

No. 03-037692- -00007-0000

Fecha: 2008-03-18 16:39:04 Dep. 2020 NUECREACIONE
Tra. 11 PATENTEIYII Eve: 379 FASENACIONALII
Act. 444 RESPUESTAREQUE Folios: 10

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Señora

JEFE DE DIVISIÓN DE NUEVAS CREACIONES

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

E.

S.

D.

REF: Expediente No. 03 037 692 – solicitud de patente de invención a favor
de KIMBERLY CLARK WORLDWIDE INC.

Respuesta a oficio No. 14201 del 09 de noviembre de 2007

JUAN PABLO CADENA SARMIENTO, portador de la tarjeta profesional No. 57.492 del C.S.J., obrando como apoderado de la sociedad KIMBERLY CLARK WORLDWIDE INC según lo acredita el documento de poder presentado ante esa División, me permito dar respuesta a las observaciones de carácter técnico y jurídico, relacionadas con la patentabilidad, para la concesión de la patente de acuerdo con la Decisión 486 según el concepto técnico No. 2091 notificado por fijación en lista de fecha 09 de noviembre de 2007, cuyo término fue prorrogado mediante escrito radicado el 04 de febrero de 2008.

En atención a las objeciones del señor examinador relacionadas con la falta de claridad del capítulo reivindicatorio nos permitimos anexar un nuevo capítulo reivindicatorio con 1 – 28, el cual no adiciona materia nueva ni extiende el alcance de la solicitud, y sustituye completamente el capítulo reivindicatorio anteriormente presentado. Así mismo se anexa una copia de la página 20, donde se corrige la tabla 1 para incluir las comas que separan los decimales, las cuales fueron omitidas de manera involuntaria.

Se han eliminado las reivindicaciones 28 – 38, acatando la sugerencia del señor examinador, con lo cual queda superada la objeción presentada a la falta de concisión y calidad del capítulo reivindicatorio.

Por otro lado el examinador objeta la altura inventiva de la solicitud a la luz de lo divulgado por la anterioridad US 5.869.075 (D1). El solicitante quisiera hacer los siguientes comentarios.

Si bien la anterioridad D1 enseña los componentes de las formulaciones de la presente solicitud, el que dicha anterioridad no enseñe las cantidades es clave al determinar la altura inventiva de la solicitud. Es claro que D1 no enseña o sugiere la sinergia originada por las cantidades de cada componente de la formulación, y menos aun el efecto que tiene la cantidad de formulación aplicada sobre el sustrato según lo divulga la presente solicitud.

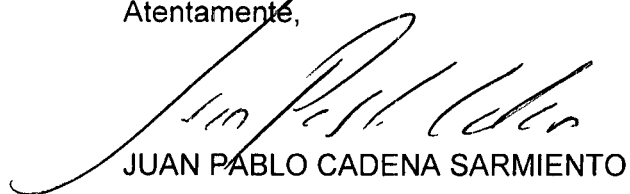
Lo que los inventores de la solicitud encontraron fue que las proporciones de los componentes en la formulación, en las cantidades divulgadas por la solicitud, poseen una sinergia particular que resulta beneficiosa para el usuario final. Además, los inventores también encontraron que agregar la loción al sustrato en las cantidades reivindicadas también mejoraba el desempeño del sustrato, al permitirle absorber la misma cantidad de humedad y, al mismo tiempo, proporcionar humectación e hidratación a la piel del usuario.

Si se lee cuidadosamente, la anterioridad D1 no identifica sinergias entre los componentes a ninguna concentración, menos aun cantidades óptimas de loción a las cuales el sustrato se comporta mejor como absorbente y como medio de aplicación de la loción sobre la piel. Sin estas divulgaciones, no hay motivación para que el técnico con habilidad en la materia derive de manera obvia lo contenido en la solicitud, por lo que la anterioridad D1 no contiene información que afecte la altura inventiva de la misma.

En vista de lo anterior, respetuosamente solicitamos el retiro de las objeciones a la presente solicitud, en base al nuevo capítulo reivindicatorio presentado y a los argumentos anteriores ya que, en opinión del solicitante, la presente invención cumple con los requisitos de claridad y además los de novedad, altura inventiva y aplicabilidad industrial de la Decisión 486.

De la Señora Jefe,

Atentamente,



JUAN PABLO CADENA SARMIENTO

T.P. No. 57.492 del C.SJ.

C.C. 80.410.337 de Usaquén

Carrera 7 No. 71-21, Torre B, Of. 402

Bogotá, Marzo 17 de 2008

CH

Anexos

Reivindicaciones

1. Un producto de papel absorbente para secar y acondicionar la piel del usuario, dicho producto de papel que comprende:

un tejido de papel; y

una loción emulsionada aceite-en-agua aplicada a dicho tejido de papel; caracterizado porque dicha loción consiste esencialmente de agua en una cantidad entre 10% y 75% por peso de dicha loción, un componente emoliente en una cantidad entre 1% y 15% por peso de dicha loción, un componente de alcohol graso en una cantidad entre 5% y 40% por peso de dicha loción, un componente emulsionador en una cantidad entre 1% y 30% por peso de dicha loción, y un componente acondicionador de la piel en una cantidad entre el 5% y 50% por peso de dicha loción, dicho componente acondicionador de la piel que incluye glicerina en una cantidad entre 1% a 10% por peso de dicha loción,

en la cual el nivel de agregados de dicha loción es entre 1% y 15% por peso de dicho producto de papel.

2. Un producto de papel tal y como se reivindica en la cláusula 1, caracterizado porque dicha agua comprende entre 40% y 70% por peso de dicha loción.

3. Un producto de papel tal y como se reivindica en la cláusula 1, caracterizado porque dicho componente emoliente comprende entre 1% y 10% por peso de dicha loción.

4. Un producto de papel tal y como se reivindica en la cláusula 1, caracterizado porque dicho componente emoliente incluye in éster de alquilo primario lineal de ácido benzóico.

5. Un producto de papel tal y como se reivindica en la cláusula 4, caracterizado porque dicho éster de alquilo primario lineal de ácido benzóico es alquil benzoato C₁₂-C₁₅.

6. Un producto de papel tal y como se reivindica en la cláusula 4, caracterizado porque dicho componente de alcohol graso comprende entre 10% a 30% por peso de dicha loción.

7. Un producto de papel tal y como se reivindica en la cláusula 1, caracterizado porque dicho componente de alcohol graso incluye un alcohol graso seleccionado del grupo que consiste de alcohol cetilo, alcohol estearilo, alcohol cetearilo, alcohol araquidilo, alcohol behenilo, y combinaciones de los mismos.

8. Un producto de papel tal y como se reivindica en la cláusula 1, caracterizado porque dicho componente emulsionador comprende entre 5 % y 20% por peso de dicha loción.

9. Un producto de papel tal y como se reivindica en la cláusula 1, caracterizado porque dicho componente emulsionador incluye un polioxietilen estearil éter.

10. Un producto de papel tal y como se reivindica en la cláusula 1, caracterizado porque dicho componente acondicionador de la piel comprende entre 10% y 40% por peso de dicha loción.

11. Un producto de papel tal y como se reivindica en la cláusula 1, caracterizado porque dicho componente acondicionador de la piel seleccionado del grupo que consiste de dimeticona, gliceril estearato, triglicérido de estearato caprílico/cáprico, fosfato cloruro dimonio-PG estearamidopropil y alcohol cetilo, y combinaciones de los mismos.

12. Un producto de papel tal y como se reivindica en la cláusula 1, caracterizado porque dicho nivel de agregados de dicha loción está entre 1% y 10% por peso de dicho producto de papel.

13. Un producto de papel tal y como se reivindica en la cláusula 1, caracterizado porque dicha loción además comprende un agente antimicrobial, un preservativo, o combinaciones de los mismos.

14. Un producto de papel tal y como se reivindica en la cláusula 1, caracterizado porque dicho producto de papel tiene un peso base de entre 0.4 y 20.5 kilogramos por resma.

15. Un producto de papel tal y como se reivindica en la cláusula 1, caracterizado porque dicho producto de papel es una toalla que tiene un peso base entre 6.8 y 20.5 kilogramos por resma.

16. Una toalla absorbente de papel para secar y acondicionar la piel del usuario, dicha toalla con un peso base de 6.8 y 20.5 kilogramos por resma, dicha toalla que comprende:

un tejido de papel;

una loción aplicada a dicho tejido de papel de tal manera que el nivel de agregados de dicha loción está entre 1% y 10% por peso de dicha toalla de papel, dicha loción que consiste esencialmente de los siguientes componentes:

- i) agua en una cantidad entre 10% y 75% por peso de dicha loción;
- ii) un componente emoliente en una cantidad entre 1% y 15% por peso de dicha loción, dicho componente emoliente que incluye C₁₂-C₁₅ alquil benzoato;
- iii) un componente de alcohol graso en una cantidad entre 5% y 40% por peso de dicha loción, en la cual dicho componente de alcohol graso incluye un alcohol graso seleccionado entre el grupo que consiste de alcohol cetilo, alcohol estearilo, alcohol cetearilo, alcohol araquidilo, alcohol behenilo, y combinaciones de los mismos; y
- iv) un componente acondicionador de la piel que comprende entre 5% y 50% por peso de dicha loción, dicho componente acondicionador de la piel que incluye glicerina en una cantidad entre 1% y 10% por peso de dicha loción.

