

UNITED STATES PATENT OFFICE

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LOTION SHAMPOO

John J. Miskel, Brooklyn, N. Y., and Louis Rasser, North Bergen, N. J., assignors to Nopco Chemical Company, Harrison, N. J., a corporation of New Jersey

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The present invention relates to an improved liquid or lotion shampoo, and more particularly to an opaque, stable shampoo liquid which yields a more abundant and more stable foam or suds.

Shampoo solutions or dispersions for cleansing human hair have long been known to the prior art. The majority of those now in use are either transparent or translucent. However, a number of lotion shampoos are suspensions of minute solid particles dispersed in liquids, and many persons prefer this type.

One of the preparations of this character consists of finely divided solid stearic acid dispersed in a liquid detergent. While satisfactory in many respects, this mixture has a number of disadvantages. When employed in hard water, some of the stearic acid precipitates as stearates of the metallic ions present in such water. This precipitate is of the nature of a scum; and hence is highly undesirable, as it tends to leave the hair somewhat sticky or gummy. Moreover, the stearic acid dispersion is none too stable, especially under the extreme atmospheric conditions of heat or cold which are frequently encountered during storage and shipment. At high temperatures, the stearic acid melts, and at low atmospheric temperatures the entire emulsion solidifies. Upon returning to normal temperatures after exposure to such extreme conditions, the product is inferior to the original material, for it is more translucent and of lower opacity than before. Further, in this shampoo, the stearic acid tends to stratify and also to precipitate and settle out to a considerable degree under normal conditions. Extreme temperatures accelerate these tendencies. This renders the product inferior in appearance and necessitates shaking prior to use. Both high opacity and uniformity in appearance of the shampoo liquid are preferred by the buying public.

One of the objects of the invention is to provide a stable, homogeneous, opaque shampoo suspension.

A second object of the invention is to provide a lotion shampoo capable of forming a detergent foam of large volume and long life.

A third object of the invention is to provide a liquid shampoo of excellent detergent qualities which will leave the hair of the user in a softer and glossier condition.

A fourth object of the invention is to provide a stable, opaque lotion shampoo containing minute particles of waxy solids which will neither separate nor stratify under extreme atmospheric temperatures; and hence which will require no shaking prior to use.

A fifth object of the invention is to provide a more economical shampoo liquid which produces detergent foam of greater abundance, greater

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stability and superior cleansing properties, whereby a smaller quantity of the shampoo is required for a given cleansing operation.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The present invention relates to an improved lotion shampoo for thoroughly cleansing hair yet leaving it with a high lustre and relatively soft. Hair in this condition is easily manageable for the involved operations of setting or dressing a woman's hair in accord with the changing modes. These desiderata are accomplished by the use of a liquid shampoo of the invention which consists of a colloidal dispersion of waxy solid particles suspended in a detergent liquid. Various waxes, higher alcohols, etc. or certain hydrogenated oils or fats may be employed, but carnauba wax is greatly preferred. The detergent liquid may be any of the conventional soaps or any of the synthetic detergents or any compatible mixture of these substances dissolved or dispersed in any suitable vehicle, such as water. It is essential that the detergent be capable of producing a foam or suds or lather. A dispersing agent is employed to render the suspension completely stable under extreme atmospheric conditions with no settling out of the solid particles from the liquid phase.

The addition of waxy solids to lotion shampoos is directly contrary to the teaching of the prior art, as it was presumed that such substances would produce gummy deposits on the hair. Thus the discovery that hair shampooed with products of the invention was lustrous, soft and in a very manageable condition was a distinct surprise. The discoveries that a waxy material increases the foaming or lathering properties of detergents and further acts as a foam stabilizer were also unexpected and unpredictable from the prior art.

The suds or lather bubbles formed by the products of the invention are extremely tenacious and this factor is considered to be responsible for the superior cleansing qualities of the composition of this invention. It is thought that such bubbles keep particles of dirt or foreign matter suspended in the soap film for a longer time, and that there is little tendency of the bubbles to break and thus deposit such particles again on the hair. This permits easier and more thorough rinsing of the hair at the conclusion of the lathering operation. By reason of the larger volume of suds produced by these improved lotion shampoos, a smaller quantity of a shampoo liquid may be employed with a resultant saving to the user.

The homogeneousness and high opacity so popular with the public results from the extremely stable dispersion of waxy solid particles in the detergent liquid which is produced by the dispersing agent. In addition, the annoyance of

shaking or stirring the preparation immediately prior to using is obviated.

