

Patented Nov. 2, 1937

2,097,737

UNITED STATES PATENT OFFICE

2,097,737

DETERGENT COMPOSITION

Oscar A. Pickett and Arthur L. Osterhof, Wilmington, Del., assignors to Hercules Powder Company, Wilmington, Del., a corporation of Delaware

No Drawing. Application August 10, 1935,
Serial No. 35,628

11 Claims. (Cl. 87-5)

This invention relates to an improved detergent composition, and more particularly to a detergent composition which will be in the form of a clear liquid but will nevertheless contain a very high proportion of active detergent.

It has heretofore been proposed to form liquid soaps and soap compositions, and many of such compositions have been clear and transparent in character. Such clear, liquid detergent compositions, however, have hitherto always been characterized by a relatively low proportion of active detergent material, such as, for example, soaps and soap-like materials. Thus, for example, liquid detergent compositions have not been hitherto produced which contain at least 50% of soap. On the contrary, all detergent compositions which contain high proportions of detergent materials, such as soap and the like, have been characterized by a paste or solid form.

Now it is the object of this invention to provide a clear, liquid detergent composition which will contain a high proportion, at least 50%, and possibly as high as 80% of soap or soap-like material.

In accordance with the invention, the detergent composition will include essentially an alkali metal soap, an aliphatic amine soap (or, in partial or complete substitution therefor, a sulphonated oil), pine oil, and water. If desired, there may be included water-soluble salt which will act as an electrolyte. The alkali metal soap and the aliphatic amine soap (or, in partial or complete substitution therefor, a sulphonated oil) will comprise together at least 50% of the detergent composition and, preferably, will comprise from 50% to 80% of the detergent composition. Pine oil will be present in amount from 10% to 45% of the total detergent composition and water in amount of from 5% to 30%.

The pine oil and water will, however, be relatively proportioned in the composition so as to form a clear solution when all the ingredients are mixed. The water-soluble salt or electrolyte, may be present in amount up to 10% of the total composition.

Of the total amount of alkali metal soap and aliphatic amine soap and/or sulphonated oil present, the alkali metal soap will constitute not less than 50%, and may vary from 50% to 95%. As an alkali metal soap, there may be used, for example, the alkali metal salts of linoleic acid, oleic acid, ricinoleic acid, palmitic acid, stearic acid, lauric acid, myristic acid, abietic acid, pimelic acid, etc., or mixtures thereof. As aliphatic amine soaps, there may be used, for example, salts of triethanolamine, monoethylamine,

diethylamine, glyceroldiamine, glycoldiamine, etc., with any of the acids named above, or mixtures thereof. As previously stated, the aliphatic amine soap may be partially or completely replaced in the detergent composition, in accordance with this invention, by a sulphonated oil, as, for example, sulphonated castor oil, sulphonated olive oil, a sulphonated ethylenic hydrocarbon, etc. As water-soluble salt or electrolyte, there may be used, for example, alkali metal borates, phosphates, chlorides, acetates, propionates, lactates, hypochlorites, sulfates, silicates, etc., or the ammonium or water-soluble amine salts of these acids.

It will be appreciated from the above description that the detergent composition, in accordance with this invention, will contain a large proportion, at least 50% and, possibly, as high as 80%, of soap or soap-like materials, and that the pine oil content of these soaps, in contrast with prior art detergent compositions containing pine oil, is considerably less than the amount of soap present. Water will be present in only sufficient amount to produce, in combination with the pine oil, a clear composition, and while the water content may run from 5 to 30%, it preferably will be kept below 10%. Despite the large quantities of soap and soap-like materials present in the detergent composition in accordance with this invention, they will be found to be clear liquids having a viscosity sufficiently low that they may be readily poured. These combined properties of clarity, fluidity and high soap content distinguish the detergent compositions in accordance with this invention from all those hitherto produced.