17. Una toalla de papel tal y como se reivindica en la cláusula 16, caracterizada porque dicha agua comprende entre 40% y 70% por peso de dicha loción.

18. Un producto de papel tal y como se reivindica en la cláusula 16, caracterizado porque dicho componente emoliente comprende entre 1% y 10% por peso de dicha loción.

19. Una toalla de papel tal y como se reivindica en la cláusula 16, caracterizada porque dicho componente de alcohol grado comprende entre 10% y 30% por peso de dicha loción.

20. Una toalla de papel tal y como se reivindica en la cláusula 16, caracterizada porque dicho componente emulsionador comprende entre 5% y 20% por peso de dicha loción.

21. Una toalla de papel tal y como se reivindica en la cláusula 16, caracterizado porque dicho emulsionador incluye un éter de estearilo polioxietileno.

22. Una toalla de papel tal y como se reivindica en la cláusula 16, caracterizada porque dicho componente acondicionador de la piel comprende entre 10% y 40% por peso de dicha loción.

23. Una toalla de papel tal y como se reivindica en la cláusula 16, caracterizada porque dicho componente acondicionador de la piel incluye un agente acondicionador de la piel seleccionado del grupo que consiste de dimeticona, gliceril estearato, triglicérido de estearato caprílico/cáprico, fosfato cloruro dimonio-PG estearamidopropil y alcohol cetilo, y combinaciones de los mismos.

24. Una toalla de papel tal y como se reivindica en la cláusula 16, caracterizada porque dicha loción además comprende un agente antimicrobial, un preservativo, o combinaciones de los mismos.

25. Un método para formar un producto de papel para secar y acondicionar la piel del usuario, dicho método que comprende:

formar un tejido de al menos un aporte que contiene fibras y agua;

secar dicho tejido por convección para remover el agua del mismo;

y de ahí en adelante, tratar dicho tejido secado con una loción emulsionada aceite-en-agua de tal manera que dicha loción tiene un nivel de agregados entre 1% y 15% por peso de dicho producto de papel, dicha loción que comprende

agua en una cantidad entre 10% y 75% por peso de dicha loción,

un componente emoliente en una cantidad entre 1% y 15% por peso de dicha loción,

un alcohol graso en una cantidad entre 5% y 40% por peso de dicha loción, y

un componente acondicionador de la piel en una cantidad entre 5% y 50% por peso de dicha loción, dicho componente acondicionador de la piel que incluye glicerina en una cantidad entre 1% y 10% por peso de dicha loción.

26. Un método tal y como se reivindica en la cláusula 25, caracterizado porque dicha loción es impresa sobre dicho tejido de papel.

27. Un método tal y como se reivindica en la cláusula 25, caracterizado porque dicha loción es rociada sobre dicho tejido de papel.

28. Un método tal y como se reivindica en la cláusula 25, caracterizado porque dicho producto de papel es una toalla que tiene un peso base de entre 0.426 kg y 1.278 kg (15 y 45 oz) por resma.

5 producto de papel tratado y entonces multiplicado por 100. Por ejemplo, el nivel de agregado de la composición puede ser desde alrededor de 1 de hasta alrededor de por ciento por peso, en algunas incorporaciones desde alrededor de 1 hasta alrededor de 10 por ciento por peso, y en algunas incorporaciones, desde alrededor de uno hasta alrededor de 5 por ciento por peso, basado en el peso del producto de papel.

La presente invención puede ser mejor comprendidas con referencia al siguiente ejemplo.

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EJEMPLO

15 La habilidad de un producto de papel para acondicionar la piel de un usuario durante el secado fue demostrado. Una loción fue primero formada de una fase de agua y de una fase de aceite. En particular, la loción tenía la siguiente composición:

Tabla 1: Componentes de la Loción

Componente	% Peso de la Loción
Fase A	
Agua	67,336
Glicerina	4,000
Fase B	
C ₁₂ -C ₁₅ benzoato de alquilo	4,000
Alcohol de cetearilo	7,000
Triglicérido de estearato caprílico/cáprico	
Esteareto-2	4,000
Esteareto-20	2,400
Alcohol de cetilo y fosfato de cloruro de PG-dimonio	1,800
estearamidopropilo	4,000
Dimeticona	4,000
Metilparaben	0,400
Pantenol (vitamina B-5)	0,002
Acetato de tocoferil (vitamina E)	0,002
Preservativo	1,000
Fragancia	0,060

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COÖPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : A61K 7/48		A1	(11) International Publication Number: WO 00/64409
			(43) International Publication Date: 2 November 2000 (02.11.00)
(21) International Application Number: PCT/US00/11142 (22) International Filing Date: 20 April 2000 (20.04.00) (30) Priority Data: 60/130,779 23 April 1999 (23.04.99) US 09/379,929 24 August 1999 (24.08.99) US (71) Applicant: KIMBERLY-CLARK WORLDWIDE, INC. [US/US]; 401 North Lake Street, Neenah, WI 54956 (US). (72) Inventors: KRZYSIK, Duane, Gerard; 1112 East Melrose Avenue, Appleton, WI 54911 (US). NELSON, Brenda, Marie; 3124 South Huckleberry Lane, Appleton, WI 54915 (US). LANGE, Beth, Anne; 415 South Olde Oneida, #319, Appleton, WI 54911 (US). OTTS, David, Roland; 809 North Kensington Drive, Appleton, WI 54915 (US). (74) Agents: CHARLIER, Patricia, A. et al.; Kimberly-Clark Worldwide, Inc., 401 N. Lake St., Neenah, WI 54956 (US).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>	
(54) Title: SKIN BARRIER ENHANCING ABSORBENT TISSUES			
(57) Abstract			
A superior skin barrier enhancing tissue product, such as facial tissue, bath tissue or paper towels and the like, can be made by applying, on the surface(s) of the tissue, a lipid-enriched melted hydrophilic composition comprising a hydrophilic solvent, a high molecular weight polyethylene glycol, a fatty alcohol (C₁₄ - C₃₀ or greater), humectant, an oil-in-water emulsifying surfactant having an HLB range greater than 7, or β-sterol, and a natural fat or oil, and thereafter resolidifying the composition to form a distribution of solid composition on the surface(s) of the tissue.			

Skin Barrier Enhancing Absorbent Tissues

Field of the Invention

5 The present invention relates to the inclusion of a lipid-enriched hydrophilic lotion on absorbent tissue products, such as facial tissue, bath tissue, paper towels, and the like. More particularly, the present invention relates to improving skin health via enhancement of skin barrier function by the delivery of lipids and humectants from a hydrophilic lotion from said absorbent tissue products to the skin.

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Background of the Invention

15 The stratum corneum is the outer-most layer of the skin and is responsible for regulating skin water levels and functioning as a barrier against chemicals and other stressors found in the environment. The complex arrangement of lipids in the intercellular space of the stratum corneum is responsible for the establishment of normal barrier function. Multi-layered structures of cholesterol, ceramides, and fatty acids, as well as some other minor lipids, provide the major barrier to the transport of hydrophilic

20 substances into the or through the skin. The link between the barrier function and skin health is apparent from the skin inflammation caused by lipid extraction from the skin.

25 Skin barrier can be damaged due to a number of mechanisms. Physical abrasion, for example caused by the repeated rubbing of absorbent tissue products on the skin, strips away layers of the skin and thus damages skin barrier. Biological fluids, such as urine, feces, nasal and vaginal secretions, may contain a variety of components that can damage skin barrier. Examples of these components include proteases, lipases, bile acids, and fatty acids. Once the skin barrier is compromised, these components, in addition to other constituents of biological fluids, can initiate or exacerbate skin

30 inflammation.

 Excessive hydration also has a negative impact on skin barrier. The hydration level of diapered skin, for example, may reach between five to ten times that of undiapered skin. Frequent contact of diapered skin with fluids such as nasal secretion

105 In another aspect, the invention resides in a tissue product wherein one or both of
the outer surfaces of the product have solidified deposits of a composition comprising
from about 10 to about 95 weight percent hydrophilic solvent, from about 5 to about 95
weight percent high molecular weight polyethylene glycol (preferably having a molecular
weight of about 720 or greater), from about 1 to about 30 weight percent of a C₁₄ to C₃₀ or
110 greater fatty alcohol, from about 0.5 to about 30 weight percent of humectant, from about
1 to about 20 weight percent emulsifying surfactant having an HLB range greater than 7,
from about 0.1 to about 10 weight percent of sterol or sterol derivative, and from about 0.1
to about 30 weight percent of natural fats or oils. The hydrophilic composition may have a
melting point from about 30°C. to about 100°C. The composition may also have a
115 penetration hardness of from about 5 millimeters to 360 millimeters.

