

UNITED STATES PATENT OFFICE

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BRUSHLESS SHAVING CREAM

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14 Claims. (Cl. 167—35)

My invention relates to shaving cream. It relates more in particular to a so-called brushless shaving cream of the type which does not depend for its action upon the lathering effect of soap. My present invention is a continuation in part of my co-pending application Serial No. 646,497, filed December 9, 1932.

Preparations employed for shaving have in general a two-fold object. They soften the hair as well as the skin on the face by emulsifying the natural oil present on the skin, and they also lubricate the skin so that the razor will pass over the same quickly.

Ordinary shaving soaps are made empirically without any thought of these two-functions, but it will be obvious that they must to some extent perform both functions in order to be usable. Those skilled in the art have found that the use of ordinary soaps is not satisfactory and accordingly attempts have been made in the past to produce a shaving cream which would perform both functions required in a more satisfactory manner. These creams were made usually from free fatty acid, usually stearic acid, and sufficient soap to emulsify the stearic acid in water. Some spermaceti wax or paraffin or other waxes or similar compounds have also been used to make the cream non-vanishing. Mixtures of the types of substances described emulsified with a relatively large amount of water (sometimes with some glycerin added) are well known. When spread on the face, they leave a substantial deposit of the emulsified stearic acid and waxes which act as a lubricant to prevent the razor from pulling or scratching.

In most of these preparations, a thorough washing of the face was first necessary to remove the natural oils. Otherwise, the cream of itself would not soften the beard. As a general rule, these creams have been fairly efficient but they are still subject to considerable improvement to remedy their outstanding defects. One difficulty has been that in order to function satisfactorily as a lubricant, they had to have a relatively large amount of fats or waxes in relation to the soap present and this caused them to be too greasy, making it hard to remove them from the face and from the razor. When the amount of wax in proportion to the soap present was decreased so that they could readily be washed from the face or razor, these creams did not lubricate well. Moreover, they all left something to be desired from the standpoint of softening the beard. Still another short-coming was that the emulsions were not sufficiently stable and in cold weather they

would freeze and the emulsions break. Moreover, they could not be employed satisfactorily when the water employed on the face is cold.

The principal object of my invention is the provision of an improved shaving cream.

Another object is the provision of a shaving cream which obviates all of the difficulties hereinabove set out.

Another object is the provision of a shaving cream which will soften the beard even though the beard has been washed only slightly or not at all before the application of the cream.

Other objects and features of the invention will be apparent as the detailed description progresses.

I have found a relatively large class of chemical compounds which, as far as I know, have never been employed in brushless shaving creams heretofore. I have found that these chemical substances can be employed in creams, the major ingredients of which are fatty acids such as stearic acid and water and the entire product emulsified completely. The emulsion product so produced has very excellent wetting properties in that it tends to soften the beard to a much greater extent than any of the shaving creams heretofore employed. It has a great advantage in being readily washed from the razor, while the remainder left on the face after shaving is as readily removed from the face by washing. The product also can be made of such consistency that while it is freely washed from the razor, it will not fall from the razor during shaving which is, of course, undesirable. It will be understood that the wetting properties heretofore referred to cause the cream as a whole to wet through the greasy layer on the skin and base of the beard when it is put on the face, thereby forming an intimate contact of the water phase of the cream and skin at the base of the beard so that the softening action is the same or better than that employed by using a soap and brush.

The class of compounds which I have discovered have a well-balanced ratio of their oleophilic and hydrophilic properties; that is to say, the polar and non-polar groupings are present in the molecule in a way that causes the composition as a whole to have both water wetting and oil wetting properties. These compounds, therefore, while having a marked hydrophilic character, making them readily miscible or soluble in water, also have oily properties which give them excellent lubricating value during shaving. The combination of hydrophilic and oleophilic properties enables the compound as a whole to penetrate

through the greasy layer on the skin, carrying the cream as a whole with it and at the same time enabling the user to remove all the deposits remaining after shaving with water.

