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**SUPERINTENDENCIA DE INDUSTRIA Y COMI
DIVISION DE NUEVAS CREACIONES**

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SUPERINDUSTRIA Y COMERCIO
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Dependencia: 2020 DIVISION DE NUEVAS CREACIONES

REF: Expediente No. 03 054.741 - Solicitud de Patente

Entrada en Fase Nacional Corresp. a la Solicitud Internacional PCT/US01/50846
a favor de **KIMBERLY - CLARK WORLDWIDE, INC.**

Titulada: ARTÍCULO ABSORBENTE QUE TIENE TRATAMIENTOS
MEDICINALES LIBERABLES

JUAN PABLO CADENA SARMIENTO, vecino de Bogotá, portador de la tarjeta profesional No. 57492 del C.S.J., obrando como apoderado sustituto de la sociedad **KIMBERLY - CLARK WORLDWIDE, INC.**, según lo acredita el documento de poder anexo, me permito allegar:

1. Copia del examen preliminar efectuado por la IPEA (formas PCT/IPEA/416 y PCT/IPEA/409), junto con su correspondiente traducción al castellano.
2. Copia de la Opinión Escrita efectuada por la IPEA (forma PCT/IPEA/408).

De la señora jefe atentamente,


JUAN PABLO CADENA SARMIENTO
C.C. No. 80.410.337 de Usaquén
Cra 7 No. 16-56 Piso 9

Bogotá, Febrero 02, 2005
CHP/MEV/hsr.

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF
INTERNATIONAL PRELIMINARY
EXAMINATION REPORT

(PCT Rule 71.1)

To:
CHRISTOS S. KYRIAKOU
KIMBERLY-CLARK WORLDWIDE, INC.
401 N. LAKE STREET
NEENAH, WI 54956

Date of Mailing
(day/month/year)

10 JAN 2005

Applicant's or agent's file reference

14853

IMPORTANT NOTIFICATION

International application No.

PCT/US01/50846

International filing date (day/month/year)

21 December 2001 (21.12.2001)

Priority date (day/month/year)

29 December 2000 (29.12.2000)

Applicant

KIMBERLY-CLARK WORLDWIDE INC.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

JAN 13 2005

Name and mailing address of the IPEA/US

Mail Stop PCT, Attn: IPEA/ US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

Karin M. Reichle

Telephone No. (571)272-3700

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 14853	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US01/50846	International filing date (day/month/year) 21 December 2001 (21.12.2001)	Priority date (day/month/year) 29 December 2000 (29.12.2000)
International Patent Classification (IPC) or national classification and IPC IPC(7): A61F 13/15, 13/20 and US Cl.: 604/307		
Applicant KIMBERLY-CLARK WORLDWIDE INC.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☒ Non-establishment of report with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 03 July 2002 (03.07.2002)	Date of completion of this report 16 December 2004 (16.12.2004)
Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer <i>Sharon R. Greene for</i> Karin M. Reichle Telephone No. (571)272-3700

Form PCT/IPEA/409 (cover sheet)(July 1998)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

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I. Basis of the report

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed.
- ☒ the description:
pages 1-19 _____ as originally filed
pages NONE _____, filed with the demand
pages NONE _____, filed with the letter of _____
- ☒ the claims:
pages 20-24 _____, as originally filed
pages NONE _____, as amended (together with any statement) under Article 19
pages NONE _____, filed with the demand
pages NONE _____, filed with the letter of _____
- ☒ the drawings:
pages 1-3 _____, as originally filed
pages NONE _____, filed with the demand
pages NONE _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
pages NONE _____, as originally filed
pages NONE _____, filed with the demand
pages NONE _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages NONE
- ☐ the claims, Nos. NONE
- ☐ the drawings, sheets/fig NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

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III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The question whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been and will not be examined in respect of:

☐ the entire international application,

☒ claims Nos. 23-43

because:

☐ the said international application, or the said claim Nos. _____ relate to the following subject matter which does not require international preliminary examination (*specify*):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. _____ are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. _____ are so inadequately supported by the description that no meaningful opinion could be formed.

☒ no international search report has been established for said claims Nos. 23-43

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the standard.

☐ the computer readable form has not been furnished or does not comply with the standard.

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V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)

Claims 4, 5, 7, 8, 10, 17, 19 YES

Claims 1-3, 6, 9, 11-16, 18, 20-22 NO

Inventive Step (IS)

Claims 19 YES

Claims 1-18, 20-22 NO

Industrial Applicability (IA)

Claims 1-22 YES

Claims NONE NO

2. CITATIONS AND EXPLANATIONS

Please See Continuation Sheet

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

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VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

The drawings are objected to under PCT Rule 66.2(a)(iii) as containing the following defect(s) in the form or content thereof: Figure 1 and the description thereof on page 7, lines 6-8 are inconsistent, i.e. the Figure is partly cut away. Figure 2 and the description thereof on page 7, lines 9-10 are inconsistent, i.e. only part of the topsheet is shown.

The description is objected to as containing the following defect(s) under PCT Rule 66.2(a)(iii) in the form or contents thereof: The abstract of the disclosure is objected to because terminology which can be inferred, i.e. "The present invention relates to", "The present invention is also directed to", should be avoided. As discussed supra, the descriptions of Figures 1-2 and the Figures are inconsistent. On page 10, the sentence on lines 23-25 is grammatically incorrect.

Claims 1-22 are objected to under PCT Rule 66.2(a)(iii) as containing the following defect(s) in the form or contents thereof: in claims 1, 6, 14 and 16, "facing"(all) should be --faceable--. In claim 15, line 3, after "material", --is-- should be inserted. In claims 12 and 20, "further" should be deleted.

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Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

V. 2. Citations and Explanations:

With regard to claims 10 and 17, see page 4, lines 13-16 and page 5, lines 8-23 of the description. "Medicaments" is interpreted in light of page 4, lines 31 et seq, page 6, lines 20-24, and page 10, line 12-page 12, line 28. "Porous" is defined as set forth on page 6, lines 30-34. "Effective amount" is defined as set forth on page 6, lines 9-13. "A pattern of a matrix of discrete segments" is interpreted in light of page 13, line 19-page 14, line 23 and page 16, line 21-page 17, line 3.

Claims 1-3, 6, 9, 11-16, 18 and 20-22 lack novelty under PCT Article 33(2) as being anticipated by HAYFORD et al '998.