In another aspect, the present invention is a method of making a soft tissue or
towel product that enhances skin barrier comprising: (a) heating a hydrophilic
composition comprising a hydrophilic solvent, high molecular weight polyethylene glycol, a
120 fatty alcohol, a humectant, an emulsifying surfactant having an HLB range greater than 7,
a sterol or sterol derivative, and a natural fat or oil to a temperature above the melting
point of the composition, causing the composition to melt; (b) uniformly applying the
melted composition to one or both surfaces of the tissue web; and, (c) resolidifying the
melted composition. The hydrophilic composition may have a melting point of from about
125 30 °C. to about 100 °C.

Detailed Description of the Invention

130 One embodiment of the present invention is a tissue or towel product having two
outer surfaces. One or both outer surfaces of the product have solidified deposits of a
composition that enhances skin barrier. The composition may comprise from about 10 to
about 95 weight percent hydrophilic solvent, from about 5 to about 95 weight percent high
molecular weight polyethylene glycol having a molecular weight of about 720 or greater,
135 from about 1 to about 30 weight percent of a C₁₄ to C₃₀ or greater fatty alcohol, from about
0.5 to about 30 weight percent of humectant, from about 1 to about 20 weight percent of
oil-in-water emulsifying surfactant having an HLB range greater than 7, from about 0.1 to
about 10 weight percent sterol and sterol derivative, and from about 0.1 to about 30
weight percent of natural fats or oils.

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The composition may have a melting point from about 30° C to about 100 °C. The composition may have a penetration hardness of from about 5 millimeters to about 360 millimeters. The add-on amount of the composition may be from about 0.5 to about 30 weight percent based on the weight of said product. The add-on amount of the composition may also be expressed as from about 0.1 grams per meter squared (g/m²) to about 30 g/m² of the tissue or towel product, and more preferably from about 0.5 g/m² to about 25 g/m².

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The hydrophilic solvent used in the composition may include water, propylene glycol, a low molecular weight polyethylene glycol, glycerin, or hydrogenated starch hydrolysate. The fatty alcohol used in the composition may include cetyl alcohol, stearyl alcohol, arachidyl alcohol, or behenyl alcohol. The molecular weight of said high molecular weight polyethylene glycol used in the composition may include from about 720 to about 1,840,000 daltons, more specifically from about 1,400 to about 440,000 daltons. The molecular weight of said high molecular weight polyethylene glycol used in the composition may include polyethylene glycol 1,400, polyethylene glycol 8,000, or polyethylene glycol 10,000. The humectant used in the composition may include glycerin, sorbitol, or hydrogenated starch hydrolysate. The surfactant used in the composition may include glyceryl stearate SE, glycol stearate SE, or emulsifying wax NF. The sterol or sterol derivative used in the composition may include soy sterol, cholesterol, or lanasterol. The natural fat or oil used in the composition may include sunflower oil, borage oil, or avocado oil.

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Another embodiment of the present invention is a method of making a tissue or towel material having an outer surface comprising: (a) heating a composition that enhances skin barrier comprising a hydrophilic solvent, a high molecular weight polyethylene glycol, a fatty alcohol, a humectant, an oil-in-water emulsifying surfactant having an HLB range greater than 7, a natural fat or oil, and a sterol or sterol derivative, to a temperature above the melting point of the composition, causing the composition to melt; (b) applying the melted composition to the outer surface of a liner or tissue material web; and (c) resolidifying the melted composition.

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The composition may have a melting point of from about 30 °C to about 100 °C. The resolidified composition may have a penetration hardness of from about 5 to about 360 millimeters. The melted composition may be applied by printing.

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Another embodiment of the present invention is a skin barrier enhancing composition comprising from about 5 to about 90 weight percent hydrophilic solvent, from about 5 to about 95 weight percent high molecular weight polyethylene glycol having a
180 molecular weight of about 720 or greater, from about 1 to about 25 weight percent of a C₁₄ to C₃₀ or greater fatty alcohol, from about 0.5 to about 10 weight percent of humectant, from about 1 to about 20 weight percent of oil-in-water emulsifying surfactant having an HLB range greater than 7, from about 0.1 to about 10 weight percent of sterol and sterol derivative.

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The composition may have a melting point from about 30 °C. to about 100 °C. The resolidified composition may have a penetration hardness of from about 5 to about 360 millimeters.

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The hydrophilic solvent of the composition may be selected from the group consisting of: water, propylene glycol, low molecular weight polyethylene glycol, glycerin, sorbitol, hydrogenated starch hydrolysate, silicone glycol, and the like, as well as mixtures thereof. The fatty alcohol of the composition may be selected from the group consisting of: cetyl alcohol, stearyl alcohol, arachidyl alcohol, behenyl alcohol, and the like, as well
195 as mixtures thereof. The high molecular weight polyethylene glycol of the composition may be selected from the group consisting of: polyethylene glycols having a average molecular weight greater than 720 daltons.

The humectant of the composition may be selected from the group consisting of:
200 glycerin, propylene glycol, sorbitol, polyethylene glycol, hydrogenated starch hydrolysates, sodium PCA, potassium PCA, sodium lactate, and the like, as well as mixtures thereof. The surfactant of the composition may be selected from the group consisting of: glyceryl stearate SE, glyceryl stearate, glycol stearate SE, glycol stearate, emulsifying wax NF, and the like, as well as mixtures thereof. The sterol or sterol

205 derivative of the composition may be selected from the group consisting of: β -sterols having a tail on the 17 position and having no polar groups for example cholesterol, sitosterol, stigmasterol, ergosterol, as well as, C₁₀-C₃₀ cholesterol/lanosterol esters, cholecalciferol, cholesteryl hydroxystearate, cholesteryl isostearate, cholesteryl stearate, 7-dehydrocholesterol, dihydrocholesterol, dihydrocholesteryl octyldecanoate,
210 dihydrolanosterol, dihydrolanosteryl octyldecanoate, ergocalciferol, tall oil sterol, soy sterol

acetate, lanasterol, soy sterol, avocado sterols, cholesterol esters, sterol esters, and the like, as well as mixtures thereof.

215 The natural fat or oil of the composition may be selected from the group consisting of: avocado oil, apricot oil, babassu oil, borage oil, camellia oil, canola oil, castor oil, coconut oil, corn oil, cottonseed oil, evening primrose oil, hydrogenated cottonseed oil, hydrogenated palm kernal oil, maleated soybean oil, meadowfoam oil, palm kernal oil, phospholipids, rapeseed oil, palmitic acid, rose hip oil, sunflower oil, soybean oil, derivatives of natural fats or oils (such as stearic acid, linoleic acid, stearyl alcohol, lauryl alcohol, myristyl alcohol, benenyl alcohol, and the like), and the like, as well as mixtures thereof.

225 The amount of the hydrophilic solvent used in the composition may be from about 5 to about 90 weight percent, and more specifically from about 25 to about 75 percent. The amount of said high molecular weight polyethylene glycol used in the composition may be is from about 5 to about 95 weight percent, and more specifically from about 15 to about 50 weight percent.

230 The amount of said fatty alcohol used in the composition may be from about 1 to about 30 percent. The amount of said surfactant used in the composition may be from about 1 to about 20 percent. The sterol or sterol derivative used in the composition may be from about 0.1 to about 10 percent. The amount of said natural fat or oil used in the composition may be from about 0.1 to about 30 percent.

235 One embodiment of the composition comprises about 48.2 weight percent propylene glycol, about 20 weight percent polyethylene glycol 8,000, about 20 weight percent stearyl alcohol about 5 weight percent glycerin, about 3 weight percent glyceryl stearate SE, about 0.8 weight percent soy sterol, and about 3 weight percent borage oil.

240 Another embodiment of the composition comprises about 34 weight percent propylene glycol, about 20 weight percent polyethylene glycol 8,000, about 10 weight percent stearyl alcohol, about 10 weight percent behenyl alcohol about 15 weight percent glycerin, about 5 weight percent propylene glycol oleate SE, about 1 weight percent cholesterol, and about 5 weight percent sunflower oil.

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materials: polyethylene glycols having an average molecular weight of 720 daltons or greater, and the like, as well as mixtures thereof. These materials are not liquid at room temperature. Particularly suitable high molecular weight polyethylene glycols can have an average molecular weight of from 720 to about 1,840,000 daltons, more specifically from about 1,400 to about 440,000 daltons, and still more specifically from about 1,760 to about 10,570 daltons.

The amount of fatty alcohol in the hydrophilic composition can be from about 1 to about 30 weight percent, more specifically from about 10 to about 25 weight percent, and still more specifically from about 15 to about 20 weight percent. As used herein, suitable fatty alcohols include, but not limited to, the following materials: alcohols having a carbon chain length of C₁₄-C₃₀ or greater, including cetyl alcohol, stearyl alcohol, arachidyl alcohol, and behenyl alcohol, and the like, as well as mixtures thereof.