The invention accordingly comprises a composition of matter possessing the characteristics, properties and the relation of components which will be exemplified in the composition hereinafter described and the scope of the invention will be indicated in the claims.

In producing the lotion shampoos of the present invention it is best to introduce the waxy substance in the form of a concentrated suspension into the detergent composition. Although such mixtures are commonly referred to as emulsions in the trade, they are actually permanent colloidal suspensions of solid particles in liquids rather than emulsions of liquids in nonmiscible liquids. The preparation of the concentrated dispersion of waxy material is important, for its compounding determines the characteristics of the liquid shampoo as well as the concentrated suspension. Addition of the concentrated dispersion to the detergent liquid merely dilutes the concentration of the waxy substance; hence the stability and uniformity of the dispersion remain unchanged and the opacity of the shampoo is proportional to the opacity of the original concentrated suspension and to the quantity of the original suspension present in the final product. It is also possible in some instances to disperse the wax directly in the detergent solution comprising the shampoo.

The concentrated wax dispersion includes a waxy material, a dispersing agent and water. Any waxy material may be used provided it has a melting point of at least 110° F. and preferably above 120° F. Substances of lower melting point are not suitable, as the characteristics of the concentrated suspension and also the lotion shampoo will be affected by exposure to temperatures in excess of those mentioned, and the original characteristics are not completely restored upon cooling to normal temperatures. This change appears to result from the melting of the waxy material, thereby converting the suspension into a true emulsion and when cooled to normal temperatures it is believed that the waxy material freezes into solid particles larger than the original particles. At any rate, once the waxy substance in suspension has been exposed to temperatures above its melting point, the concentrated suspension or shampoo liquid is inferior as to opacity and uniformity of appearance; for then the waxy material tends to stratify and to precipitate and settle out to some extent.

The naturally-occurring waxes are obtained from plants and insects, but many can be synthesized; they consist essentially of esters of monohydric, high molecular weight alcohols, including sterols, and higher fatty acids. Hydrocarbons are often present in natural waxes, and frequently the natural waxes contain either free higher fatty acids or higher alcohols. These natural waxes are suitable for use in the present invention and include carnauba, candelilla, montan and bees' waxes. The "synthetic waxes" are termed waxes because of their similarity in appearance and physical properties to natural waxes rather than similarity in chemical structure; for in this class fall certain hydrogenated oils or fats and certain higher fatty amides, alcohols and alkylolamides. Among the many specific examples are hydrogenated castor oil ("opal" wax), stearyl amide, stearyl alcohol, cetyl alcohol, diethylene glycol stearate, monoethanolamide of hydroxy fatty acids, monoethanolamide

of castor oil and stearyl monoethanolamide. In general, they may be described as plastic substances which are solid at room temperature, somewhat crystalline in structure and harder, more brittle and less greasy than fats. The terms "waxy material" and "waxy substance" are employed herein to denote any of the naturally-occurring waxes or any of the synthetic waxes or mixtures thereof. While all of the materials mentioned in colloidal suspension will improve lotion shampoos to some extent, they do not yield equally good results. The naturally-occurring waxes are far better for the purpose than synthetic waxes; and carnauba wax is strikingly superior to any other naturally-occurring wax. In all cases the waxy material utilized must have a melting point in excess of 110° F. and preferably above 120° F.

Two classes of dispersing agents have been found satisfactory in producing the concentrated, permanently stable, colloidal suspension. One is composed of a mixture of a soluble soap and a hydrogenated oil. This soap is a product of the mixing of an organic or inorganic alkaline substance with a commercial saturated fatty acid. Among the suitable alkaline materials are the organic amines, such as triethanolamine, diethanolamine, morpholine, etc., and the hydroxides and carbonates of potassium, sodium and ammonia. Triethanolamine is preferred, and the amines in general have proven superior to the inorganic alkalies for the purpose. The acyl radical of the soap is preferably derived from stearic acid, but palmitic, myristic or lauric acids or mixtures thereof may be used if desired. The hydrogenated oil adds to the opacity of the suspension; any hydrogenated animal, vegetable or fish oil may be employed. The second class of dispersing agents comprises the salts of various sulfated fatty alcohols, known under the registered trade-mark "Duponol."

