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PACKAGE FOR DISPENSING A WARMED COMPOSITION

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ABSTRACT OF THE DISCLOSURE

Packages are described which comprise two compositions maintained isolated from each other within a container, one of the compositions comprising water and the other composition comprising a suspension in an inert anhydrous vehicle of an agent capable of liberating heat upon contact with water. Valve means communicate with each composition, actuation resulting in mixing of portions of each composition and dispensing of the mixture in a warmed state.

This is a continuation of application Ser. No. 707,993 filed Feb. 26, 1968, now abandoned.

This invention relates to packages adapted for the dispensing of a warmed composition for shaving and other purposes.

Packages of the type described in U.S. Pat. 2,655,480 to J. G. Epitzer et al. have been widely used in dispensing lather-producing compositions from a pressurized container filled with a mixture of an aqueous soap solution and a volatile propellant. Considerable efforts have been directed to develop means whereby such packages can be adapted to dispensing a lather in a warmed state, which is particularly desirable for shaving and other purposes. A number of devices have been developed utilizing heat exchange principles in which the lather dispensed from the package is passed in indirect heat exchange contact with a vessel filled with hot water such that the lather is heated and dispensed in a warmed state. A typical device of this nature is described in U.S. Pat. 3,175,733. Such devices suffer from obvious disadvantages in that they are bulky and especially in that they depend upon an available source of hot water or electricity.

U.S. Pat. 3,240,396 to R. M. Friedenberg represented a considerable step forward in the art of producing and dispensing a warmed lather in that the heat generating means are self-contained and do not depend upon an outside source of heat. In the system described in U.S. Pat. 3,240,396, heating is effected by taking advantage of the heat of solution of magnesium chloride or any one of a number of other metallic oxides, hydroxides and salts which are described generally by the term "thermogenic agents." Such thermogenic agents are in solid form within the package in such a way that lather produced upon actuation of a valve affixed to the container filled with a pressurized aqueous surfactant solution passes in contact with the thermogenic agent resulting in the solution of a small quantity of the thermogenic agent with a consequent generation of heat, thereby resulting in dispensing of a warmed lather.

While packages described in U.S. Pat. 3,240,396 represented a marked step forward over packages depending upon a heat exchange principle with hot water, they do suffer from commercial and technical disadvantages in that the maintenance of the thermogenic agent in solid form within the dispensing head of the package requires a relatively complex apparatus and, in addition, renders difficult the maintenance of a constant rate of solution throughout the life of the package. It is apparent that for optimum results a precisely metered quantity of thermogenic agent should pass into the aqueous surfacant solution dispensed from the can to insure intimate mixing and a consistent temperature rise throughout the life of the package.

The invention sought to be patented resides in the concept of a package adapted for the dispensing of a warmed composition comprising a container with means to maintain two compositions isolated from each other within the container, the first composition comprising water and the second composition comprising magnesium chloride in suspension in an anhydrous inert vehicle; means to apply pressure to each of said compositions and valve means communicating with each composition whereby actuation of the valve means results in the mixing of portions of each of said compositions and dispensing of the mixture from the package in a warmed state. Packages of the invention are especially adapted for dispensing a warmed surfactant for shaving and other purposes.

The manner and process of making and using the invention will now be described generally so as to enable one skilled in the art of cosmetic chemistry to make and use the same as follows:

Packages within the scope of the present invention are in the form of a container filled with two compositions which are maintained isolated from each other. It is essential that one composition comprise water and the other a suspension of magnesium chloride in an inert anhydrous vehicle. When such compositions are mixed the heat liberated upon contact of the magnesium chloride in one composition with the water in the other results in warming the mixture.

Magnesium chloride is present in one of the compositions in suspension in an inert anhydrous vehicle, the quantity of the magnesium chloride being such that upon solution in the water present in the other composition, a temperature rise of at least 25° F. is obtained.

The vehicle selected must be inert and non-reactive with the magnesium chloride and thus must be completely free of water. Useful vehicles include silicone fluids, such as dimethylpolysiloxanes having a viscosity up to about 20,000 centistokes at 25° C., mineral oil, for example USP light and heavy grade mineral oils, and mineral spirits, for example isoparaffinic hydrocarbons of a boiling range of 280°–450° F. at 1 atmosphere.

The magnesium chloride must be of small particle size to insure rapid solution in the water present in the other composition, and preferably of 50 microns diameter or less. Particle size reduction is conveniently effected by ball-milling the magnesium chloride in the vehicle.