With regard to claims 14, 15, 21 and 22, see claim interpretation section supra, the Figures, col. 1, lines 4-6, col. 3, lines 69 et seq, col. 4, lines 10-26, i.e. the topsheet is 2, the absorbent material is 1, the backsheet is 5, an effective amount is disclosed at col. 2, lines 64 et seq, a medicinal composition is 3, 4 and 6 or just 3 and 4 and disclosed at col. 2, lines 39-60, the discrete segments are 4, a pattern is disclosed at col. 4, lines 30-36, i.e. "a portion of", Figure 1 and 4, i.e. an array, and col. 2, lines 26-29, i.e. clusters, the volume is disclosed at col. 2, lines 17-25 (the volume of a sphere is $\frac{4}{3}\pi(r^3)$), i.e. 3 picoliters to 400 nanoliters is equal to .000003-4 cubed mm and a capsule having a diameter of 200 microns has a volume of about .004 cubed mm. With regard to claim 1, see Figure 1, the spheres 4 stick out of matrix 6 and the portions sticking out are "substantially" semi-spherical in cross section, see also col. 2, line 18. With regard to claim 18, see again col. 4, lines 30-36, i.e. "a portion of" and col. 2, lines 26-29, i.e. clusters. With regard to claim 20, the composition is claimed as including a filler. However, the specifics of the filler have not been disclosed. Therefore, the composition as disclosed at col. 2, lines 39-60 is considered to include such a "filler". With regard to claims 1-3, 6 9 and 11-13 see discussion of claims 14-16, 18 and 20-22 supra, i.e. the segments 4 of the pattern have the claimed dimensions, and col. 5, lines 30-33, the segments 4 are present in the claimed amount.

Claims 4-5, 7-8, 10 and 17 lack an inventive step under PCT Article 33(3) as being obvious over HAYFORD et al '998.

Claims 10 and 17 claim the frequency of positioning. See page 4, lines 13-16 and page 5, lines 8-23 of the description. It is especially noted that as disclosed this is just the number of times an applicator "may" fire. Therefore this claim appears to be a product by process claim, i.e. the claiming of the frequency of possible firing of an applicator during the manufacture of the claimed product. This process does not appear to provide any further structure of the article than that already claimed. It is the structure of the end product of the process which determines patentability not the process. Therefore, the Hayford device includes the same structure or lacks an inventive step with regard to such structure, as best understood.

With regard to claims 4-5 and 7-8 Applicant claims the discrete segments located in a specific pattern not taught by Hayford. Hayford only discloses application to a portion, e.g. clusters, an array, or the entire surface. However, page 13, line 19-page 14, line 23 and page 16, line 21-page 17, line 3 does not disclose the criticality of the patterns of the claims as compared to other patterns such

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Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

as those shown by Hayford. Where, as here, the general conditions of a claim are disclosed in the prior art, i.e. a certain amount of medicament in a pattern on the body faceable surface of a topsheet, it would not involve an inventive step to discover the optimum or workable patterns by routine experimentation.

Claims 1-22 meet the criteria set forth in PCT Article 33(4) and thus have industrial applicability because the subject matter claimed can be made or used in industry.

----- NEW CITATIONS -----

US 3585,998 A (HAYFORD et al) 22 Junne 1971, see Figures.

TRATADO DE COOPERACIÓN DE PATENTES

Remitente:

OFICINA ENCARGADA DEL EXAMEN PRELIMINAR INTERNACIONAL

PCT

A:
CHRISTOS S. KYRIAKOU
KIMBERLY CLARK WORLDWIDE, INC.
401 N. LAKE STREET
NEENAH, WI 54956

NOTIFICACION DE TRANSMISION DEL INFORME DEL EXAMEN PRELIMINAR INTERNACIONAL

(Regla 71.1 PCT)

Fecha de envío
(Día/Mes/Año)

10 DE ENERO DE 2005

No. de Expediente del Solicitante o Apoderado

14853

COMUNICACIÓN IMPORTANTE

No. de Solicitud Internacional

PCT/US01/50846

Fecha Internacional de Presentación
(día/mes/año)

21 de Diciembre de 2001
(21.12.2001)

Fecha de Prioridad (día/mes/año)

29 de Diciembre de 2000 (29.12.2000)

Solicitante

KIMBERLY-CLARK WORLDWIDE, INC.

1. Se comunica al solicitante que la oficina encargada del examen preliminar internacional le envía con el presente el informe de examen preliminar internacional, elaborado para la solicitud internacional, en caso dado con los anexos correspondientes.

2. Una copia del informe, en caso dado con los anexos correspondientes, se hace llegar a la Oficina Internacional para su envío posterior a todas las oficinas seleccionadas.

3. A solicitud de una oficina seleccionada, la Oficina Internacional preparará una traducción del informe (pero no de los anexos) al inglés y la remitirá a esta oficina.

4. RECORDATORIO

Para ingresar en la fase nacional el solicitante, dentro de los 30 meses a partir de la fecha de prioridad (o en algunas oficinas incluso después), tiene que realizar ante cada oficina seleccionada ciertos actos (entrega de traducciones y desembolso de honorarios nacionales) (Artículo 39 (1)) (véase también la información remitida por la Oficina Internacional en el Formulario PCT/IB/301).

Si se tiene que enviar a una oficina seleccionada una traducción de la solicitud internacional, entonces esta traducción tiene que incluir traducciones de todos los anexos al informe de examen preliminar internacional. Es obligación del solicitante elaborar dichas traducciones y hacerlas llegar directamente a las oficinas seleccionadas respectivas.

Mayores detalles en cuanto a los plazos normativos y los requisitos de las oficinas seleccionadas se desprenden del Volumen II de la guía PCT para solicitantes.

Nombre y dirección postal de la IPEA/US

Mail Stop PCT, Attn: IPEA/US
Comisionado de Patentes
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimil No. (703)305-3230

Empleado Autorizado

Karin M. Reichle

Teléfono No. (571)272-3700

TRATADO SOBRE COOPERACIÓN INTERNACIONAL
EN MATERIA DE PATENTES

PCT

INFORME DE EXAMEN PRELIMINAR INTERNACIONAL
(Artículo 36 y Regla 70 PCT)

No. de Expediente del Solicitante o Apoderado 14853	PROCEDIMIENTO POSTERIOR Véase comunicación sobre el envío del informe de examen preliminar internacional (Formulario PCT/IPEA/416)	
No. Solicitud Internacional PCT/US01/50846	Fecha Internacional de Presentación (día/mes/año) 21 de Diciembre de 2001 (21.12.2001)	Fecha de Prioridad (día/mes/año) 29 de Diciembre de 2000 (29.12.2000)
Clasificación Internacional de Patente (IPC) o Clasificación Nacional e IPC IPC(7): A61F 13/15, 13/20 y UC Cl.: 604/307		
Solicitante KIMBERLY-CLARK WORLDWIDE, INC		