The amount of humectant in the hydrophilic composition can be from about 0.5 to about 30 weight percent, more specifically from about 1 to about 20 weight percent, and still more specifically from about 5 to about 10 weight percent. Humectants are typically cosmetic ingredients used to increase the water content of the top layers of the skin. This group of materials includes primarily hygroscopic ingredients. As used herein, suitable humectants include, but are not limited to, the following materials: Acetamide MEA, Aloe Vera Gel, Arginine PCA, Chitosan PCA, Copper PCA, Corn Glycerides, Dimethyl Imidazolidinone, Fructose, Glucamine, Glucose, Glucose Glutamate, Glucuronic Acid, Glutamic Acid, Glycereth-7, Glycereth-12, Glycereth-20, Glycereth-26, Glycerin, Honey, Hydrogenated Honey, Hydrogenated Starch Hydrolysate, Hydrolyzed Corn Starch, Lactamide MEA, Lactic Acid, Lactose Lysine PCA, Mannitol, Methyl Gluceth-10, Methyl Gluceth-20, PCA, PEG-2 Lactamide, PEG-10 Propylene Glycol, Polyamino Sugar Condensate, Potassium PCA, Propylene Glycol, Propylene Glycol Citrate, Saccharide Hydrolysate, Saccharide Isomerate, Sodium Aspartate, Sodium Lactate, Sodium PCA, Sorbitol, TEA-Lactate, TEA-PCA, Urea, Xylitol, and the like, as well as mixtures thereof.

The amount of oil-in-water emulsifying surfactant having an HLB range greater than 7 in the hydrophilic composition can be from about 1 to about 20 weight percent, more specifically from about 2 to about 15 weight percent, and still more specifically from about 3 to about 10 weight percent. Emulsifying surfactants are employed typically in cosmetic preparations to form emulsions of various components. The immiscible phase, such as an oil, is dispersed as droplets in the continuous phase, such as water.

(protection, delayed wetting, lubricity, tissue tactile softness); oils (mineral, vegetable, and animal); fatty esters and, the like. Powders to enhance lubricity, oil adsorption, provide skin protection, astringency, opacity, etc. and microencapsulated ingredients can also be dispersed into the formulation.

The total tissue add-on of the composition can be from about 0.5 to about 40 weight percent, more specifically from about 5 to about 30 weight percent, and more specifically from about 10 to about 15 weight percent, based on the weight of the tissue. The add-on amount will depend upon the desired effect of the composition on the product attributes and the specific composition. A preferred method to uniformly apply the heated composition to the surface of the tissue web is rotogravure printing, either direct or indirect (offset), because it is a more precise printing process and offers maximum control of the composition distribution and transfer rate. However, other printing methods, but not limited to, flexographic printing, slot coating, or spraying such as WEKO, can be used.

As used herein, all recited ranges of amounts, temperatures, molecular weights and penetration hardnesses are intended to include all sub-ranges within the recited ranges, even though not specifically stated.

The compositions of the present invention may be applied to the entire outer surface(s) of the tissue or towel product or portions thereof. The compositions of the present invention may be applied non-uniformly to the outer surface of the tissue or towel product. The term "non-uniformly", as used herein, refers to the amount, pattern of distribution, thickness of the application, areas of non-coverage, or the like, for which the composition can be varied over the outer surface(s) of the tissue or towel product.

Also as used herein, a "tissue product" can be a facial tissue, bath tissue, paper towel, dinner napkin or the like. The tissue products of this invention can be one-ply, two-ply, three-ply or more. In all cases, the composition is applied to one or both outer surfaces of the product after the product has been dried. The composition can be applied after the plies are brought together or prior to bringing the plies together. The individual plies can be layered or blended (homogeneous) creped or uncreped, throughdried or wet-pressed.

We claim:

- 785 **1.** A tissue or towel product having two outer surfaces, wherein one or both outer surfaces of the product have a hydrophilic composition that enhances skin barrier comprising:
- 790 from about 10 to about 95 weight percent hydrophilic solvent;
 from about 5 to about 95 weight percent high molecular weight polyethylene glycol having a molecular weight of about 720 or greater;
 from about 1 to about 30 weight percent of a C₁₄ to C₃₀ or greater fatty alcohol;
 from about 0.5 to about 30 weight percent of humectant;
 from about 1 to about 20 weight percent of oil-in-water emulsifying surfactant having an HLB range greater than 7;
- 795 from about 0.1 to about 10 weight percent sterol and sterol derivative; and,
 from about 0.1 to about 30 weight percent of natural fats or oils.
- 2.** The product of Claim 1, wherein said composition having a melting point from about 30° C to about 100 °C.
- 3.** The product of Claim 1, wherein said composition has a penetration hardness of from about 5 millimeters to about 360 millimeters.
- 4.** The product of Claim 1, wherein the add-on amount of said composition is from about 0.5 to about 30 weight percent based on the weight of said product.
- 5.** The material of Claim 1, wherein the add-on amount of said composition is from about 0.1 grams per meter squared (g/m²) to about 30 g/m² of said material.
- 6.** The product of Claim 1, wherein said hydrophilic solvent is water.
- 7.** The product of Claim 1, wherein said hydrophilic solvent is propylene glycol.



US005871763A

United States Patent [19]
Luu et al.

[11] **Patent Number:** **5,871,763**
[45] **Date of Patent:** **Feb. 16, 1999**

[54] **SUBSTRATE TREATED WITH LOTION**

5,246,545 9/1993 Ampulski et al. 162/112

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[21] **Appl. No.:** **847,409**

[22] **Filed:** **Apr. 24, 1997**

[51] **Int. Cl.⁶** **A01N 25/34**

[52] **U.S. Cl.** **424/402; 424/404**

[58] **Field of Search** **424/402, 404**

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[57]

ABSTRACT

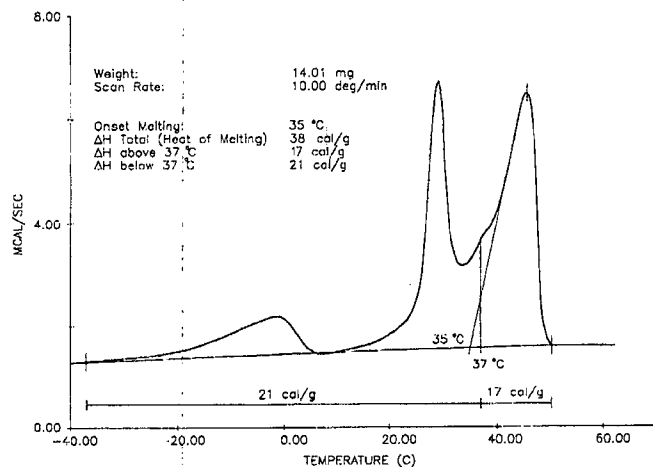
A substrate treated with a lotion including an emollient and a retention/release agent, wherein the lotion has at least one of: (a) a ΔH above about 37° C. of above about 10 calories/gram (and optionally, a ΔH below about 37° C. of above about 15 calories/gram), a total heat of melting of above about 25 calories/gram, preferably above about 30 calories/gram, and an onset of melting temperature of at least about 30° C., preferably from about 30° C. to about 45° C.; and (b) a ΔH above about 30° C. of above about 15 calories/gram (and optionally, a ΔH below about 30° C. of above about 10 calories/gram), a total heat of melting of above about 25 calories/gram, preferably above about 30 calories/gram, and an onset of melting temperature of at least about 30° C., preferably from about 30° C. to about 45° C. is disclosed. Preferably the lotion includes an aromatic ester or fatty alcohol ester of a non-fatty organic acid emollient or mixture thereof and a retention/release agent, and optionally, surfactant, and/or medicinal agent. The lotion has the effect of making the treated substrate, preferably tissue, towel or napkin, optionally wet-strengthened, wipe or nonwoven material, feel smooth, lubricious and nongreasy. The skin care benefits of the lotionized substrate are expressed whether the product is used dry or prewetted with water.

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75 Claims, 2 Drawing Sheet



SUBSTRATE TREATED WITH LOTION

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a substrate treated with lotion. In particular, this invention relates to a nongreasy-feeling lotionized substrate whereby the lotion transfers to the skin during use to provide a smooth, lubricious, nongreasy-feeling layer on the skin. The nongreasy-feeling lotion contains an emollient and retention/release agent. The lotion may also contain optional ingredients, including a surfactant and/or a medicinal agent.

2. Description of the Related Art

Absorbent tissue and towel products, such as facial tissue, bath tissue and paper towels, wipes and nonwoven materials have been used to absorb body fluids and cleanse and dry the skin. Absorbent products such as these have the disadvantage of abrading and drying out the skin causing uncomfortable irritation and redness. To reduce these deleterious effects, the substrate has been provided with formulations, which have lubricity thereby enabling the substrate to glide across the surface of the skin, or which become deposited on the surface of the skin in an attempt to replenish lost natural skin oils.