When the dispersing agent is a salt of a sulfated alcohol, about 1 to 5 parts by weight of this agent should be used for each 10 parts of waxy material in preparing the concentrated, permanently stable, colloidal suspension. Increasing the quantity of this disperser tends to dissolve the waxy substance at the temperatures such as are used in preparing the suspensions, e. g. such as the temperature used in Example B hereinafter, and reducing it tends to produce an unstable suspension from which the solid matter will settle out. For the other class of dispersing agents, approximately 1 to 3 parts of saturated fatty acid and 1 to 3 parts hydrogenated oil are admixed with 10 parts of the waxy material; the quantity of alkaline matter is preferably somewhat in excess of that required to completely saponify the fatty acid. For each 10 parts of waxy material, the concentrated dispersion should contain in the neighborhood of 80 to 90 parts of water, but these proportions may be varied considerably depending on the particular ingredients and the concentration desired.

The concentrated suspension of waxy material is suitable for use in any soap or synthetic detergent solution of the foam-forming type. Sodium and potassium soaps of the various fatty acids, sulfated fatty acid monoethanolamides, alkyl aryl alkali sulfonates, alkali salts of fatty alcohol sulfates, and alkali alkyl naphthalene sulfonates are representative of the wide range of lathering detergents with which the present invention is concerned.

A variety of other agents may be added to the

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Liquid shampoos to obtain certain desirable features. Methyl ester of castor oil is a desirable additive as it appears to lessen or prevent the accumulation of static electric charges on the individual strands of hair while drying. This aids in keeping the hair manageable for subsequent dressing processes. The stability of the dispersion in alkali soaps appears to be enhanced by the presence of small amounts of certain coupling agents as, for instance, methyl ester of castor oil, mahogany soap, glycols, sulfated fatty acids and sulfated fatty oils. Also, the addition of a small proportion of wetting agents such as sulfated methyl oleate and the like to a soap solution is thought to increase the effectiveness of the shampoo. Perfume is customarily added in minute quantities to render the odor of the shampoo liquid more pleasing. The incorporation of ethyl alcohol is advantageous, for it dissolves oil present on the unwashed hair, renders the shampoo less viscous and reduces the quantity of residual soap left on the hair after rinsing. In regions having very hard water, hard water resistive agents may be used to advantage in lotion shampoos having an alkali soap base, but are not needed when a synthetic detergent is employed. The hard water resistive agents may be divided into two classes; the true water softeners which remove the calcium and magnesium ions by precipitation as inorganic salts rather than metallic soaps, and dispersing agents which disperse the metallic soaps with an alkali soap to prevent their precipitation. Among the suitable water softeners may be mentioned tetrasodium pyrophosphate, sodium hexametaphosphate and sodium tetrakisphosphate. The dispersing agents for metallic soaps include such compounds as the diethanolamides of fatty acids, especially the fatty acids derived from coconut oil.

While the proper proportions of detergent and wax-like material in the shampoo must necessarily depend to a considerable extent on the particular detergent and waxy substance used, the following generalizations have been found applicable to the present invention. In the case of foamable synthetic detergents, satisfactory results may be obtained with from about 5 to about 65 parts of the detergent to one part of wax on a dry basis. However, better results will be secured by keeping the quantity of synthetic detergent within the range of 10 to 30 parts of detergent for each part of wax on a dry basis. When employing an alkali soap, 10 to 130 parts by weight may be utilized but a ratio of about 20 to 60 parts for each part of wax is recommended.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following examples which are given merely to further illustrate the invention and are not to be construed in a limiting sense all parts given being by weight.

Example A

	Parts by weight
Carnauba wax (light-colored, refined grade)	10.0
Stearic acid	2.0
Hydrogenated fish oil	2.0
Triethanolamine	1.5
Water	84.5
Total	100.0

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The carnauba wax, stearic acid and hydrogenated fish oil are melted together at about 95° C. with stirring. The triethanolamine is then stirred into the blended mixture and agitation is continued until a clear gel forms. Thereafter, water heated to about the same temperature is added slowly and intermittently with mixing. The agitation is continued until an even dispersion of wax is attained. The triethanolamine used is somewhat in excess of that required to saponify the stearic acid to insure complete saponification. The soap formed acts as a dispersing agent for the carnauba wax while the hydrogenated fish oil lends additional opacity to the suspension. Candelilla wax, montan wax, cetyl alcohol, hydrogenated castor oil, etc. may be substituted for the carnauba wax.