1.	Este informe de examen preliminar internacional fue elaborado por la Oficina Encargada del Examen Preliminar Internacional y se envía al solicitante según Artículo 36.
2.	Este INFORME comprende un total de <u>7</u> hojas, inclusive esta portada ☒ Además se adjuntan ANEXOS al informe; en este caso se trata de hojas con descripciones, reivindicaciones y/o dibujos, que se modificaron y que sirven de base a este informe, y/o hojas con correcciones efectuadas por esta oficina (véase Regla 70.16 y Sección 607 de las instrucciones administrativas al PCT). Estos anexos comprenden en total de _____ hojas.
3.	Este informe contiene datos con respecto a los siguientes puntos: I ☒ Base del Informe II ☐ Prioridad III ☒ Sin elaboración de un dictamen sobre novedad, actividad inventiva y posibilidad de aplicación industrial IV ☐ Uniformidad deficiente de la invención V ☒ Declaración justificada según Artículo 35(2) con respecto a la novedad, la actividad inventiva y la posibilidad de aplicación industrial; documentos y explicaciones que sustentan esta declaración VI ☐ Ciertos documentos enumerados VII ☒ Ciertas deficiencias del registro internacional VIII ☐ Ciertas observaciones relacionadas con la solicitud internacional

Fecha de presentación de la petición 03 de Julio 2002 (03.07.2002)	Fecha de la preparación de este informe 16 de Diciembre de 2004 (16.12.2004)
Nombre y dirección postal del IPEA/US Mail Srop PCT, Attn: IPEA/US Comisionado de Patentes P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimil No. (703)305-3230	Empleado Autorizado Karin M. Reichle Telefono (571)272-3700

INFORME DEL EXAMEN PRELIMINAR INTERNACIONAL

Solicitud Internacional No.

PCT/US01/50846

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I. Bases para este reporte.

1. Respecto a los elementos de la solicitud internacional:*

- ☒ la solicitud internacional como se entregó originalmente
- ☒ la descripción:
 - páginas 1-19 como se entregaron originalmente
 - páginas NINGUNA como se entregaron con la demanda
 - páginas NINGUNA como se entregaron con la carta de _____
- ☒ las reivindicaciones:
 - páginas 20 - 24 como se entregaron originalmente
 - páginas NINGUNA como se corrigieron (junto con cualquier declaración) bajo el Artículo 19
 - páginas NINGUNA como se entregaron con la demanda
 - páginas NINGUNA como se entregaron con la carta de _____
- ☒ los dibujos
 - páginas 1 - 3 como se entregaron originalmente
 - páginas NINGUNA como se entregaron con la demanda
 - páginas NINGUNA como se entregaron con la carta de _____
- ☐ la lista de la descripción
 - páginas NINGUNA como se entregaron originalmente
 - páginas NINGUNA como se entregaron con la demanda
 - páginas NINGUNA como se entregaron con la carta de _____

2. Respecto al idioma, todos los elementos anteriormente marcados estaban disponibles o fueron suministrados a esta oficina en el idioma en el que se entregó la solicitud internacional, a menos que se diga lo contrario en este punto. Estos elementos estaban disponibles o fueron entregados a esta oficina en el siguiente idioma _____ los cuales son

- ☐ El idioma de la traducción entregada para propósitos de la búsqueda internacional (Regla 23.1 (b)).
- ☐ El idioma de publicación de la solicitud internacional (bajo la Regla 48.3 (b)).
- ☐ El idioma de la traducción entregada para propósitos del examen preliminar internacional (bajo las Reglas 55.2 y/o 55.3)

3. respecto a cualquier secuencia de nucleótido y/o aminoácidos divulgados en esta solicitud internacional, el examen preliminar internacional se realizó sobre la base de la secuencia:

- ☐ contenida en la solicitud en forma impresa
- ☐ entregada junto con la solicitud internacional en una forma legible en un computador
- ☐ suministrada subsiguientemente a esta oficina de forma escrita
- ☐ suministrada subsiguientemente a esta oficina en forma legible en un computador
- ☐ la declaración que la secuencia escrita suministrada no va más allá de lo divulgado en la solicitud internacional como se entregó ha sido suministrada
- ☐ La declaración que la información registrada en la forma legible a computador es idéntica a la secuencia escrita ha sido suministrada.

4. ☐ Las correcciones han resultado en la cancelación de:

- ☐ la descripción, páginas NINGUNA
- ☐ las reivindicaciones, Nos. NINGUNA
- ☐ los dibujos, hojas/figuras NINGUNA

5. ☐ Este informe ha sido admitido como si (algunas de) las enmendaduras no hubieran sido hechas, ya que se considera que estas van más allá de la divulgación preliminar, como se indica el Apartado Suplementario (Regla 70.2 (c)).**

* Las hojas de reemplazo que han sido suministradas a la Oficina receptora en respuesta a una invitación bajo el Artículo 14 se mencionan en este informe como "entregadas originalmente" y no se anexan a este informe ya que no contienen enmendaduras (Reglas 70.16 y 70.17)

** Cualquier hoja de reemplazo que contiene tales enmiendas debe mencionarse bajo el asunto 1 de éste informe.

INFORME DEL EXAMEN PRELIMINAR INTERNACIONAL

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III. Sin establecer opinión respecto a la novedad, el nivel inventivo y la aplicabilidad industrial

1. La pregunta sobre si la invención reivindicada parece novedosa, involucrar nivel inventivo (no ser obvia), o ser aplicable industrialmente no ha sido y no será examinada respecto a:

☐ La totalidad de la solicitud internacional

☒ Las reivindicaciones Nos. 23 - 43

porque:

☐ Dicha solicitud internacional, o dichas reivindicaciones Nos. _____ se relacionan con la siguiente materia la cual no requiere un examen preliminar internacional (*especifique*):

☐ La descripción, reivindicaciones o dibujos, (*indicar los elementos particulares debajo*) o dichas reivindicaciones Nos. _____ son tan poco claras que no se puede formar una opinión significativa (*especifique*):

☐ Las reivindicaciones, o dichas reivindicaciones Nos. _____ están tan mal sustentadas por la descripción que no se puede formar una opinión significativa.

☒ No se ha establecido un informe de búsqueda internacional para las reivindicaciones Nos. 23 - 43

2. No se puede llevar a cabo un examen preliminar internacional debido a la falta de el listado de la secuencia de nucleótidos y/o aminoácidos en cumplir con los estándares proporcionados por el anexo C de la Instrucciones Administrativas:

☐ No se ha presentado la forma escrita o no cumple con el estándar.

☐ No se ha presentado una forma legible por computador o no cumple con el estándar.

INFORME DEL EXAMEN PRELIMINAR INTERNACIONAL

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V. Declaración concluyente de acuerdo a la Regla 66.2 (a)(ii) con relación a la novedad, el nivel inventivo o la aplicabilidad industrial; citas y explicaciones que soportan tal declaración

1. DECLARACIÓN

Novedad (N)	Reivindicaciones	4, 5, 7, 8, 10, 17, 19	Si
	Reivindicaciones	1-3, 6, 9, 11-16, 18, 20-22	No
Nivel Inventivo (IS)	Reivindicaciones	19	Si
	Reivindicaciones	1 - 18, 20 - 22	No
Aplicabilidad Industrial (IA)	Reivindicaciones	1-22	Si
	Reivindicaciones	NINGUNA	No

2. CITAS Y EXPLICACIONES

Por favor ver hoja de continuación.