Metallic salts other than magnesium chloride, as well as metallic oxides and hydroxides, exhibit a like property of generating heat upon contact with water, for example sodium oxide, calcium oxide, barium oxide, aluminum bromide, aluminum chloride and stannous chloride, and such materials which may generally be referred to as

thermogenic agents as that term is defined in U.S. Pat. 3,240,396 are the full equivalents of magnesium chloride in the preparation of packages of this invention and their use in place of magnesium chloride will result in preparation of packages included within the scope of the invention.

Packages within the scope of the present invention are applicable for dispensing a wide range of formulations in a warmed state for many end use purposes; for example, for cosmetic purposes such as shaving, hair dyeing and bleaching, as well as general cleansing purposes, and also for medicinal applications for topical use, such an analgesics, chest rubs and the like. For such purposes, the package will contain a surfactant system. As used herein, the term "surfactant" is used in the broad sense to identify and define substances which, by themselves or with additives, form "detergents," that is to say, among other effects they exert a cleansing action on a surface by surface-active properties; they also, by themselves or with additives are emulsifiers, that is to say, because of their surface-active properties they stabilize mixtures of otherwise immiscible materials. The term "surfactant" thus, for the purposes of the art herein taught, embraces compositions derived from naturally occurring substances which are commonly referred to as soaps as well as compositions derived from substances prepared synthetically.

It has been found that monovalent metal or organic amine fatty alcohol sulfates in which the fatty alcohol moiety contains at least 10 carbon atoms are particularly useful surfactants in the preparation of packages of this invention, for example sodium lauryl sulfate, potassium stearyl sulfate, sodium palmityl sulfate triethanolamine lauryl sulfate and the like.

The surfactant can be present in either the composition comprising water, in which case it would normally be present in the form of an aqueous emulsion; or, alternately, in the suspension of magnesium chloride in the anhydrous vehicle as described above. It is generally preferred that the surfactant be present in the water composition in the form of an aqueous emulsion. The package will also include, in either or both compositions, additives depending upon the end use of the composition to be dispensed. Where a stable foam is desired, as for example for use in shaving, humectants designed to minimize rate of drying may be present, such as glycerin, propylene glycol, sorbitol, and the like. For cosmetic purposes, a perfume is normally used to impart a desired degree of fragrance to the product. Where the compositions are intended for medicinal purposes for topical use, such as analgesics and chest rubs, medicinal agents such as methylsalicylate, thymol, eucalyptol or other essential oils, a local anesthetic such as benzocaine or any other conventional topical useful medicinal agent can be present to impart the desired medicinal effect to the product to be dispensed.

In accordance with a specific embodiment of this invention, the composition comprising magnesium chloride also contains an alkali metal carbonate in an amount sufficient to precipitate magnesium ion as magnesium carbonate after contact of the second composition with the aqueous surfactant composition. Such a formulation has been found to be particularly useful where packages are designed to dispense compositions where it is desirable not to have magnesium ion present in solution. Other materials which have anionic moieties which form a precipitate with magnesium ion, such as alkali metal fluorides, hydroxides, borates, oxalates and the like are the full equivalents of alkali metal carbonates in the preparation of packages in accordance with the above described embodiment of this invention.

The two compositions, formulated as described above, are maintained isolated from each other within a container. Such a container is constructed of rigid or flexible material depending upon the pressurization means to be utilized for dispensing. A collapsible container formed of plastic or metal is used where pressurization is effected manually by squeezing. In accordance with the preferred embodiment of this invention, self-pressurization is employed through use of a liquefied propellant gas within the container in either or both of the isolated compositions and in this case, a pressure-tight container having sufficient wall strength to withstand the propellant pressure is employed. The container can be formed of a wide class of materials used in the art of aerosol packaging such as glass, rigid plastics and metal. Such propellants must be of such a nature that they do not destroy the surfactant or its ingredients and thus must be fully compatible therewith. Such propellants should have vapor pressure of approximately 12 to 85 pounds per square inch gauge at 70° F. using as propellants saturated aliphatic hydrocarbons such as propane, butane, isobutane, and the like, and/or chlorofluoroalkanes containing not more than two carbon atoms and at least one fluorine atom having the desired vapor pressure for use in the invention. Propellant gases such as carbon dioxide or nitrous oxide or liquefied propellants such as dimethyl ether with a high degree of water solubility may also be used as pressurization means.

The two compositions, formulated as described above, are packaged within a container in such a way as to remain isolated with each other. Valve means are provided to communicate with each composition such that upon actuation of the valve means, a quantity of each composition is mixed and the resulting mixture is dispensed from the package. The quantity and concentration of magnesium chloride must be adjusted in relation to the proportioning properties of the valve means to attain the desired temperature rise.

There are many different ways in which the final package can be constructed which will influence the selection of appropriate valve means and the means selected for pressurization. Several such ways are discussed hereinafter.