Examples of lotionized bathroom and facial tissue include Charmin Plus® and Puffs Plus®, respectively, commercially available from the Procter & Gamble Co. These products contain a lotion based on petrolatum and mineral oil and leave a greasy feel to the skin after use.

Kleenex Ultra®, made by the Kimberly-Clark Corp., is an example of a commercially available facial tissue treated with a silicone-based lotion in an effort to render the tissue smoother feeling and softer. U.S. Pat. No. 5,227,242 to Walter et al., discloses facial tissues containing a silicone compound represented as exhibiting improved softness and reduced linting while maintaining absorbency.

Numerous examples of premoistened wipes can be found in the marketplace. However, many of these contain volatile alcohol solutions which remove skin lipids and fats, causing dryness, and do not provide a lubricious nongreasy-feeling layer on the skin.

U.S. Pat. No. 4,550,035 to Smith relates to cosmetic applicators which include an absorbent sheet impregnated with a complex mixture of emollients, absorbent particles, fragrances and deodorizing agents. The emollients may include emollient oils, such as fatty alcohol esters of benzoic acid, col. 2, line 64, and a mixture of C₁₂-C₁₅ linear primary alkyl esters of benzoic acid such as FINSOLV® TN, col. 3, lines 8-13; emollient waxes, such as C₁₂-C₁₈ fatty-alcohols, col. 3, line 20; cationic emollients; and nonionic emollients.

U.S. Pat. No. 4,690,821 to Smith et al., discloses the simultaneous moisturizing and absorbing of water from wet skin with cosmetic applicators impregnated with a water-free composition including a hydrophilic emollient oil and a hydrophobic emollient oil. The combination of benzyl alcohol ester of a C₁₀-C₂₀ fatty acid with fatty alcohol esters of benzoic acid, such as C₁₂-C₁₅ alkyl benzoate (FINSOLV® TN), provides a hydrophobic emollient oil. The fatty alcohol benzoates can be replaced by waxy C₂-C₈ alkyl esters of fatty acids or fatty alcohol esters of C₃-C₆ aliphatic carboxylic acids. A hydrophilic emollient oil is disclosed which includes a C₂-C₁₀ polyol having 2-5 free hydroxyl groups reacted with a fatty acid, fatty alcohol or a polyoxy (lower) alcohol plus lanolin derivative of polyoxyalkylene and a polyoxyalkylene derivative of a fatty alcohol.

European Applications WO95/35411 and WO95/35412 to Klofta, et al., disclose a lotioned tissue paper represented as imparting a soft, lubricious, lotion-like feel. The lotioned tissue paper contains a lotion composition which is semi-solid or solid at 20° C. The lotion composition contains a substantially water free emollient having a plastic or fluid consistency at 20° C. and being a member selected from petroleum-based emollients, fatty acid ester emollients, alkyl ethoxylate emollients, fatty acid ester ethoxylates, fatty alcohol emollients, and mixtures thereof; an agent capable of immobilizing the emollient on the surface of the tissue paper, the immobilizing agent having a melting point of at least 35° C. and being a member selected from C₁₂-C₂₂ fatty alcohols, C₁₂-C₂₂ fatty acids, C₁₂-C₂₂ fatty alcohol ethoxylates, and mixtures thereof; and optionally a hydrophilic surfactant.

U.S. Pat. No. 4,112,167 to Dake, et al., discloses an article of manufacture for cleansing the skin. A soft, flexible web having a low density wiping zone works in concert with a lipophilic cleansing emollient in an effort to remove soil from the skin with improved effectiveness. It is represented that the lipophilic cleansing emollient reduces hydration of the soil and weakens the soil-skin adhesive forces while the low density wiping zone of the web entraps and thus removes the soil from the skin.

European Application WO95/16824 to Warner et al., discloses a lotion represented as imparting a lubricious, lotion-like feel when applied to tissue paper in amounts as low as 5-15% by weight. The lotion includes plastic or fluid emollient such as petrolatum, or a mixture of petrolatum with alkyl ethoxylate emollient, and an immobilizing agent such as sorbitan stearates or N-coco, N-methyl glucamide to retain the lotion on the surface of the tissue and optionally a hydrophilic surfactant to improve wettability. Less lotion is applied than other lotionized tissue in an effort to minimize detrimental effects on tensile strength and caliper of treated tissue.

U.S. Pat. No. 4,643,939 to Sugiyama et al., relates to an oil absorbing cosmetic tissue consisting of an absorbent sheet impregnated with a bactericide, such as triclosan (col. 2, line 46). This tissue is designed to absorb oil rather than to transfer a lotion to the skin.

Thus, there is a need for a lotion formulation that can be applied to a substrate which will remain readily available for transfer to the user's skin in an efficient and cost-effective manner, which provides a lubricious, nongreasy-feeling and breathable layer which maintains proper skin moisture/vapor balance, which users may find soothing to irritated skin and which may facilitate healing of chapped skin and skin suffering from discomfort, such as diaper rash or hemorrhoids.

SUMMARY OF THE INVENTION

The present invention relates to a substrate treated with a nongreasy-feeling lotion containing an emollient and a retention/release agent as base ingredients. The lotion has the effect of making the treated substrate feel nongreasy and lubricious. Skin care benefits of the lotionized substrate are expressed whether the product is used dry or prewetted with water.

Thus, in accordance with one aspect of the present invention, there is provided a lubricious, nongreasy-feeling lotionized tissue, wipe or nonwoven material, whereby the lotion transfers to the skin during use to provide a breathable, smooth layer which acts to maintain the proper skin moisture/vapor balance and which users find soothing to irritated or damaged skin.

In accordance with another aspect of the present invention, there is provided a substrate treated with a lotion which, optionally, contains one or more of the following: a surfactant which aids in skin cleansing, and a medicinal agent, such as an antimicrobial agent which kills bacteria and fungi commonly found on skin, thereby providing an enhanced cleaning and deodorizing benefit.

In accordance with a further aspect of the present invention, there is provided a tissue, towel or napkin, optionally wet-strengthened, or wipe or nonwoven material, such as that used for diaper, incontinence and menstrual pad coverstock, that is treated with a nongreasy-feeling lotion.

In accordance with a still further aspect of the present invention, there is provided an embossed tissue, embossed towel, or embossed napkin, optionally wet-strengthened, that is treated with a nongreasy-feeling lotion.

In accordance with yet another aspect of the present invention, there is provided a lubricious, nongreasy-feeling lotionized tissue, wipe or nonwoven material, whereby the lotion forms a cold cream when contacted with water and transfers to the skin during use to provide a breathable, smooth layer which acts to maintain the proper skin moisture/vapor balance and which users find soothing to irritated or damaged skin.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other aspects of the present invention will become apparent upon a review of the following detailed description and accompanying drawings wherein:

FIG. 1 is a DSC thermogram plot of the melting properties of a lotion formulation of the invention; and

FIG. 2 is a DSC thermogram plot of the melting properties of a lotion formulation of the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

All percentages, ratios and proportions used herein are by weight of the composition, unless otherwise specified. The temperature of human skin is assumed to be between about 30° C. and about 37° C. and room temperature is assumed to be between about 20° C. and about 25° C.

The present invention relates to a substrate treated with a nongreasy-feeling lotion. The invention also relates to a tissue, towel or napkin, optionally wet-strengthened, or wipe or nonwoven material, such as that used for diaper, incontinence and menstrual pad coverstock that is treated with a nongreasy-feeling lotion. The lotion has the effect of making the treated substrate feel nongreasy, reducing chaffing and irritation when the substrate is applied to the skin, and imparting a lubricious feel. Skin care benefits of the lotionized substrate are expressed whether the invention is used dry or prewetted with water.

The lotion formulation possesses desired physical attributes, such as having a smooth, lubricious, nongreasy feel; the ability to form a breathable layer which acts to maintain proper skin moisture/vapor balance; the ability to moisturize the skin; the ability when melted to wet the surface of the substrate; the capability to be retained on a substrate at about room temperature; and the ability to at least partially melt to transfer to the surface of the skin when contact is made with body heat. After transfer, at least a portion of the lotion may resolidify on the skin to form a smooth surface layer that is perceived as nongreasy.

Most preferably, the lotion is substantially free of water, i.e., anhydrous. Preferably, water is not intentionally added

to the lotion. However, minor amounts of water may be present due to ambient humidity or small amounts added with optional additives. Typically, the lotion of the present invention contains about 15% or less water, preferably about 10% or less water, more preferably about 5% or less water.

