid cetyl phosphoric ester are stirred into 100 parts of a freshly prepared, and still warm neutral triethanolamine soap of oleic acid. The resulting paste is distinguished by an especially mild action. It may be kneaded with about the same quantity of powdered pumice in order to prepare a highly efficient preparation for washing hands.

**Example 7**

25 parts of an about 80 per cent aqueous paste of the neutral sodium salt of the product obtained by the action of gaseous sulphur trioxide on dodecylene are worked into 100 parts of a solid coco soap. The soap preparation obtained has an excellent foaming power.

For preparing a very good bath soap, from 1/2 to 1 per cent of a suitable perfume composition stable to alkali may be added. What I claim is:—

1. Soap preparations comprising an alkali metal soap and from 100 to about 1000 per cent, by weight of the soap, of neutralized sulphonic acid corresponding to the formula $R\text{COO}\cdot C_6\text{H}_4\cdot \text{SO}_3\cdot H$ in which $R\text{COO}$ is the radicle of a fatty acid of vegetal origin.

2. Soap preparations comprising an alkali metal soap and from 100 to about 1000 per cent, by weight of the soap, of an alkali metal soap of a sulphonic acid corresponding to the formula $R\text{COO}\cdot C_6\text{H}_4\cdot \text{SO}_3\cdot H$ in which $R\text{COO}$ is the radicle of a fatty acid of vegetal origin.

3. Soap preparations comprising an alkali metal soap and from 100 to about 1000 per cent, by weight of the soap, of an alkali metal salt of a sulphonic acid corresponding to the formula $R\text{COO}\cdot C_6\text{H}_4\cdot \text{SO}_3\cdot H$ in which $R\text{COO}$ is the radicle of oleic acid.

4. Soap preparations comprising a soap derived from a water-soluble base and at least 5 per cent, by weight of the soap, of a true sulphonic acid substance containing at least 8 carbon atoms and corresponding to the formula $R\text{COO}\cdot X\cdot R'\cdot \text{SO}_3\cdot \text{OMe}$ in which $R$ denotes an aliphatic radicle, $X\cdot R'$ denotes an oxalkylene ($-O\cdot R'$) or an amino-alkylene radicle and $Me$ denotes an alkali radicle.

5. Soap preparations comprising a soap derived from a water-soluble base and from 100 to about 1000 per cent, by weight of the soap, of a true sulphonic acid substance containing at least 8 carbon atoms and corresponding to the formula $R\text{COO}\cdot X\cdot R'\cdot \text{SO}_3\cdot \text{OMe}$ in which $R$ denotes an aliphatic radicle, $X\cdot R'$ denotes an oxalkylene...
(—O—R,—) or an amino-alkylene radicle and Me denotes an alkali radicle.

6. Soap preparations comprising an alkali metal soap and from 100 to about 1000 per cent, by weight of the soap, of a true sulphonic acid substance containing at least 8 carbon atoms and corresponding to the formula R—CO—X—R₁—SO₂—OMe in which R denotes an aliphatic radicle, —X—R₁ denotes an oxalkylene (—O—R,—) or an amino-alkylene radicle and Me denotes an alkali radicle.

In testimony whereof I have hereunto set my hand.

JOSEPH NUESSLEIN.