The package can be constructed in the form of a two-chambered container, separated by a rigid wall, with each chamber fitted with a valve leading to a common discharge conduit. Such a structure is illustrated in U.S. Pat. 2,941,696 and with such, both compositions are pressurized. Alternately, structure as illustrated in U.S. Pat. 3,295,727 can be employed in which case one of compositions is pressurized and is present in the body portion of the container with the second composition in the illustrated chamber surrounding the dip tube. Pressurized vapors from the first composition act upon the second composition in this structure. U.S. Pat. 3,272,389 illustrates another form of package construction useful in the invention. In this structure, venturi action of one pressurized composition provides the motive force for dispensing the second composition.

A particularly desirable form of package for dispensing a surfactant composition in accordance with the invention is to utilize a package having two compartments in which the two compositions are packaged within a pressure-tight container, the compartments being separated by a movable wall actuatable upon a pressure differential between the two compartments when the valve means affixed to the container are actuated. In such a system, the movable wall can be in the form of a movable piston, for example, as illustrated in U.S. Pat. 3,217,936, or in the form of a collapsible bag as illustrated in U.S. Pat. 2,973,-883. The disclosures of the aforementioned patents are incorporated by reference herein for illustrative purposes to the same extent as if set forth at length. It is to be understood that such patents are merely illustrative of various means to package the two compositions of this invention within a container and to dispense portions of both compositions to insure mixing and dispensing upon actuation of the valve means.

Packages of this invention are filled by conventional means. Where pressurization is brought about by a liquefied propellant included in either or both compositions,

filling can be by either pressure-or-cold-filling techniques. If cold filling is employed, a propellant having an atmospheric pressure boiling point temperature of above 32° F. must be used to avoid freezing of the water present in the package.

The best mode contemplated by the inventors for carrying out their invention will now be set forth as follows:

EXAMPLE 1

Two compositions are prepared with the following compositions:

(A)

	Parts by weight
Triethanolamine lauryl sulfate (40% aqueous)	34.72
Dipropylene glycol	2.60
Cetyl alcohol	4.34
Triethanolamide of lauryl alcohol	1.74
Water	56.60
	100.00

(B)

Anhydrous magnesium chloride	50.4
Light mineral oil	43.6
Polyoxyethylene (2) oleyl ether	1.0
Sodium lauryl sulfate	5.0
	100.0

These compositions are used in preparing a package in accordance with the invention, the ultimate package being in the form illustrated in U.S. Pat. 2,973,883, as follows:

Fill 94 parts by weight of Composition A into a pressure tight container. Fill a collapsible container having a diameter smaller than the opening in the pressure tight container with 20 parts by weight of Composition B. Insert collapsible container and affix valve means to communicate individually with the two compositions, the valve means being constructed such that actuation causes flow in the relative proportions of 5 parts of Composition A to 1 part of Composition B. Pressurize container with 6 parts of hydrocarbon propellant (84% isobutane-16% propane), Actuation of the valve means results in dispensing of a warmed composition ideally suited for shaving purposes, with a temperature rise of at least 25° F.

The following example illustrates preparation of another package within the scope of the invention.

EXAMPLE 2

A package of the type described in Example 1 is prepared with the following compositions:

(A)

	Parts by weight
Sodium lauryl sulfate (29% aqueous)	13.56
Octyl phenoxy polyethoxy ethanol	1.69
Water	84.75
	100.00

(B)

Magnesium chloride anhydrous	26.41
Sodium carbonate anhydrous	26.41
Light mineral oil	44.01
Polyoxyethylene (2) oleyl ether	0.53
Sodium lauryl sulfate	2.64
	100.00

The ingredients are packaged and pressurized as described in Example 1 in the proportions of 3 parts of Composition A to 1 part of Composition B. A creamy foam in a warmed state is produced upon actuation of the valve means, with a temperature rise of at least 25° F.

It is to be understood that the invention is not to be limited to the exact compositions shown and described, as obvious modifications and equivalents will be apparent to one skilled in the art, and the invention is therefore to be limited only by the scope of the appended claims. The subject matter which the applicants regard as their invention is particularly pointed out and distinctly claimed as follows.

We claim:

1. A package adapted for the dispensing of a surfactant composition therefrom in warmed aerosol form which comprises a pressure-tight container with means to maintain two compositions therein isolated from each other, the first of said compositions consisting essentially of an aqueous emulsion of a surface active agent, selected from the group consisting of anionic and non-anionic detergents and the second of said compositions consisting essentially of a suspension of a thermogenic agent which generates heat upon contact with water, said agent being finely divided and in suspension with an inert vehicle non-reactive with said second composition, said first and second compositions each present in an amount effective to result in a warmed surfactant composition when mixed; means to apply pressure to each of said compositions whereby actuation of said valve means results in the mixing of portions of each of said compositions and dispensing of the mixture from said package as a surfactant in warmed aerosol form.