An advantage in formulating a water-free, or low water content lotion includes the improved storage and handling characteristics of such lotions. Under anhydrous or low water content conditions, microorganism growth is reduced. However, as the water content increases, microorganisms can proliferate by using the organic ingredients as nutrient sources. Under such circumstances, suppression of microbial growth typically requires the addition of preservation agents. Furthermore, as the water content of oil-based lotions increases, the water forms droplets suspended in the matrix of "oily" ingredients. At low water levels these droplets are able to move freely past each other during mixing of the lotion. As the amount of water is increased, the number and size of water droplets increases, leading to crowding of the available space for the droplets to move about. This crowding is reflected in an increased viscosity of the lotion. Of course, viscosity modifiers known to those skilled in the art can be added to control viscosity.

The present invention relates to a substrate treated with a nongreasy-feeling lotion containing an emollient and a retention/release agent as base ingredients. The lotion may also contain one or more optional ingredients, which include the following: a mild surfactant which facilitates skin cleansing, and a medicinal agent such as an antimicrobial agent which kills bacteria, virus, protozoa and fungi commonly found on skin thereby providing an enhanced cleaning and deodorizing benefit.

The lotion of the present invention has a ΔH above about 37° C. of above about 10 calories/gram and a ΔH total (total energy to melt) of above about 25 calories/gram, preferably above about 30 calories/gram.

In another embodiment, the lotion of the present invention has a ΔH below about 37° C. of above about 15 calories/gram, a ΔH above about 37° C. of above about 10 calories/gram, and a ΔH total (total energy to melt) of above about 25 calories/gram, preferably above about 30 calories/gram.

In another embodiment, the lotion of the present invention has a ΔH above about 30° C. of above about 15 calories/gram and a ΔH total (total energy to melt) of above about 25 calories/gram, preferably above about 30 calories/gram.

In another embodiment, the lotion of the present invention has a ΔH above about 30° C. of above about 15 calories/gram, a ΔH below about 30° C. of above about 10 calories/gram, and a ΔH total (total energy to melt) of above about 25 calories/gram, preferably above about 30 calories/gram.

A lotion that meets at least one of these energy melting criteria is perceived as nongreasy, having high quality performance and hand feel perception.

Additionally, the lotion of the present invention has an onset of melting for the highest melting peak of the lotion formulation of above about 30° C. The onset of melting temperature, as used herein, is defined as the point at which the highest melting Differential Scanning Calorimetry (DSC) endothermic peak begins to transition from the solid to the liquid phase. The onset of melting temperature is determined by the point at which a tangent drawn at the greatest slope on the leading edge of the endothermic peak intersects the extrapolated baseline of the DSC thermogram. This point of intersection has also been called the extrapolated onset. See, for example, "Thermal Analysis, 3rd Edition", by Wendlandt, which is incorporated by reference

herein in its entirety. Typically, this peak represents the melting of the retention/release agent ingredient of the lotion formulation. Consequently, the onset of melting temperature of the lotion is typically lower than the onset of melting temperature of the retention/release agent alone, due to the melting point depression of the retention/release agent caused by the emollient and any optional ingredients in the lotion. Preferably, the onset of melting temperature of the lotion is within the range of from about 30° C. to about 45° C., more preferably, within the range that approximates skin temperature.

Thus, both the onset of melting temperature and the energy required to melt the lotion are important to hand feel perception. Data in Tables 3 and 4 show that the energy required to melt the entire lotion formulation (ΔH total), the ΔH below about skin temperature (e.g., represented by ΔH values obtained below about 30° C. and below about 37° C.), as well as the ΔH above about skin temperature (ΔH above about 30° C. and ΔH above about 37° C.) are correlated to the "Greasiness Index." In general, if the total energy required to melt a lotion is too low, the lotion tends to be completely melted to a liquid by body heat at the moment it is transferred from the substrate to the skin and is perceived as greasy. Moreover, a lotion having too high a total energy to melt that will not be partially melted by body heat is also an undesirable lotion because it will not spread easily on the skin. Such undesirable lotions do not transfer sufficient desired materials to the skin, and they have a dry feel. The preferred lotion is partially melted by body heat, transfers to the skin upon application and at least a portion of the lotion resolidifies on the skin to form a silky smooth layer that is perceived as nongreasy. It is thought that the lotion of the present invention can be viewed at about skin temperature as a layer of solid retention/release agent particles, at least partially liquefied emollient(s), the liquefied portion of the retention/release agent, and possibly liquefied and/or solid optional ingredients, and that this structure provides an effect that enhances lubricity and nongreasy hand feel perception. Skin application and post application temperatures may fluctuate due to frictional forces during application and environmental factors which may cause components of the lotion formulation to undergo slight changes in the proportions of liquid and solid phase components of the formulation.

FIG. 1 illustrates the melting properties of the lotion formulation of Example 6. The highest melting peak in FIG. 1 exhibits an onset of melting at about 35° C., confirming that this lotion is partially melted at about human skin temperature.

FIG. 2 illustrates the melting properties of the lotion formulation of Example 21. The highest melting peak in FIG. 2 exhibits an onset of melting at about 34° C., confirming that this lotion is partially melted at about human skin temperature.

The retention/release agent is present in an amount of preferably from about 25% to about 95%, more preferably from about 45% to about 90% of the lotion. The retention/release agent has two functions. First, it functions as a retention aid for the emollient (or emollient blend) and the optional lotion ingredients on the substrate. When liquid, the lotion formulation has a surface tension that allows it to wet the substrate. Second, it functions to facilitate release from the substrate of the emollient (or emollient blend and optional ingredients when the treated substrate is applied to human skin. Retention of the ingredients of the lotion formulation on the substrate is facilitated by the retention/release agent as the retention/release agent is preferably

selected to have a melting point substantially higher than about room temperature. This enables the lotion formulation to be maintained substantially as a solid at about room temperature. At about human skin temperature, the lotion at least partially melts to transfer at least a portion of the emollient (or emollient blend), retention/release agent, and optional ingredients as a layer on the skin. After transfer at least a portion of the liquid retention/release agent may resolidify together with other ingredients to provide a layer having a smooth, lubricious and nongreasy feel.

An important attribute of the retention/release agent is its melting properties, including its onset melting point. Preferably, the onset of melting of the retention/release agent is below about 50° C. (data collected using DSC). This allows melting point depression by the added emollient (or emollient blend) and optional ingredients to adjust the onset of melting for the highest melting peak of the lotion formulation to above about 30° C. Two or more retention/release agents can be blended in varying proportions to attain an onset of melting of the retention/release blend of less than about 50° C., as demonstrated in the examples provided in Table 1. The proportion of each component may depend on individual onsets of melting. As demonstrated in the Table 1, blending two or more retention/release agents may result in a blend with a lower heat of melting than for either of the components alone, resulting in an retention/release agent that will melt more easily on human skin.

Suitable retention/release agents include known agents, which when mixed with the emollient of the invention provide a lotion which has the above recited ΔH values and onset melting temperature of the present lotion. Suitable retention/release agents are those agents capable of facilitating the retention of the lotion on the substrate to which the lotion is applied and facilitating the release of the lotion from the substrate when applied to the skin. It is noted that the melted lotion formulation of the present invention has surface tension values such that the lotion is capable of wetting the substrate and when cooled is capable of being retained on the substrate. Similarly, the lotion formulation of the present invention has surface tension values when at least partially melted such that the lotion is capable of being transferred to the skin upon contact. Preferably, retention/release agents include those agents, which when mixed with the emollient of the invention, that are capable of imparting to the lotion the properties of being at least partially solid at about room temperature and which facilitate the retention of the lotion on the substrate at about room temperature and at least partially liquid at about human skin temperature and which facilitate the release of the lotion from the substrate at about human skin temperature. Suitable retention/release agents (or agent blends) include those retention/release agents (or blends) having an onset of melting temperature preferably between about 30° C. and about 65° C.

Fatty alcohols are suitable retention/release agents. Suitable fatty alcohols include substituted and unsubstituted, linear or branched C₁₀-C₂₄ fatty alcohols, preferably C₁₂-C₁₈ fatty alcohols. Preferred are dodecanols, tridecanols, tetradecanols, pentadecanols, hexadecanols, heptadecanols, octadecanols, nonadecanols, cicosanols, heneicosanols, docosanols, tricosanols, tetracosanols and mixtures thereof. Particularly preferred are cetyl alcohol, stearyl alcohol and cetearyl alcohol (which is a mixture of cetyl and stearyl alcohols).

Other retention/release agents include polymers having an appropriate melting range, such as poly(ethylene glycol) of 900 molecular weight or higher, low molecular weight natural and modified polysaccharides, vinyl ether maleic

anhydride copolymers, polyacrylic acids, and polyvinyl pyrrolidones, or waxes, such as, beeswax, candelilla wax, carnuba wax, ceresine wax, montan wax, sugar cane wax, a commercial soft wax, and the like.

The fatty alcohols (or other retention/release agents) may be blended with behentrimonium methosulfate, stearylalkonium chloride, PEG-40 castor oil, or mixtures thereof. The retention/release agents listed in Table 1 are not meant to limit the choices for the lotion of this invention.