INFORME DEL EXAMEN PRELIMINAR INTERNACIONAL

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VII Ciertos defectos en la solicitud internacional

Se notaron el (los) siguiente(s) defecto(s) en la forma o los contenidos de la solicitud internacional:

Se objetan los dibujos bajo la Regla 66.2(a)(iii) del PCT por contener el (los) siguiente(s) defecto(s) en la forma o el contenido de los mismos: La Figura 1 y la descripción de la misma en la página 7, líneas 6-8 son inconsistentes; en otras palabras la Figura esta parcialmente cortada. La Figura 2 y la descripción de la misma en la página 7, líneas 9-10 es inconsistente; en otras palabras solo se muestra una parte de la hoja superior.

La descripción se objeta por contener el (los) siguiente(s) defecto(s) bajo la regla 66.2(s)(iii) del PCT en la forma o el contenido de la misma: el resumen de la divulgación se objeta por la terminología que puede ser inferida; en otras palabras "La presente invención se relaciona con", "La presente invención también está dirigida a", debe evitarse. Como se discute arriba, la descripción de las figuras 1-2 y las figuras son inconsistentes. En la página 10, la oración en las líneas 23-25 es gramáticamente incorrecta.

Las reivindicaciones 1-22 se objetan bajo la Regla 66.2(a)(iii) del PCT por contener el (los) siguiente(s) defecto(s) en la forma o el contenido de las mismas: en las reivindicaciones 1, 6, 14 y 16, "que enfrenta" (a todos) debe ser --que se puede enfrentar --. En la reivindicación 15, línea 3, después de "material", se debe insertar -- es --. En las reivindicaciones 12 y 20, se debe borrar "además".

Casilla Suplementaria

(A ser usada cuando el espacio en cualquier casilla precedente no sea suficiente)

V. 2. Citas y Explicaciones:

Respecto a las reivindicaciones 10 y 17, ver página 4, líneas 13 - 16 y página 5, líneas 8-23 de la descripción. "Medicamentos" se interpreta a la luz de la página 4, líneas 31 en adelante, página 6, líneas 20-24, y página 10, línea 12 - página 12, línea 28. "Poroso" se define como se establece en la página 6, líneas 30-34. "Cantidad efectiva" se define como se establece en la página 6, líneas 9-13. "Un patrón de una matriz de segmentos discretos" se interpreta a la luz de la página 13, línea 19 - página 14, línea 23 y página 16, línea 21 - página 17, línea 3.

Las reivindicaciones 1-3, 6, 9, 11-16, 18 y 20-22 carecen de novedad bajo el Artículo 33(2) del PCT como lo anticipa HAYFORD y colaboradores '998.

Respecto a las reivindicaciones 14, 15, 21 y 22, ver la sección de interpretación de las reivindicaciones arriba, las Figuras, col. 1, líneas 4-6, col. 3, líneas 69 y consecutivas, col. 4, líneas 10-26, en otras palabras la hoja superior es 2, el material absorbente es 1, la hoja posterior es 5, una cantidad efectiva se divulga en la col. 2, líneas 64 y consecutivas, una composición medicinal es 3, 4 y 6 o solo 3 y 4 como se divulga en la col. 2, líneas 39-60, los segmentos discretos son 4, un patrón se divulga en la col. 4, líneas 30-36, en otras palabras "una porción de", Figura 1 y 4, en otras palabras una distribución, y la col. 2, líneas 26-29, en otras palabras grupos, el volumen se divulga en 2, líneas 17-25 (el volumen de una esfera es $\frac{4}{3}\pi r^3$), en otras palabras 3 picolitros a 400 nanolitros es igual a 0.000003-4 mm cúbicos y una cápsula que tiene un diámetro de 200 micrones tiene un volumen de alrededor de 0.004 mm cúbicos. Respecto a la reivindicación 16, ver Figura 1, las esferas 4 sobresalen de la matriz 6 y las porciones que sobresalen son "sustancialmente" de sección transversal semiesférica, ver también la col. 2, línea 18, ver nuevamente la col. 4, líneas 60-36, en otras palabras "una porción de" y la col. 2, líneas 26-29, en otras palabras grupos. Respecto a la reivindicación 20, la composición se reivindica como que incluye un relleno. Sin embargo, los detalles específicos del relleno no han sido divulgados. Por lo tanto, la composición como se divulga en la col. 2, líneas 39-60 se considera como que incluye un "relleno".

Respecto a las reivindicaciones 1-3, 6, 9, y 11-13 ver la discusión para las reivindicaciones 14-16, 18 y 20-22 arriba, en otras palabras los segmentos 4 del patrón tienen las dimensiones reivindicadas, y la col. 5, líneas 30-33, los segmentos 4 están presentes en la cantidad reivindicada.

Las reivindicaciones 4-5, 7-8, 10 y 17 carecen de nivel inventivo bajo el Artículo 33(3) del PCT como es obvio sobre HAYFORD y colaboradores '998.

Las reivindicaciones 10 y 17 reivindican la frecuencia de posicionamiento. Ver página 4, líneas 13-16 y página 5, líneas 8-23 de la descripción. Se nota especialmente que como se divulga esto es solo el número de veces que un aplicador "puede" disparar. Por lo tanto esta reivindicación parece ser una reivindicación de producto por proceso, en otras palabras la reivindicación de la frecuencia de posibles disparos de un aplicador durante la fabricación del producto reivindicado. Este proceso no parece proporcionar ninguna estructura adicional a las ya reivindicadas. Es la estructura del producto terminado del proceso la que determina la patentabilidad no el proceso. Por lo tanto, El dispositivo de Hayford incluye la misma estructura o carece de un nivel inventivo respecto a tal estructura, como se entienda mejor.

Respecto a las reivindicaciones 4-5 y 7-8, el solicitante reclama que los segmentos discretos localizados en un patrón específico no los enseña Hayford. Hayford solo divulga la aplicación a una porción, por ejemplo grupos, una disposición, o la totalidad de la superficie. Sin embargo, la página 13, línea 19-página 14, línea 23 y la página 16, línea 21 - página 17, línea 3 no divulga lo crítico de los patrones de las reivindicaciones al compararlos con otros patrones tal como

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(A ser usada cuando el espacio en cualquier casilla precedente no sea suficiente)

lo muestra Hayford. Donde, como aqui, las condiciones generales de una reivindicación se divulgan en el arte previo, en otras palabras cierta cantidad de medicamento en un patrón sobre la superficie que puede encarar al cuerpo de una hoja superior, no involucraria un nivel inventivo el descubrir los patrones óptimos o trabajables por experimentación rutinaria.