2. A package according to claim 1 wherein said means to apply pressure is effectuated by including a liquefied gas in said first composition within the main body portion of the container and wherein said second composition is contained within a separate compartment within said container separated from said first composition by a movable wall operable by a differential in pressure between said first composition and said second composition upon actuation of said valve means, said liquefied gas having a vapor pressure at 70° F. of between 12 and 85 pounds per square inch gauge.

3. A package according to claim 1 wherein said means to apply pressure is effectuated by including a liquefied gas in said first and said second compositions, said liquefied gas having a vapor pressure at 70° F. of between 12 and 85 pounds per square inch gauge.

4. A package according to claim 1 wherein said means to apply pressure is effectuated by including a liquefied gas in said second composition within the main body portion of the container and wherein said first composition is contained within a separate compartment within said container separated from said second composition by a movable wall operable by a differential in pressure between said second composition and said first composition upon actuation of said valve means, said liquefied gas having a vapor pressure at 70 F. of between 12 and 85 pounds per square inch gauge.

5. A package according to claim 1 wherein said vehicle is mineral oil.

6. A package according to claim 5 wherein the surface active agent comprises sodium lauryl sulfate.

7. A package according to claim 5 wherein the surface active agent comprises triethanolamine lauryl sulfate.

8. A package according to claim 1 wherein the thermogenic agent of the second composition is a metallic salt and wherein said second composition includes an alkali metal carbonate in an amount stoichiometrically equivalent to the metallic salt in said composition in the conversion of said salt to a metallic carbonate.

9. A package adapted for the dispensing of a composition therefrom in a warmed state which comprises a container with means to maintain two compositions therein isolated from each other, the first of said compositions consisting essentially of water and the second of said compositions consisting essentially of a suspension of a finely divided thermogenic agent selected from the group consisting of metallic salt, metallic oxide and metallic hydroxides in an anhydrous non-reactive inert

vehicle, a surface active composition being present in one of said compositions, means for applying pressure to each of said compositions, whereby actuation of said mixing means results in the mixing of portions of each of said compositions in amounts sufficient to cause warming and dispensing of the mixture from said package in a warmed state.

10. A package adapted for the dispensing of a surfactant composition therefrom in warmed aerosol form which comprises a pressure-tight container with means to maintain two compositions isolated from each other, the first of said compositions consisting essentially of an aqueous emulsion of a member selected from the group consisting of a detergent, soap or emulsifier and the second of said compositions consisting essentially of a suspension of a finely divided alkaline-earth metallic salt in an anhydrous inert, non-reactive vehicle, said salt present in an amount to attain an effective temperature rise upon mixing said first and second compositions; means to apply pressure to each of said compositions and valve means communicating with each of said compositions whereby actuation of said valve means results in the mixing of portions of each of said compositions and dispensing of the mixture from said package as a surfactant in warmed aerosol form.

11. A package according to claim **10** wherein said means to apply pressure is effectuated by including a liquefied gas in said first composition within the main body portion of the container and wherein said second composition is contained within a separate compartment within said container separated from said first composition by a movable wall operable by a differential in pressure between said first composition and said second composition upon actuation of said valve means, said liquefied gas having a vapor pressure at 70° F. of between 12 and 85 pounds per square inch gauge.

12. A package according to claim **10** wherein said means to apply pressure is effectuated by including a liquefied gas in said first and said second compositions, said liquefied gas having a vapor pressure at 70° F. of between 12 and 85 pounds per square inch gauge.

13. A package according to claim **10** wherein said means to apply pressure is effectuated by including a liquefied gas in said second composition within the main body portion of the container and wherein said first composition is contained within a separate compartment within said container separated from said second composition by a movable wall operable by a differential in pressure between said second composition and said first composition upon actuation of said valve means, said liquefied gas having a vapor pressure at 70° F. of between 12 and 85 pounds per square inch gauge.

14. A package according to claim **10** wherein said vehicle is mineral oil.

15. A package according to claim **14** wherein said first composition comprises sodium lauryl sulfate.

16. A package according to claim **14** wherein said first composition comprises triethanolamine lauryl sulfate.

17. A package according to claim **10** wherein the second composition includes an alkali metal carbonate in an amount stoichiometrically equivalent to the metallic salt in said composition in the conversion of said salt to a metallic carbonate.

References Cited

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WILLIAM E. SCHULZ, Primary Examiner

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