The detergent composition in accordance with this invention may be readily prepared by any normal and usual procedure for the production of mixtures of pine oil and various soaps. Thus, for example, the fatty or resin acid constituent of the soap may be dissolved in the pine oil and added to an aqueous solution of the aliphatic amine and alkali metal hydroxide; or the alkali metal hydroxide, for example, sodium or potassium hydroxide, in aqueous solution may be mixed with a solution of fatty or resin acid in pine oil and the aliphatic amine or sulphonated oil then added with stirring or agitation.

As illustrative of detergent compositions in accordance with this invention, the following formulae, descriptive of suitable compositions, are given. In Table I the formulae are expressed in percentages of materials present in the finished detergent composition, while in Table II

82

2,097,737

formulae are given for the same compositions but are expressed in parts by weight of materials used in the production of the detergent compositions.

2. A clear, liquid detergent composition comprising 50%-80% of a mixture of an alkali metal soap and an aliphatic amine soap, 10%-45% pine

Table I

	(1)	(2)	(3)	(4)	(5)	(6)
	Percent	Percent	Percent	Percent	Percent	Percent
Potassium oleate	30.0	36.0		33.0	27.5	30.0
Potassium resinate		21.0	14.5			15.0
Potash-coconut oil soap			23.0			
Triethanolamine oleate	30.0	6.0	23.5	20.0		10.0
Neutralized sulfonated castor oil						
Pine oil	30.0	28.0	25.0	9.7	27.0	7.5
Trisodium phosphate			3.5	28.5	30.0	23.0
Sodium metasilicate	4.0			1.5		2.0
Water	6.0	9.0	10.5	7.3	2.0	13.5

Table II

	(1)	(2)	(3)	(4)	(5)	(6)
	Percent	Percent	Percent	Percent	Percent	Percent
Oleic acid	47.04	35.90	16.10	42.84	24.28	33.34
Roasin		18.88	13.04			13.49
Coconut oil			19.48			
Sulfonated castor oil (75%)				12.43	34.59	9.81
Pine oil	30.00	28.00	25.00	28.50	30.00	23.00
Caustic potash (88%)	5.87	10.60	8.21	7.09	7.15	8.90
Triethanolamine	9.45	1.89	7.40	6.30		3.15
Trisodium phosphate			3.50	1.50		2.00
Sodium metasilicate	4.00				2.00	
Water	3.64	4.78	7.27	1.34	1.98	6.51

While the detergent compositions produced in accordance with this invention are fluid in nature, they may have a viscosity sufficiently high so that they cannot readily be admixed in use with a liquid of very low viscosity without the use of suitable agitating means. For certain purposes, accordingly, for example, where the detergent composition is ultimately to be dissolved in a saturated hydrocarbon or chlorinated hydrocarbon solvent for use in dry cleaning, it may be preferable to add to the detergent composition after its production an amount of saturated hydrocarbon or chlorinated hydrocarbon solvent approximately equal to the amount of detergent composition, since the thinned composition so produced may be more readily admixed with additional solvent for use in dry cleaning. Similarly, small amounts of alcohols, such as ethyl alcohol, may be used, if desired, to reduce the viscosity of the finished detergent composition. It will be understood, however, that it is not necessary to dilute the detergent composition in accordance with this invention, since it is itself fluid in character.

It will be appreciated that the details and examples hereinbefore set forth are illustrative only and are in no way to be considered as limitations of the invention herein broadly described and claimed.

This application is filed as and constitutes a continuation in part of our copending application, Serial No. 544,682, filed June 15, 1931.

What we claim and desire to protect by Letters Patent is:

1. A clear, liquid detergent composition comprising 50%-80% of a mixture of an alkali metal soap and a detergent selected from the group consisting of aliphatic amine soaps, sulfonated oils and mixtures thereof; 10%-45% pine oil and 5%-30% water; the said mixture of alkali metal soap and selected detergent consisting of 50%-95% of the alkali metal soap and 5%-50% of the said selected detergent, and the water and pine oil being relatively proportioned so as to form a clear solution when all the ingredients are mixed.

oil and 5%-30% water; the said soap mixture consisting of 50%-95% of the alkali metal soap and 5%-50% of the said amine soap and the water and pine oil being relatively proportioned so as to form a clear solution when all the ingredients are mixed.