- 5 Substances of the kinds set out are numerous and of widely different chemical compositions. They possess this factor in common, however, that they all possess oleophilic and hydrophilic groupings in the same compound.
- 10 The oleophilic or non-polar part of the molecule is formed by a hydrocarbon chain of not less than eight carbon atoms. This chain may be in the form of a long chain alkyl group or groups; it may be in the form of aralkyl groups
- 15 or radicals of long chain fatty acids or long chain alcohols. The hydrophilic part of the molecule consists of a group having a definite attraction for water, such as a number of hydroxy groups or an inorganic acidic group such as a sulphuric acid radical, phosphoric acid radical, esters of such acids as short chain organic chemicals like ethionic acid, or esters with polyhydric alcohols like glycol mono-sulphuric acid, etc. The hydro-
- 20 philic group is connected with the oleophilic or non-polar group either directly as in the case of sulphonic acid or phosphonic acid derivatives of aliphatic hydrocarbons; or said compounds may be in the form of esters of long chain aliphatic alcohols, such as sulphuric esters of alcohols or phosphoric esters of alcohols. The compounds
- 25 which I employ may also be of a type wherein the oleophilic and hydrophilic groups are interconnected through the residue of a carboxyl group. Thus, for example, on one side of the residue of a carboxyl group there may be a long chain aliphatic hydrocarbon radical such as a higher fatty acid radical and on the other side there may be an acid group or an acid group joined thereto through an aliphatic group such
- 30 as an ethionic acid radical, or through an ester of a polyhydric alcohol with a strong acid as, for instance, glycerine mono-sulphuric acid esterified with a higher fatty acid; or the hydrophilic group may comprise an amine group which may be substituted in the same way as a carboxy radical. The free valences in the $-\text{CO}-$ group
- 35 may be substituted by a mono-valent or a polyvalent alcohol radical, by an NH_2 group or an organic amine radical, and a hydrophilic group may be linked to an oleophilic group such as in the sulphonated oils or other derivatives of that type.

- In order to teach those skilled in the art the full scope of my invention, I shall name a few
- 40 representatives of the different classes of compounds indicated. As a sulphonic acid, I wish to cite the cetyl sulphonic acid as described by Reychler in the *Kolloidal Zeitschrift*, volume 12, page 277. As another one of this kind, I wish to
- 45 mention the compound



- 50 which is disclosed in British Patent 358,583. As an ester of a long chain alcohol, I wish to mention sulphuric acid esters of lauryl alcohol, oleyl alcohol, and, cetyl alcohol.

- As derivatives of fatty acids, I wish to mention
- 55 sulphonated castor oil, butyl sulpholeic acid and similar derivatives as disclosed in United States Patents 1,822,977, 1,822,978 and 1,822,979, or the sulphonated monooleyl ethylene glycol as disclosed in French Patent 721,340, or the fatty
- 60 acid derivative of ethane sulphonic acid as de-

scribed in United States Patent 1,881,172, or compounds like lecithin.

There are still other compounds which may be referred to briefly, such as sulphonated oleyl amide; compounds of amides of fatty acids in which the amide group is substituted with ethionic acid or other similar derivatives. The main feature is that all of these compounds mentioned, as well as all other of the class, are excellent emulsifying agents; they are first class wetting agents due to their prominent hydrophilic groups and excellent lubricating agents due to their oleophilic groups.

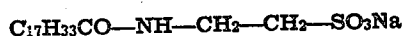
While the original application referred to hereinabove, of which the present application is a continuation-in-part, was directed originally to the inclusion in a brushless shaving cream of a proportion of any one of the substances coming within the various classifications referred to in the preceding paragraphs, such original application has since been amended to limit the claims in respect to the character of the emulsifying and wetting agent employed. The present application is directed to the use in brushless shaving creams of the character described herein of amide substances having emulsifying and wetting functions. These amide substances have oleophilic and hydrophilic groups, but all of them are characterized by a $\text{CO}-\text{N}=\text{}$ nucleus. In the amide substances, as will be made clear by a further description, the hydrophilic property may be present in one or more of the groups or radicals linked to the nitrogen. In the case of amides having an NH_2 grouping, the hydrophilic property is in part imparted to the molecule as a whole by the NH_2 group, and preferably there are other hydrophilic radicals or groups including at least one inorganic oxygenated acid radical.

The substances used in accordance with the present invention may be represented by the formula $\text{R}-\text{CO}-\text{NX}_2$ wherein "R" is a saturated or unsaturated hydrocarbon radical with at least seven carbon atoms, or the substitution products thereof such as the hydroxy, sulphonic and phosphonic acid substitution products, or sulphuric or phosphoric acid esters; "X" may be hydrogen, an acyl, alkyl, alkylol or alkylene group, their oxy, hydroxy, sulphonic and phosphonic acid substitution products, or their sulphuric or phosphoric acid esters. In the molecule as a whole, there is at least one inorganic oxygenated acid radical, it being obvious that such acid radical may be present in either the R or X group according to the definition of the formula.

For further clearness, I shall now point out more in particular certain sub-groups, all of which have the same nucleus formula as that given in the preceding paragraph.