TABLE 1

Retention/ Release Agent (or Blend)	Supplier Source	Onset of Melting (°C.)	ΔH total in calories per Gram
1-Hexadecanol (H)	Aldrich Chemical	48	55
1-Octadecanol (O)	Aldrich Chemical	56	53
Crodacol ® CS50 (50/50 Blend of H/O)	Croda Chemical	49	49
Crodacol ® C70 (70/30 Blend of H/O)	Croda Chemical	47	49
Crodacol ® S70 (70/30 Blend of O/H)	Croda Chemical	50	49
Incroquat ® Behenyl TMS *	Croda Chemical	45	38
Incroquat ® CR **	Croda Chemical	46	39

* A blend of 75% Crodacol ® CS50 with 25% behentrimonium methosulfate.
 ** A blend of 86% Crodacol ® CS50 with 7% PEG-40 castor oil and 7% stearylalkonium chloride.

Suitable emollients of the present invention include emollients or emollient blends typically known in the art, or other compounds, or materials which function to lubricate or moisturize the skin surface, retard moisture loss, and/or maintain the skin moisture/vapor balance. Suitable emollients include those compounds which associate with the resolidified lotion to form a smooth, lubricious, nongreasy-feeling layer on the skin. Suitable emollients include those typically used in emollient creams and lotions, including liquid hydrocarbons (such as mineral oil, and the like), vegetable and animal fats and oils (such as, lanolin, triglycerides, and the like), alkyl fatty acid esters (such as methyl, isopropyl, and butyl esters of fatty acids, and the like), fatty alcohol esters of benzoic acid, phospholipids (such as lecithin, and the like), and silicones.

Preferably the emollients are liquid at or near human skin temperature, typically between about 30° C. and about 37° C., and when spread as a film, maintain the skin moisture/vapor balance. Preferably, emollients or emollient blends have complete and rapid spreading on water, i.e., have a high spreading ratio. A correlation has been discovered between emollients having a high spreading ratio on water and lotion formulations containing such emollients that have a less greasy or nongreasy hand feel perception by sensory panels. Additionally, the ability of the emollient to spread as a film provides a more breathable layer than nonspreading emollients, like petrolatum or mineral oil (or mixtures thereof). The spreading ratio is defined as the ratio of area occupied by a drop of the test emollient or emollient blend on a water surface over the area occupied by a drop of mineral oil on the water surface. Details of the test method can be found in "The Spreading Properties of Some New Liquid Emollients" by Rosemarie Pasquale, et. al. in the Journal of Cosmetics and Toiletries, October, 1985, which is incorporated herein by reference in its entirety.

The spreading behavior of nonspreading emollients, like mineral oil, can be modified to spread completely, as for example, by blending two or more emollients (see Table 2). The emollients or emollient blends listed in Table 2 are not meant to limit the emollients or emollient blends suitable for use in the lotion of this invention. Other emollients or emollient blends are suitable for the lotion of this invention, preferably those that are mostly liquid at about 30° C. and have a high spreading ratio on water. However, other emollients or emollient blends are suitable such as those not having a high spreading ratio and/or not being mostly liquid at about 30° C.

TABLE 2

Emollient Blend #	Emollient Blend Composition	Spreading Ratio at 25° C.
1	mineral oil	1
2	C12-C15 alkyl octanoate	>35
3	C12-C15 alkyl benzoate	>35
4	50% mineral oil/ 50% C12-C15 alkyl octanoate	>35
5	50% mineral oil/ 50% C12-C15 alkyl benzoate	>35
6	75% mineral oil/ 25% n-stearyl benzoate	>35

In another embodiment, the present invention relates to a substrate treated with a lotion including an aromatic ester emollient or fatty alcohol ester of a non-fatty organic acid emollient or mixture thereof and a retention/release agent, wherein the lotion is at least partially liquid at about human skin temperature and at least partially solid at about room temperature. The aromatic ester emollient or fatty alcohol ester of a non-fatty organic acid emollient or mixture thereof is present in an amount of at least about 5%, preferably, from about 5% to about 75%, more preferably from about 10% to about 55%, most preferably from about 15% to about 40% of the lotion. With respect to the present invention, the term "fatty" means a branched or unbranched non-aromatic, non-cyclic hydrocarbon chain having ten or more carbon atoms. The term "non-fatty" means a hydrocarbon chain having less than ten carbon atoms.

Suitable aromatic ester emollients of the invention include an ester containing at least one aromatic ring, preferably at most two aromatic rings. Suitable aromatic esters include benzoate esters, and esters of other aromatic acids, and mixtures thereof. Suitable benzoate ester emollients include C₁₂-C₁₅ alkyl benzoate, stearyl benzoate, octyl dodecyl benzoate, isostearyl benzoate, methyl gluceth-20 benzoate, stearyl ether benzoate, poloxamer 182 dibenzoate behenyl benzoate, poloxamer 105 benzoate, dipropylene glycol dibenzoate, or mixtures thereof. C₁₂-C₁₅ alkyl benzoate is a particularly preferred benzoate ester emollient.

Suitable emollients also include a fatty alcohol ester of a non-fatty organic acid, which include stearyl octanoate, cetyl octanoate, myristyl octanoate, lauryl octanoate, C₁₂-C₁₅ octanoate, triisocetyl citrate, isodecyl neopentanoate, isostearyl neopentanoate, and the like.

The lotion can also contain a surfactant which emulsifies the lotion when the lotion is combined with water during use to form a cream. Suitable surfactants include conventional surfactants, preferably cationic, anionic, nonionic, polymeric, amphoteric surfactants or mixtures thereof. In

this manner various oil-in-water or water-in-oil emulsions can be created upon use. The surfactant may have a hydrophilic lipophilic balance (HLB) value of less than about 8. Alternately, the surfactant may have an HLB value of greater than about 13. Also known to the art is the blending of surfactants to obtain a desired range of HLB values. Preferably, the surfactant is a blend of from about 1% to about 10%, preferably from about 1% to about 3%, of a surfactant having an HLB value of less than about 8 and from about 1% to about 20%, preferably from about 1% to about 10%, of a surfactant having an HLB value of greater than about 13. Preferably, the surfactant blend is from about 5% to about 20%, most preferably from about 5% to about 15% of the lotion formulation. The surfactant having an HLB value of less than about 8 is preferably selected from the class of polyol esters, most preferably methyl glucoside sesquistearate. The surfactant having an HLB value of greater than about 13 is preferably selected from the class of ethoxylated polyol esters, wherein the ethoxylated polyol esters contain from 15 to 30 oxyethylene units, most preferably wherein the surfactant is ethoxylated methyl glucoside sesquistearate containing 20 moles of oxyethylene units.

The lotion can optionally include a therapeutic amount of a medicinal agent. Medicinal agents include medicines, antipathogenic agents, antimicrobial agents, antibacterial agents, antiviral agents, disinfectants, analgesics, other types of medicine having suitable medicinal properties, and the like. For example, an antibacterial agent can be present in an amount of from about 0.01% to about 10%, preferably from about 0.05% to about 5%, of the lotion. Suitable antimicrobial agents include those effective against human pathogens, such as *escherichia coli*, *staphylococcus aureus*, *salmonella chloreraesuis*, *salmonella typhi*, *pseudomonas aeruginosa*, *pseudomonas cepacia*, and the candida species, including *albicans*. Specific antimicrobial agents suitable for use in the lotion of the invention include 2,4,4'-trichloro-2'-hydroxydiphenyl ether (triclosan); 3,4,4'-trichlorocarbanilide (triclocarban); 3,4,4'-trifluoromethyl-4,4'-dichlorocarbanilide (cloflucarban); 5-chloro-2-methyl-4-isothiazolin-3-one; iodopropynylbutylcarbamate; 8-hydroxyquinoline; 8-hydroxyquinoline citrate; 8-hydroxyquinoline sulfate; 4-chloro-3,5-xyleneol (chloroxyleneol); 2-bromo-2-nitropropane-1,3-diol; diazolidinyl urea; butoconazole; nystatin; terconazole; nitrofurantoin; phenazopyridine; acyclovir; clortrimazole; chloroxyleneol; chlorhexidine; chlorhexidine gluconate; miconazole; terconazole; butylparaben; ethylparaben; methylparaben; methylchloroisothiazoline; methylisothiazoline; a mixture of 1,3-bis(hydroxymethyl)-5,5-dimethylhydantoin and 3-iodo-2-propynyl butyl carbamate; oxyquinoline; EDTA; tetrasodium EDTA; p-hydroxyl benzoic acid ester; alkyl pyridinium compounds; quaternary ammonium compounds, such as coco phosphatidyl PG-dimonium chloride; mixtures thereof; and the like. Other preferred antimicrobial agents include derivatives of substituted N-alkyl imidazolines disclosed in U.S. Pat. No. 4,078,071 to Walker, issued Mar. 7, 1978, which is incorporated herein by reference in its entirety.