3. A clear, liquid detergent composition comprising 50%-80% of a mixture of an alkali metal soap and a detergent selected from the group consisting of aliphatic amine soaps, sulfonated oils and mixtures thereof; 10%-45% pine oil; a water-soluble salt selected from the group consisting of alkali metal, ammonium and water-soluble amine salts of boric, phosphoric, hydrochloric, acetic, sulfuric and silicic acids in amount not exceeding 10%; and 5%-30% water; the said mixture of alkali metal soap and selected detergent consisting of 50%-95% of the alkali metal soap and 5%-50% of the said selected detergent, and the water and pine oil being relatively proportioned so as to form a clear solution when all the ingredients are mixed.

4. A clear, liquid detergent composition comprising 50%-80% of a mixture of an alkali metal oleate and an aliphatic amine soap, 10%-45% pine oil and 5%-30% water; the said soap mixture consisting of 50%-95% of the alkali metal oleate and 5%-50% of the aliphatic amine soap and the water and pine oil being relatively proportioned so as to form a clear solution when all the ingredients are mixed.

5. A clear, liquid detergent composition comprising 50%-80% of a mixture of an alkali metal soap and a detergent selected from the group consisting of aliphatic amine soaps, sulfonated oils and mixtures thereof; 10%-45% pine oil and 5%-10% water; the said mixture of alkali metal soap and selected detergent consisting of 50%-95% of the alkali metal soap and 5%-50% of the said selected detergent and the water and pine oil being relatively proportioned so as to form a clear solution when all the ingredients are mixed.

6. A clear, liquid detergent composition comprising 50%-80% of a mixture of an alkali metal soap and an ethanolamine soap, 10%-45% pine

oil and 5-30% water; the said soap mixture consisting of 50%-95% of the alkali metal soap and 5-50% of the said amine soap and the water and pine oil being relatively proportioned so as to form a clear solution when all the ingredients are mixed.

7. A clear, liquid detergent composition comprising 50%-80% of a mixture of an alkali metal soap and a triethanolamine soap, 10%-45% pine oil and 5-30% water; the said soap mixture consisting of 50%-95% of the alkali metal soap and 5-50% of the said amine soap and the water and pine oil being relatively proportioned so as to form a clear solution when all the ingredients are mixed.

8. A clear, liquid detergent composition comprising 50%-80% of a mixture of an alkali metal abietate and an aliphatic amine soap, 10%-45% pine oil and 5-30% water; the said soap mixture consisting of 50%-95% of the alkali metal abietate and 5-50% of the said amine soap and the water and pine oil being relatively proportioned so as to form a clear solution when all the ingredients are mixed.

9. A clear, liquid detergent composition comprising 50%-80% of a mixture of an alkali metal palmitate and an aliphatic amine soap, 10%-45%

pine oil and 5-30% water; the said soap mixture consisting of 50%-95% of the alkali metal palmitate and 5-50% of the said amine soap and the water and pine oil being relatively proportioned so as to form a clear solution when all the ingredients are mixed.

10. A clear, liquid detergent composition comprising 50%-80% of a mixture of an alkali metal abietate and an ethanolamine soap, 10%-45% pine oil and 5-30% water; the said soap mixture consisting of 50%-95% of the alkali metal abietate and 5-50% of the said amine soap and the water and pine oil being relatively proportioned so as to form a clear solution when all the ingredients are mixed.

11. A clear, liquid detergent composition comprising 50%-80% of a mixture of an alkali metal abietate and a triethanolamine soap, 10%-45% pine oil and 5-30% water; the said soap mixture consisting of 50%-95% of the alkali metal abietate and 5-50% of the said amine soap and the water and pine oil being relatively proportioned so as to form a clear solution when all the ingredients are mixed.

OSCAR A. PICKETT.
ARTHUR L. OSTERHOF.