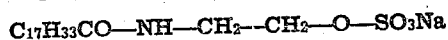
An important group of substances for use in my invention are fatty acid amides of unsaturated fatty acids treated with an oxygenated inorganic acid by the usual types of processes utilized in producing Turkey red oil types of substances in which case the double bonds are affected by the acid and produce either the fatty esters or substitution products, depending upon whether the acid forming element is linked to carbon directly or through oxygen. This class of substance is preferably neutralized by treatment with an alkali to form a salt. For most purposes, the sodium salt is preferred. A specific example of this type of substance is sulpholeyl amide sodium salt. Other examples are phosphated ricinoleic acid, sulphated linoleic acid,

amide, and their salts. Another sub-class of substances coming within the general classification given are the substituted amides in which at least one hydrogen of the amido group is substituted by an alkionie acid group. The alkionie radical in this case is represented by the X of the general formula given hereinabove. A specific example of this type of substance is the condensation product of oleic acid and tauric acid having the general formula



This substance imparts valuable properties to the cream and is a preferred substance among the sub-class of substances described immediately hereinabove. Another example of the same class of substances is as follows: coconut oil fatty acid amides in which the amino group are substituted with two ethionie acid radicals.

Still another sub-class of substances is the primary amides substituted by at least one alkylol group, which alkylol group has its terminal hydroxy group esterified with an oxygenated inorganic acid. A very suitable type of substance coming within this general classification is a fatty acid amide wherein one of the hydrogens of the amido group is replaced by an ethanol group, the alcoholic hydroxy group of which is esterified with sulphuric or phosphoric acid. As a preferred example, a substance represented by the following compound may be given:



Other examples of the sub-class or sub-group of substances described immediately hereinabove are as follows: sulphuric acid ester of a condensation product of cocoanut oil fatty acids and diethanol amine; phosphoric acid ester of a condensation product of linoleic acid and monoglycerol amine; and sulphuric acid ester of a condensation product of cocoanut oil fatty acid amide and diethyleneglycol.

The creams consist for the most part of a fatty body like the stearic acid or any other solid fatty acid like palmitic acid, etc., with or without a solid fat like hydrogenated fats, lard, waxes, etc., or mixtures thereof. The quantity may range from 5 to 30% depending upon the hardness of the particular vehicle. A certain proportion of soap may be used ranging from 2 to 10%, or may be omitted. The emulsifying and wetting agent required may range from about 1/2 to 5% or more. Perfumes and other antiseptic agents may be used in a small percentage as required. The water content preferably ranges between 50 and 80%. The resulting product is a cream of whatever consistency may be desired; a cream which is stable, which when put on the face immediately penetrates the grease layer and spreads until a very thin layer is obtained and which washes off very easily with water by dissolving or dispersing in the water solution; a cream which will not thin out on the face and fall off the razor during shaving.

For the better understanding of those skilled in the art, I give hereinbelow some representative examples of brushless shaving creams made in accordance with the present invention:

	Per cent
(1) Paraffin fatty acids	25
Sulphonated oleyl amide	3
Carbolic acid	0.1
Perfume	0.5
Water	71.4

	Per cent
(2) Palmitic acid	20
Tri-ethanol amine	5
Sodium salt of the sulphuric acid ester of the condensation product of oleic acid and mono-ethanolamine	5
Carbolic acid	0.1
Perfume	0.5
Water	68.9
Menthol	0.5 10

	Per cent
(3) Hydrogenated cocoanut oil fatty acid	15
Ethylene glycol	5
Caustic potash	5
The condensation product of oleic acid and tauric acid	3
Carbolic acid	0.1
Perfume	0.5
Water	71.4 20

	Per cent
(4) Stearic acid	20
Soap	5
The sodium salt of the condensation product of palmityl amide and ethionie acid	3
Carbolic acid	0.1
Perfume	0.5
Water	71.4 30

Obviously the examples given are by no means exhaustive since those skilled in the art are readily enabled to prepare formulae of the same general character employing other types of substances in accordance with the teaching of my invention.

In my disclosure, I do not wish to limit myself either to proportions or to chemical procedure. In fact, substantially any composition of matter of this kind may be used as long as it contains a proper vehicle. Such vehicle may be stearic acid or other fatty acid, vegetable fat or mineral fat or paraffin or any other fat or wax, like carnauba, synthetic wax like Rigolan wax, and an emulsifying agent with high wetting power that has both oleophilic and hydrophilic groups of the nature described and performing the function indicated falls within the limit of my disclosure.

The term "soluble" is used in the claims in a broad sense to include the characteristics of both molecular and colloidal dispersibility in water.