Las reivindicaciones 1-22 cumplen los criterios establecidos por el Artículo 33(4) del PCT y por lo tanto tienen aplicabilidad industrial porque la materia reivindicada puede hacerse o usarse industrialmente.

----- NUEVAS CITAS -----

US 3.585.998 A (HEYFORD y colaboradores) 22 de Junio de 1971, ver Figuras

PATENT COOPERATION TREATY

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From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
WILLIAM W. LETSON
KIMBERLY-CLARK WORLDWIDE, INC.
401 N. LAKE STREET
NEENAH, WI 54956

PCT

WRITTEN OPINION

(PCT Rule 66)

Date of Mailing
(day/month/year)

15 OCT 2004

Applicant's or agent's file reference

14853

REPLY DUE

within 1 month/day from
the above date of mailing

International application No.

PCT/US01/50846

International filing date (day/month/year)

21 December 2001 (21.12.2001)

Priority date (day/month/year)

29 December 2000 (29.12.2000)

International Patent Classification (IPC) or both national classification and IPC

IPC(7): A61F 13/15, 13/20 and US Cl.: 604/307

Applicant

KIMBERLY-CLARK WORLDWIDE INC.

1. This written opinion is the first (first, etc.) drawn by this International Preliminary Examining Authority.

2. This opinion contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2 (a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

3. The applicant is hereby **invited to reply** to this opinion.**When?**See the time limit indicated above. ~~The applicant may, before the expiration of that time limit, request this Authority to grant an extension. See rule 66.2(d).~~**How?**

By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also

For an additional opportunity to submit amendments, see Rule 66.4.

For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 *bis*.

For an informal communication with the examiner, see Rule 66.6

~~If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.~~

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 29 April 2003 (29.04.2003)

Name and mailing address of the IPEA/US

Mail Stop PCT, Attn: IPEA/ US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

Karin M. Reichle

Telephone No. (703) 308-0858

Form PCT/IPEA/408 (cover sheet)(July 1998)

WRITTEN OPINION

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I. Basis of the opinion

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed
- ☒ the description:
pages 1-19, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____
- ☒ the claims:
pages 20-24, as originally filed
pages NONE, as amended (together with any statement) under Article 19
pages NONE, filed with the demand
pages NONE, filed with the letter of _____
- ☒ the drawings:
pages 1-3, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____
- ☐ the sequence listing part of the description:
pages NONE, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the written opinion was drawn on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages NONE
- ☐ the claims, Nos. NONE
- ☐ the drawings, sheets/fig NONE

5. ☐ This opinion has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed."

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III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The question whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 23-43

because:

☐ the said international application, or the said claim Nos. _____ relate to the following subject matter which does not require international preliminary examination (*specify*):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. _____ are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. _____ are so inadequately supported by the description that no meaningful opinion could be formed.

☒ no international search report has been established for said claims Nos. 23-43.

2. A written opinion cannot be drawn due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the standard.

☐ the computer readable form has not been furnished or does not comply with the standard.

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V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims <u>4, 5, 7, 8, 10, 17, 19</u>	YES
	Claims <u>1-3, 6, 9, 11-16, 18, 20-22</u>	NO
Inventive Step (IS)	Claims <u>19</u>	YES
	Claims <u>1-18, 20-22</u>	NO
Industrial Applicability (IA)	Claims <u>1-22</u>	YES
	Claims <u>NONE</u>	NO

2. CITATIONS AND EXPLANATIONS

With regard to claims 10 and 17, see page 4, lines 13-16 and page 5, lines 8-23 of the description. "Medicaments" is interpreted in light of page 4, lines 31 et seq, page 6, lines 20-24, and page 10, line 12-page 12, line 28. "Porous" is defined as set forth on page 6, lines 30-34. "Effective amount" is defined as set forth on page 6, lines 9-13. "A pattern of a matrix of discrete segments" is interpreted in light of page 13, line 19-page 14, line 23 and page 16, line 21-page 17, line 3.

Claims 1-3, 6, 9, 11-16, 18 and 20-22 lack novelty under PCT Article 33(2) as being anticipated by HAYFORD et al '998.

With regard to claims 14, 15, 21 and 22, see claim interpretation section supra, the Figures, col. 1, lines 4-6, col. 3, lines 69 et seq, col. 4, lines 10-26, i.e. the topsheet is 2, the absorbent material is 1, the backsheet is 5, an effective amount is disclosed at col. 2, lines 64 et seq, a medicinal composition is 3, 4 and 6 or just 3 and 4 and disclosed at col. 2, lines 39-60, the discrete segments are 4, a pattern is disclosed at col. 4, lines 30-36, i.e. "a portion of", Figure 1 and 4, i.e. an array, and col. 2, lines 26-29, i.e. clusters, the volume is disclosed at col. 2, lines 17-25 (the volume of a sphere is $\frac{4}{3}\pi(r^3)$), i.e. 3 picoliters to 400 nanoliters is equal to .000003-4 cubed mm and a capsule having a diameter of 200 microns has a volume of about .004 cubed mm. With regard to claim 16, see Figure 1, the spheres 4 stick out of matrix 6 and the portions sticking out are "substantially" semi-spherical in cross section, see also col. 2, line 18. With regard to claim 18, see again col. 4, lines 30-36, i.e. "a portion of" and col. 2, lines 26-29, i.e. clusters. With regard to claim 20, the composition is claimed as including a filler. However, the specifics of the filler have not been disclosed. Therefore, the composition as disclosed at col. 2, lines 39-60 is considered to include such a "filler". With regard to claims 1-3, 6, 9 and 11-13 see discussion of claims 14-16, 18 and 20-22 supra, i.e. the segments 4 of the pattern have the claimed dimensions, and col. 5, lines 30-33, the segments 4 are present in the claimed amount.

Please See Continuation Sheet

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VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

The drawings are objected to under PCT Rule 66.2(a)(iii) as containing the following defect(s) in the form or content thereof: Figure 1 and the description thereof on page 7, lines 6-8 are inconsistent, i.e. the Figure is partly cut away. Figure 2 and the description thereof on page 7, lines 9-10 are inconsistent, i.e. only part of the topsheet is shown.

The description is objected to as containing the following defect(s) under PCT Rule 66.2(a)(iii) in the form or contents thereof: The abstract of the disclosure is objected to because terminology which can be inferred, i.e. "The present invention relates to", "The present invention is also directed to", should be avoided. As discussed supra, the descriptions of Figures 1-2 and the Figures are inconsistent. On page 10, the sentence on lines 23-25 is grammatically incorrect.