An anti-viral agent can be present in an amount of from about 0.025% to about 5%, preferably from about 0.05% to about 2.5%, of the lotion. Suitable anti-viral agents include those effective against, or at least retardant toward Corona virus, Picorna virus, Rhino virus, Herpes simplex, Herpes genitalis, Herpes labialis, Respiratory Syncytial Virus [RSV], Para influenza, Cytomegalovirus, Adenovirus, Condyloma and certain synergistic disease states that can

involve a virus and a protozoa or a virus and any of the unfriendly enzymes, e.g., protease, lipase and amylase, that causes a compromised skin as the precursor state for the viral infection to occur. Specific anti-viral agents suitable for use in the lotion of the present invention include bioflavonoids such as hesperitin, naringin, catechin and certain selected amino acids such as L-lysine and L-glutamic acid, a non-protein amino acid of leguminous origin such as L-canavanine and an analog of L-arginine; dicarboxylic acids such as malonic, glutaric, citric, succinic, and diglycolic acids; alpha hydroxy carboxylic acid such as D-galacturonic acid from *Sterculia urens*; neem seed oil [*Azadirachta indica*] in its un-denatured form; sandalwood oil [*Santalum album* L.] in its un-denatured form. Optionally, the anti-viral agent could be admixed with at most about 50% by weight of the anti-viral agent of a protease inhibitor such as zinc oxide or other suitable zinc salt.

The lotion can optionally include fragrance. The fragrance can be present in an amount of from about 0.01% to about 2%. Suitable fragrance includes volatile aromatic esters, non-aromatic esters, aromatic aldehydes, non-aromatic aldehydes, aromatic alcohols, non-aromatic alcohols, heterocyclic aroma chemicals, and natural floral fragrances, such as blossom, carnation, gardenia, geranium, iris, hawthorne, hyacinth and jasmine.

The lotion can optionally include natural or synthetic powder like talc, mica, boron nitride, silicone, or mixtures thereof.

During use as a dry product, the lotion of the present invention is transferred from the substrate, such as tissue, wipe, or nonwoven material to the user's skin and leaves a smooth-feeling, nongreasy layer which retards the loss of skin moisture otherwise known as trans-epidermal water loss (TEWL). The term TEWL generally refers to the rate of water vapor diffusion across the stratum corneum and would depend directly on the ambient relative humidity, the stratum corneum barrier integrity, temperature, and inversely on the stratum corneum thickness. TEWL (gram/meter²*hour) can be determined by an evaporimeter based on the equation:

$$TEWL = D' dp/dn$$

where

- D'=constant (g/m²*hr*Pa)
- dp/dn=vapor pressure gradient (Pa/m)
- p=vapor pressure (Pa)
- n=distance from the skin (m)

See "Bioengineering of the skin, methods and instrumentation" page 2, which is incorporated by reference herein in its entirety.

Typically, TEWL can be reduced by applying an occlusive barrier agent, such as petrolatum. Petrolatum has several disadvantages, including effectively preventing moisture evaporation from the skin surface. Petrolatum is impermeable to moisture and may cause excessive skin hydration to result from water transfer from lower layers of skin. Excessive moisture retention by the epidermis can lead to swelling or edema and is to be avoided. Additionally, a highly occlusive barrier layer that inhibits oxygen exchange with the stratum corneum favors growth of anaerobic organisms on the skin whose acidic metabolic by-products can cause skin irritation and dermatitis. Consequently, to maintain proper skin health and conditioning, the skin surface needs to be able to exchange moisture as well as oxygen. Maintenance of proper oxygen exchange and moisture balance at

tant. Humectants are hygroscopic materials with a two-fold moisturizing action including water retention and water absorption. Humectants prevent the loss of moisture from skin and help to attract moisture from the environment. Preferred humectants include glycerol, hydrolyzed silk, ammonium lactate, hydroxypropyltrimonium hydrolyzed silk, hydroxypropyl chitosan, hydroxypropyltrimonium hydrolyzed wheat protein, lactamidopropyltrimonium chloride, and ethyl ester of hydrolyzed silk. The botanical extract, animal oil or humectant is preferably present in an amount of less than about 3% when used in the base formulation of the invention. Further optional components include a skin refreshing agent such as encapsulated water in oil, eucalyptus oil, and menthol oil. All of these optional materials are well known in the art as additives for such formulations and can be employed in appropriate amounts in the lotion compositions of the present invention by those skilled in the art.

The substrate of the present invention can be any suitable applicator that the lotion can be retained upon. Suitable substrates include a web, gauze, cotton swab, transdermal patch, container or holder. The lotion may be retained on the substrate in any desired amount.

The web of the present invention can be any suitable substrate web, including a flushable or nonflushable web of cellulosic fibers; a web of synthetic fibrous material; tissue, towel or napkin, optionally wet-strengthened; wipe or non-woven material, such as that used for diaper, incontinence and menstrual pad cover-stock; and the like. Suitable synthetic fibrous material includes meltblown polyethylene, polypropylene, copolymers of polyethylene and polypropylene, bicomponent fibers including polyethylene or polypropylene, and the like. The substrate also may be embossed.

The present invention includes a flushable or nonflushable web of cellulosic fibers treated on at least one side thereof, preferably in an amount of from about 0.1% to about 25%, more preferably from about 0.5% to about 20%, by weight of the dried fiber web with the lotion of the present invention. The present invention further relates to a web of synthetic fibrous material treated on at least one side thereof, preferably in an amount of from about 0.1% to about 25%, more preferably from about 0.5% to about 20%, by weight of the dried web with the lotion of the present invention.

The substrate can be prepared according to conventional processes (including TAD, CWP and variants thereof) known to those skilled in the art. The substrate may be creped or uncreped. For example, conventional wet pressed tissues are typically prepared by first preparing and mixing the fibrous raw material in a vat. The stock is transferred usually at a consistency of about 1% to about 5% through a centrifugal pump to a headbox, where the consistency is about 0.1% to about 1.0%. The fibrous mixture is deposited into a moving foraminous wire such as fourdrinier wire to form a web mat. Water is drained through this wire by use

of vacuum and drainage elements. The embryonic web is transferred onto a hot Yankee dryer via one or two press rolls. The web is about 25% to about 50% solids after passing through the press rolls. The transferred web is adhered onto the surface of the Yankee which has been previously prepared by spraying an adhesive material directly onto the metal surface. The dried web is then removed via the use of a creping doctor which scrapes off the web from the surface of the Yankee dryer metal drum. The dried web is then wound up at the reel of the paper machine. Lotion can be applied to the substrate according to conventional application methods known to those skilled in the art.

The invention will be further illustrated with reference to the following specific examples. It is understood that these examples are given by way of illustration and are not meant to limit the disclosure or the claims to follow.

EXAMPLES

The lotion formulations compiled in Tables 3 and 4 below were prepared according to the following procedure: the individual ingredients were mixed together and heated to about 75° C. until the mixture was completely melted. The mixture was maintained at about 75° C. for about 15 minutes with moderate agitation. At this point the lotion was ready to apply to a substrate.

DSC data were determined using a Perkin-Elmer DCS4, which had been calibrated with an indium metal standard, which has a melting (onset) temperature of 156.6° C. and a heat of melting of 6.80 calories per gram, as reported in the chemical literature. Each sample was placed into an analysis pan at room temperature, inserted into the instrument, cooled to -45° C., then taken through a three-step, heat/quick cool/heat, regimen at a heating rate of about 10° C. per minute through a range of from -45° C. to 100° C. and the data from the first heating was discarded. First-heating data are discarded because sample contact with the DSC pan is poor and peaks seen are often due to samples shifting in the pan. Each formulation was contained in a 300 mL beaker, samples were taken from three locations, edge/center/edge in a straight line. A slight variation in composition was observed between the edge and center samples. Additionally, standard DSC operating parameters known to those skilled in the art were used for all examples. DSC thermograms from the second heat cycle were used for all analyses. A sample size typically of about 14 milligrams was used for each formulation example. The energy required to melt each sample from a temperature of -45° C. is designated as the total energy to melt (ΔH total); the energy required to raise the temperature of the sample from -45° C. to either 30° C. or 37° C. is the ΔH below 30° C. or ΔH below 37° C., respectively; and the energy required to raise the temperature of the sample from 30° C. or 37° C. to fully liquid is the ΔH above 30° C. or ΔH above 37° C., respectively.

TABLE 3

#	Chemicals	Example 1 (weight %)	Example 2 (weight %)	Example 3 (weight %)	Example 4 (weight %)	Example 5 (weight %)	Example 6 (weight %)	Example 7 (weight %)	Example 8 (weight %)
1	Mineral oil	30	0	0	17.5	0	0	0	0
2	Heavy mineral oil	0	0	60	0	0	0	0	0
3	Petrolatum	65	48.4	0	0	0	0	0	0
4	Isopropyl palmitate	0	0	3	0	0	0	0	0
5	C12-C15 Alkyl octanoate	0	0	0	0	35	0	0	0
6	C12-C15 Alkyl benzoate	0	0	0	17.5	0	35	0	17.5