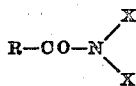
What I claim as new and desire to protect by Letters Patent of the United States is:

1. A brushless shaving cream comprising a plastic emulsion of oleaginous and aqueous materials and having included therein a proportion of a chemical compound having oleophilic and hydrophilic groups in the molecule, said chemical compound being of a class consisting of fatty acid amides having at least eight carbon atoms wherein the hydrocarbon chain may be substituted by a group of a class consisting of hydroxy, sulphonic and phosphonic acid groups or may be esterified with sulphuric or phosphoric acid, and wherein the hydrogen of the amido group may be substituted with an acyl, alkyl, alkylol or alkylene group, the oxy, hydroxy, sulphonic or phosphonic acid substitution products thereof or the sulphuric or phosphoric acid esters, the amide as a whole having at least one oxygenated inorganic acid radical.

2. A brushless shaving cream comprising a plastic emulsion of oleaginous and aqueous materials and having included therein a proportion

of a chemical compound having oleophilic and hydrophilic groups in the molecule and being represented by the general formula

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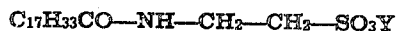
wherein "R" is a hydrocarbon radical with at least seven carbon atoms, saturated or unsaturated, including hydroxy, sulphonie acid and phosphonic acid substitution products and sulphuric and phosphoric acid esters thereof; and wherein "X" stands for hydrogen, an acyl, alkyl, alkylol or alkylene group, the oxy-, hydroxy, sulphonie acid and phosphonic acid substitution products of such groups, and the sulphuric and phosphoric acids thereof, the compound as a whole having at least one oxygenated inorganic acid radical in either the R or one of the X groups.

3. A brushless shaving cream comprising a plastic emulsion of oleaginous and aqueous material and having included therein a proportion of a chemical compound having oleophilic and hydrophilic groups in the molecule and comprising a fatty acid amide having at least eight carbon atoms and wherein the fatty acid radical has an oxygenated inorganic acid group attached to carbon directly or through an oxygen linkage.

4. A brushless shaving cream comprising a plastic emulsion of oleaginous and aqueous material and having included therein a proportion of a chemical compound having oleophilic and hydrophilic groups in the molecule and comprising a sulpholeyl amide.

5. A brushless shaving cream comprising a plastic emulsion of oleaginous and aqueous material and having included therein a proportion of a chemical compound having oleophilic and hydrophilic groups in the molecule and comprising a fatty acid amide having at least eight carbon atoms and wherein at least one hydrogen of the amido group is replaced by an alkionie acid radical.

6. A brushless shaving cream comprising a plastic emulsion of oleaginous and aqueous material and having included therein a proportion of



wherein Y is a cation.

7. A brushless shaving cream comprising a plastic emulsion of oleaginous and aqueous material and having included therein a chemical compound having oleophilic and hydrophilic groups in the molecule and comprising a fatty acid amide having at least eight carbon atoms and wherein at least one hydrogen of the amido group is replaced by an alkylol group, the alcoholic

hydroxy group of which is esterified by an oxygenated inorganic acid radical.

8. A brushless shaving cream comprising a plastic emulsion of oleaginous and aqueous material and having included therein a proportion of a substance represented by the formula



9. A brushless shaving cream comprising a plastic emulsion of oleaginous material and aqueous material and having included therein a proportion of a chemical compound having oleophilic and hydrophilic groups in the molecule and comprising a condensation product of a relatively high molecular weight fatty acid and tauric acid.

10. The product of claim 1 wherein the oleaginous material comprises a normally solid fatty acid and wherein the chemical compound comprises a minor proportion of the product.

11. The product of claim 3 wherein the oleaginous material comprises a normally solid fatty acid and wherein the chemical compound comprises a minor proportion of the product.

12. The product of claim 6 wherein the oleaginous material comprises a normally solid fatty acid and wherein the chemical compound comprises a minor proportion of the product.

13. A brushless shaving cream comprising a plastic emulsion of oleaginous material in the form of a normally solid higher fatty acid, and aqueous material, and having included therein a proportion of a chemical compound having oleophilic and hydrophilic groups in the molecule, said chemical compound being represented by the general formula



wherein R is an aliphatic hydrocarbon radical containing more than 8 carbon atoms and M is an oxygenated sulphur-containing inorganic acid radical.

14. A brushless shaving cream comprising a plastic emulsion of oleaginous material in the form of a normally solid higher fatty acid, and aqueous material, and having included therein a proportion of a chemical compound having oleophilic and hydrophilic groups in the molecule, said chemical compound being represented by the general formula



wherein R is an aliphatic hydrocarbon radical containing more than eight carbon atoms, X is hydrogen, n is either zero or one, Y is a lower hydrocarbon radical, M is an oxygenated sulphur-containing inorganic acid radical, and w is a small whole number.

WOLF KRITCHEVSKY.