Example B

	Parts by weight
Carnauba wax (light-colored, refined grade)	10.0
"Duponol ME" (sodium lauryl sulfate)	2.0
Water	88.0
Total	100.0

This concentrated wax suspension is prepared by diluting the "Duponol ME" with an equal weight of water, and stirring the resulting solution into molten carnauba wax. Thereafter the remaining water is added slowly and intermittently with constant agitation. All ingredients are preheated to and maintained at approximately 95° C. until a uniform wax dispersion is formed.

Example C

	Parts by weight
Candelilla wax	8.0
Stearic acid	2.0
Hydrogenated fish oil	2.0
Triethanolamine	1.5
Water	86.5
Total	100.0

The preparation of this wax suspension is identical with that of Example A.

Example D

	Parts by weight
Monoethanolamide of castor oil	10.0
Stearic acid	2.0
Hydrogenated fish oil	2.0
Triethanolamine	1.5
Water	84.5
Total	100.0

This concentrated suspension is prepared in the same manner as Example A.

Example I

	Parts by weight
Coconut fatty acids	16.0
Hydrogenated fatty acids (M. P. 51.0° C.) ..	5.2
45% potassium hydroxide solution (5.2 parts KOH in 6.3 parts water)	11.5
Wax suspension from Example A, B, C or D ..	12.0
Methyl ester of castor oil	3.0
Sulfated methyl oleate	0.8
Perfume	0.2
Water	51.3
Total	100.0

In compounding this liquid shampoo the water in a suitable vessel is heated to 70° C. and maintained at that temperature while all of the ingredients are incorporated with stirring. The coconut and hydrogenated fatty acids are added first in the hot water. When they have melted completely, the methyl ester of castor oil (chiefly methyl ricinoleate) and sulfated methyl oleate are introduced. Next the aqueous potassium hydroxide solution is poured in to completely saponify the fatty acids. After saponification, the concentrated wax suspension which had been previously prepared and the perfume are blended in to complete the dispersion. The product has been found to possess desired properties to the highest degree yet encountered with a shampoo having an alkali soap base. The hydrogenated fatty acids appear to increase the effect of the wax in promoting and stabilizing an extremely large volume of lather. The sulfated methyl oleate is optional but recommended wherever a wetting agent is desirable, as for use on exceptionally oily hair.

Example II

A lotion shampoo is prepared in the same manner with the same ingredients in the same proportions as in Example I, except for the omission of the methyl ester of castor oil. The product has properties generally similar to the properties of the product of the previous example.

Example III

Parts by weight	
30% aqueous soap solution (10 parts dry soap in 23 parts water)	33.0
Diethanolamide of coconut fatty acids.....	20.0
Wax suspension of Example A, B, C or D....	12.0
Perfume	0.2
Water	34.8
Total	100.0

The ingredients listed are stirred together at ordinary temperatures to produce the shampoo. The soap is a blend of potassium soaps of a mixture of fatty acids in the proportions given in Example I. The diethanolamide compound disperses the precipitated metallic soaps when the shampooing is performed with hard water thereby preventing their deposition on the hair.

Example IV

Parts by weight	
Lotion shampoo of Example III	95
Ethanol	5
Total	100

The alcohol is mixed in the shampoo fluid of Example III to provide more efficient cleansing, especially of oily hair. It produces a less viscous liquid, and reduces to a minimum for any degree of rinsing the residual soap remaining on the hair.

Example V

Parts by weight	
30% soap solution (25.5 parts dry soap in 59.5 parts water)	85.0
Wax suspension of Example A, B, C or D	12.0
Methyl ester of castor oil	3.0
Total	100.0

This emulsion is readily prepared at room temperature by merely stirring together the substances listed. Any conventional soap may be employed.

Example VI

Parts by weight	
Sodium alkyl naphthalene sulfonate (active basis, salt free)	15.0
Wax suspension of Example A, B, C or D....	12.0
Water	73.0
Total	100.0

The sulfonate mentioned is one of the class of recently developed "soapless" soaps or synthetic detergents. The sulfonate radical is attached directly to the naphthalene ring. Here again it is only necessary to thoroughly mix the constituents.

Example VII

Parts by weight	
Capryl monoethanolamide sodium sulfate..	28.0
Wax suspension of Example A, B, C or D....	12.0
Water	60.0
Total	100.0

This shampoo composition illustrates the application of the invention to a sulfated type of synthetic detergent. In making this composition the synthetic detergent is dissolved in the water and the wax dispersion is added to the solution while stirring.