Claims 1-22 are objected to under PCT Rule 66.2(a)(iii) as containing the following defect(s) in the form or contents thereof: in claims 1, 6, 14 and 16, "facing"(all) should be --faceable--. In claim 15, line 3, after "material", --is-- should be inserted. In claims 12 and 20, "further" should be deleted.

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Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

TIME LIMIT:

The time limit set for response to a Written Opinion may not be extended. 37 CFR 1.484(d). Any response received after the expiration of the time limit set in the Written Opinion will not be considered in preparing the International Preliminary Examination Report.

V. 2. Citations and Explanations:

Claims 4-5, 7-8, 10 and 17 lack an inventive step under PCT Article 33(3) as being obvious over HAYFORD et al '998.

Claims 10 and 17 claim the frequency of positioning. See page 4, lines 13-16 and page 5, lines 8-23 of the description. It is especially noted that as disclosed this is just the number of times an applicator "may" fire. Therefore this claim appears to be a product by process claim, i.e. the claiming of the frequency of possible firing of an applicator during the manufacture of the claimed product. This process does not appear to provide any further structure of the article than that already claimed. It is the structure of the end product of the process which determines patentability not the process. Therefore, the Hayford device includes the same structure or lacks an inventive step with regard to such structure, as best understood.

With regard to claims 4-5 and 7-8 Applicant claims the discrete segments located in a specific pattern not taught by Hayford. Hayford only discloses application to a portion, e.g. clusters, an array, or the entire surface. However, page 13, line 19-page 14, line 23 and page 16, line 21-page 17, line 3 does not disclose the criticality of the patterns of the claims as compared to other patterns such as those shown by Hayford. Where, as here, the general conditions of a claim are disclosed in the prior art, i.e. a certain amount of medicament in a pattern on the body faceable surface of a topsheet, it would not involve an inventive step to discover the optimum or workable patterns by routine experimentation.

Claims 1-22 meet the criteria set forth in PCT Article 33(4) and thus have industrial applicability because the subject matter claimed can be made or used in industry.

----- NEW CITATIONS -----

US 3,585,998 A (HAYFORD et al) 22 June 1971, see Figures.

PODER

Yo (nosotros)

domiciliado(s) en

Nombro(amos) a: **RAMIRO CASTRO DUQUE** y/o **JUAN PABLO CADENA SARMIENTO** y/o **BEATRIZ JARAMILLO S.** de Santafé de Bogotá, Colombia, apoderados verdaderos y legales con poder especial, amplio y suficiente, para recabar de las oficinas y autoridades colombianas administrativas, judiciales y de policía, en cualquier instancia o recurso, la obtención de patentes de invención, registros de marcas, diseños industriales, modelos de utilidad, depósitos de nombres comerciales y enseñas, registros de derechos de autor y contratos sobre los mismos, obtención de certificados de obtentor de variedades vegetales, así como sus prórrogas, renovaciones, anotaciones de traspaso, cambios de nombre y/o domicilio; elaborar, tramitar y registrar contratos de licencia y licencias de cualesquiera clases; intervenir como demandante o como demandado en cualquier instancia y recurso ante cualquier juez, corporación, funcionario público o autoridad en acciones judiciales, administrativas y de policía tales como: oposiciones al registro de marcas; acciones de caducidad, cancelación y nulidad; acciones reivindicatorias, acciones derivadas de la obtención o explotación de licencias; acciones de competencia desleal; demandas penales; acciones de indemnización de perjuicios, reclamos y observaciones a solicitudes de patentes, diseños industriales, modelos de utilidad, en el ejercicio de medidas cautelares y en otras acciones o medidas similares.

A este efecto, lo(s) faculto(amos) para elevar solicitudes, formular descripciones, enmiendas, protestas, declaraciones, oposiciones, cancelaciones, nulidades, apelaciones y reclamos; pagar impuestos, cuotas y gravámenes prescritos por la ley; renunciar o desistir a derechos concedidos o en curso de concesión; recibir toda clase de documentos y valores, dando el descargo respectivo, y, en general, para dar ante dichas autoridades todos los pasos necesarios al efecto indicado y tomar todas las medidas que creyeren conducentes al resguardo de mis (nuestros intereses), con todas las demás facultades regales necesarias.

Este poder comprende la facultad de ratificar o confirmar en mi (nuestro) nombre lo actuado así como la facultad de desistir, transigir, comprometer, y la de sustituirlo en todo o en parte y revocar sustituciones. Asimismo nombro(amos) a: **RAMIRO CASTRO DUQUE** y/o **JUAN PABLO CADENA SARMIENTO** y/o **BEATRIZ JARAMILLO S.** domiciliado(s) en la Carrera 7 No. 16-56 Piso 9, mis (nuestros) apoderados en Colombia, con facultades para recibir notificaciones y designar apoderados judiciales o extrajudiciales.

Otorgado y firmado en

hoy de de 20

Firma

Nombre

Cargo

POWER OF ATTORNEY

I (We) Kimberly-Clark Worldwide, Inc.

domiciled in 401 N. Lake Street, Neenah, Wisconsin 54956, USA.

Hereby appoint **RAMIRO CASTRO DUQUE** and/or **JUAN PABLO CADENA SARMIENTO** and/or **BEATRIZ JARAMILLO S.** of Santafé de Bogotá, Colombia, my (our) true and lawful attorneys with special, ample and sufficient power to obtain from the Colombian administrative, judicial and police offices and authorities, in any instance, privileges of patents of invention, registration of trademarks, industrial designs and utility models; registration of commercial names and emblems, registration of copyright and contracts related thereto, certificates of obtainers of vegetables varieties, as well as extensions, renewals and recordal of assignments and changes of name and domicile related to the above; to prepare, prosecute and register licenses of any kind; to act as plaintiff or defendant in any instance or recourse, and before any judge, corporation, public official or authority in judicial, administrative and police actions, such as: oppositions to the registration of trademarks; caducity, cancellation and nullity actions; claim actions derived from the obtaining or exploration of licenses, action of unfair competition; penal demands, actions of indemnities for damages: claims or observations on patent applications, models, industrial designs and utility models; in the exercise of preventive measures: and in other actions or similar proceedings.

To that effect they are hereby empowered to file applications, formulate descriptions, amendments, protests, declarations, oppositions, cancellations, nullifies, appeals and claims; to pay taxes, quotas and assessments prescribed by law, renounce or waive the rights granted or in the process of granting; to receive all kind of documents and valuables, giving the respective release of receipt, and, in general, to take before said authorities the necessary steps to such effect, and any measures that they may deem pertinent to the safeguard of my (our) interests) with all the other necessary legal powers.

This power includes the faculty to ratify or confirm desist, settle and compromise on my (our) behalf, and to substitute this power in whole or in part and to revoke substitutions. At the same time I (We) hereby appoint **RAMIRO CASTRO DUQUE** and/or **JUAN PABLO CADENA SARMIENTO** and/or **BEATRIZ JARAMILLO S.** domiciled in Carrera 7 No. 16-56 Piso 9, my (our) attorneys) in fact, to receive notifications and to designate judicial and extrajudicial attorneys.

Granted and signed in

this 6th day of

Signature

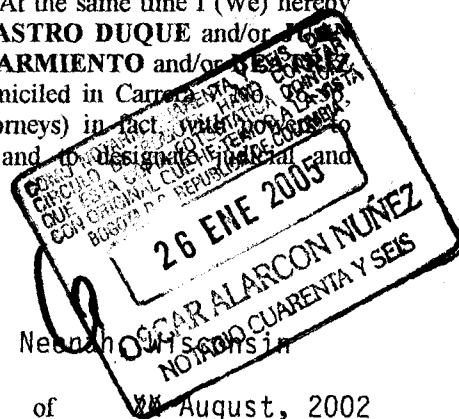
Name

Title

Nancy Lee Carter

Assistant Secretary

Kimberly-Clark Worldwide, Inc.



**CERTIFICADO NOTARIAL
(SOCIEDAD)**

Hoy de de personalmente compareció ante mí

a quien conozco, y de quien me consta que
firmó el anterior documents, debidamente
juramentado declaró y dijo que él es

de

Sociedad legalmente constituida para un
período de duración que aún no ha terminado;
que el declarante está autorizado por dicha
compañía para conferir este poder; que el sello
estampado por él al pie de tal poder, en
nombre y representación de la expresada
compañía, es el sello oficial de ella; y que el
objeto para el cual se confiere este
instrumento está comprendido dentro del de la
sociedad.

El suscrito Notario hace constar que tuvo a la
vista las pruebas de la existencia de la
sociedad.

Estado de
con fecha

y que quien confiere el presente poder es su
representante.

Notario Público (sello)

**CERTIFICADO NOTARIAL
PERSONA NATURAL**

Hoy de de compareció(eron) ante mí

a quien (es) conozco y me consta que es(son)
la(s) persona(s) firmante(s) del documento
que precede y quien(es) declara(n) que
otorgan el mismo para los fines y propósitos
que en él se expresan.

Notario Público (sello)

LEGALIZACION POR APOSTILLA ES REQUERIDA

**NOTARIAL CERTIFICATE
(CORPORATION)**

On this day of of personally appeared before
me Nancy Lee Carter

to me known, and known to me to be the
person who signed the foregoing instrument
who being by me duly sworn did depose and
say that he (she) is the Assistant Secretary
of Kimberly-Clark Worldwide, Inc.

Which is legally constituted for a term not yet
expired, that deponent is authorized by said
Company to confer this Power of Attorney:
that the seal affixed hereunto by the deponent
in the name and on behalf of said Corporation
is the corporate seal thereof; and that the
purpose for which this instrument is granted
is included within the corporate purpose of
company.

The undersigned Notary Public attests that he
has seen the documents that prove the
existence of the company.

State of Wisconsin
under date of

and that he (she) who grants the present
power of attorney is its Representative.

Charles R. Gorge
Notary Public (Seal)

My commission expires September 11, 2005

**NOTARIAL CERTIFICATE
NATURAL PERSON**

On this day of of personally appeared before
me

who is(are) known to me and who I attest
executed the foregoing document and he
(they) declared he (they) grant(s) the
document for the uses and purposes therein
expressed.

Notary Public (Seal)

LEGALIZATION BY APOSTILLE IS REQUIRED

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TRADUCCIÓN SIMPLE AL ESPAÑOL de la apostilla que vienen junto con el poder dado por **Kimberly-Clark Worldwide, Inc.**, domiciliada en 401 N. Lake Street, Neenah, Wisconsin, 54956 Estados Unidos de América a **Ramiro Castro Duque y/o Juan Pablo Cadena Sarmiento y/o Beatriz Jaramillo S.** domiciliados en la Carrera 7 # 16-56 P. 9, Bogotá.

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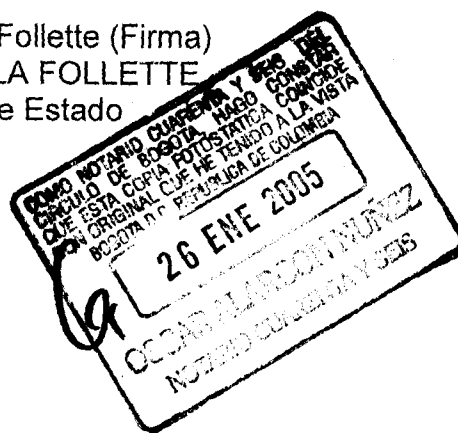
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CERTIFICADO

5. en Madison, Wisconsin
6. Agosto 6 de 2002
7. por Secretario de Estado de Wisconsin
8. No. 73756
9. Sello/Timbre
10. Firma

Douglas La Follette (Firma)
DOUGLAS LA FOLLETTE
Secretario de Estado



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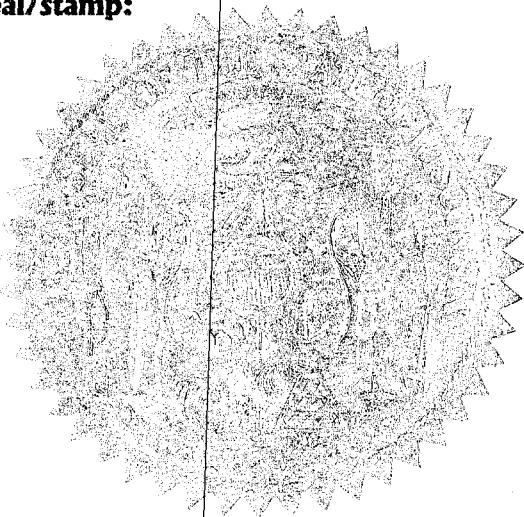
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1. Country: United States of America
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3. acting in the capacity of Notary Public, State of Wisconsin
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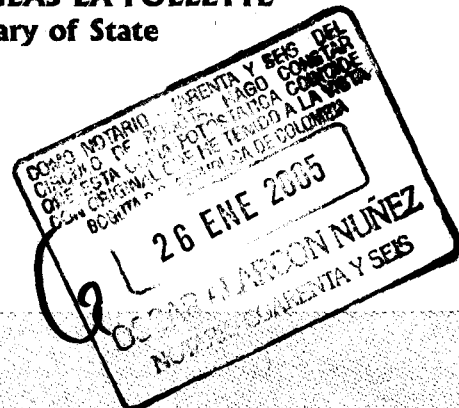
CERTIFIED

5. at Madison, Wisconsin
6. August 16, 2002
7. by the Secretary of State of Wisconsin
8. No. 73756
9. Seal/stamp:
10. Signature:



Douglas La Follette

DOUGLAS LA FOLLETTE
Secretary of State





GAVIRI A

ORGANIZACION ELECTORAL
REGISTRADURIA NACIONAL DEL ESTADO CIVIL

REGISTRO CIVIL DE DEFUNCION

Indicativo
Serial 5562241

Datos de la oficina de registro							
Clase de oficina:	Registraduria	Notaria	X	Consulado	Corregimiento	Insp. de Policia	Código 9795
País - Departamento - Municipio - Corregimiento o/o Inspección de Policía							
COLOMBIA CUNDINAMARCA BOGOTA D.C.						NOTARIA 32.	