Example VIII

Parts by weight	
Dry "Nacconol NR"	28.0
Wax suspension of Example A, B, C or D....	12.0
Water	60.0
Total	100.0

"Nacconol NR" is another synthetic detergent and consists of sodium alkyl benzene sulfonate wherein the alkyl radical is derived from kerosene containing about 12 carbons and the sulfate group is attached directly to the benzene ring. In preparing this shampoo the synthetic detergent is dissolved in the water and the wax suspension added with mixing as in the preceding example.

Example IX

Parts by weight	
"Duponol ME"	28.0
Wax suspension of Example A, B, C or D....	12.0
Water	60.0
Total	100.0

"Duponol ME" is sodium lauryl sulfate and represents another class of the synthetic detergents; other sulfated fatty alcohols which may differ in the length of their alkyl chains may be substituted. The preparation of this composition is similar to that of Examples VII and VIII above.

Since certain changes may be made in the above composition of matter and different embodiments of the invention could be made without departing from its scope, it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all the generic and specific features of the invention herein described, and all statements of the scope of the invention, which as a matter of language might be said to fall therebetween.

Having described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A lotion shampoo which comprises an opaque stable colloidal suspension of 1 part by weight

of a hydrophobic saponifiable wax having a melting point above 110 degrees Fahrenheit in a liquid mixture of water and from 5 to 65 parts by weight of an anionic hydrophilic lathering detergent.

2. The lotion shampoo of claim 1 in which said detergent comprises an alkali metal soap.

3. The lotion shampoo of claim 1 in which said detergent comprises a synthetic aryl sulfonate detergent.

4. The lotion shampoo of claim 1 in which said wax comprises carnauba wax.

5. A lotion shampoo which comprises an opaque stable colloidal suspension of 1 part by weight of a hydrophobic saponifiable wax having a melting point above 110 degrees Fahrenheit in a liquid mixture of water, a dispersing agent in sufficient quantity to stably disperse the wax in water, and from 5 to 65 parts by weight of an anionic hydrophilic lathering detergent.

6. The lotion shampoo of claim 5 in which said dispersing agent comprises an alkali metal salt of a sulfated higher fatty alcohol.

7. The lotion shampoo of claim 5 in which said dispersing agent comprises a mixture of an alkaline soap and a hydrogenated fatty oil.

8. A lotion shampoo which comprises an opaque stable colloidal suspension of 1 part by weight of a hydrophobic saponifiable wax having a melting point above 110 degrees Fahrenheit in a liquid mixture of water, an amine soap together with a hydrogenated fatty oil in sufficient quantity to stably disperse the wax in water, and from 5 to 65 parts by weight of an anionic hydrophilic lathering detergent.

9. The lotion shampoo of claim 8 in which said wax comprises carnauba wax and said detergent comprises 10 to 30 parts by weight of a synthetic aryl sulfonate detergent.

10. The lotion shampoo of claim 8 in which said wax comprises carnauba wax and said detergent comprises an alkali metal soap.

11. A lotion shampoo which comprises an opaque stable colloidal suspension of 1 part by weight carnauba wax, in a liquid mixture of water, an alkylolamine soap together with a hydrogenated fatty oil in sufficient quantity to stably disperse the wax in water, methyl ester of castor oil in minor amount, up to about 0.8% sulfated methyl oleate, and from 5 to 65 parts by weight of an alkali metal soap.

12. The lotion shampoo of claim 1 in which said detergent comprises a sulfated fatty acid monoethanolamide.

13. The lotion shampoo of claim 1 in which said detergent comprises an alkali salt of a fatty alcohol sulfate.

14. The lotion shampoo of claim 8 in which said wax comprises carnauba wax and said detergent comprises 10 to 30 parts by weight of a sulfated fatty acid monoethanolamide.

15. The lotion shampoo of claim 8 in which said wax comprises carnauba wax and said detergent comprises 10 to 30 parts by weight of an alkali salt of a fatty alcohol sulfate.

JOHN J. MISKEL.
LOUIS RASSNER.

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Certificate of Correction

Patent No. 2,519,062

August 15, 1950

JOHN J. MISKEL ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 9, lines 47 and 48, for "methyl ester of castor oil in minor amount," read *up to about 3% of the methyl ester of castor oil;*

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 24th day of October, A. D. 1950.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.