Datos del inscrito	
Apellidos y nombres completos	
CASTRO DUQUE RAMIRO	
Documento de identificación (Clase y número)	Sexo (en Letras)
C.C.No. 170322 DE BOGOTA	MASCULINO

Datos de la defunción			
Lugar de la Defunción: País - Departamento - Municipio - Corregimiento o/o Inspección de Policía			
COLOMBIA CUNDINAMARCA BOGOTA D.C.			
Fecha de la defunción		Hora	Número de certificado de defunción
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Documento presentado		Nombre y cargo del funcionario	
Autorización judicial	Certificado Médico X	ANDRES DIAZ CAMPOS	
		R.M. No. 79982662	

Datos del denunciante	
Apellidos y nombres completos	
EDGAR DAVID REGINO H.	
Documento de identificación (Clase y número)	Firma
C.C.No. 15.030.154 DE LORICA/ CORDOBA	

Primer testigo	
Apellidos y nombres completos	
Documento de identificación (Clase y número)	Firma

Segundo testigo	
Apellidos y nombres completos	
Documento de identificación (Clase y número)	Firma

Fecha de inscripción		Nombre y firma del funcionario que autoriza	
Año 2004	Mes 10	Día 02	BLANCA LÓPEZ RESTRERO

PADRES:		ESPACIO PARA NOTAS
ALFONSO CASTRO		
MERCEDES DUQUE		

DIVISION DE NUEVAS CREACIONES

RADICACIÓN EXPEDIENTE No. 03-54741

**EL EXTRACTO DE LA PRESENTE SOLICITUD DE PATENTE DE INVENCION -
PCT FUE PUBLICADO EN LA GACETA DE PROPIEDAD INDUSTRIAL No 534,
DE FECHA 28 DE NOVIEMBRE DE 2003, EL TERMINO HABIL SEÑALADO
POR LA LEY EXPIRA EL 25 DE FEBRERO DE 2004.**

NOTA: Dentro del plazo de los seis (6) meses siguientes a partir de la fecha de publicación en la gaceta de Propiedad Industrial, deberá solicitar y cancelar el examen de patentabilidad so pena de que la solicitud caiga en abandono, de acuerdo con lo establecido en el Artículo 44 de la Decisión 486/2000.

SE PRESENTARON OPOSICIONES POR PARTE DE TERCEROS.

SI _____ **NO** ☒ _____



US006153209A

United States Patent [19]

[11] Patent Number: 6,153,209

Vega et al.

[45] Date of Patent: Nov. 28, 2000

[54] ARTICLE HAVING A TRANSFERABLE
BREATHABLE SKIN CARE COMPOSITION
THEREON

[75] Inventors: Victor Nicholas Vega, Cincinnati, Ohio;
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Roe, West Chester, Ohio

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Cincinnati, Ohio

[21] Appl. No.: 09/407,950

[22] Filed: Sep. 28, 1999

[51] Int. Cl.⁷ A01N 25/34; A61L 9/00;
A61F 13/15

[52] U.S. Cl. 424/404; 424/400; 424/76.1;
424/76.3; 424/445; 604/363; 604/364; 604/381;
604/382

[58] Field of Search 424/404, 76.1,
424/76.3, 445, 400; 604/363; 514/847

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Primary Examiner—Thurman K. Page

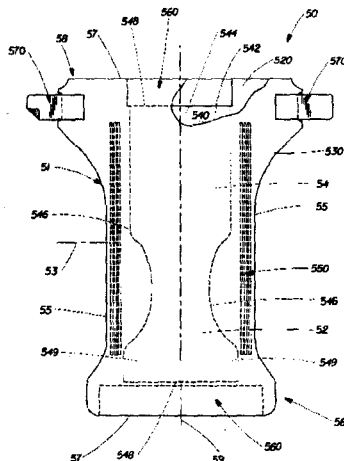
Assistant Examiner—Isis Ghali

Attorney, Agent, or Firm—Caroline Wei-Berk; George W.
Allen; Kirsten K. Stone

[57] ABSTRACT

The present invention relates to an article having a skin care composition disposed on at least a portion of the article. The skin care composition is a breathable, barrier protectant which can be immobilized on the article and is transferable to the wearer's skin via contact, normal wearer motion and/or body heat. Particularly, the skin care composition should have a water vapor transmission rate of at least about 0.1 gm/m²/hr and a barrier property of at least about -25 on Hunter b scale, as measured by a Methylene Blue Dye Method.

32 Claims, 3 Drawing Sheets



ARTICLE HAVING A TRANSFERABLE BREATHABLE SKIN CARE COMPOSITION THEREON

FIELD OF THE INVENTION

The present invention relates to absorbent articles such as diapers, training pants, adult incontinence devices, sanitary napkins, pantliners, and the like. More particularly, the present invention relates to absorbent articles for body exudates wherein the article has a skin care composition disposed thereon. Such a composition is transferable to the wearer's skin by normal contact, wearer motion, and/or body heat. The skin care composition used in the present invention is suitable for maintaining and/or improving skin condition of the wearer of the article upon transfer during use. The skin care composition used in the present invention provides a protective barrier against water, large molecules and particulate matter that exist in body exudates. Such a composition also minimizes abrasions where the absorbent article and the wearer's skin are in contact, eases BM clean-up, and may also deliver skin care ingredients to achieve various skin benefits. Most importantly, the skin care composition used in the present invention provides a breathable, protective barrier that keeps body exudates and other irritants from direct contact with the skin yet allows water vapor to pass through.

BACKGROUND OF THE INVENTION

The major function of disposable absorbent products, such as diapers, training pants, adult incontinence devices, sanitary napkins, panty liners, and the like, is to absorb and contain body exudates. Although these absorbent articles may be highly efficient for the absorption of liquids, they also can create an occlusive micro-environment in the body regions where they are worn. This occlusion micro-environment often results in overhydration of the skin. It is known that overhydrated skin is more susceptible to skin disorders, including erythema (i.e., redness), diaper rash or diaper dermatitis, heat rash, abrasion, pressure marks and skin barrier break-down. Diaper rash is a common form of irritation and inflammation of those parts of an infant's body normally covered by a diaper, which is caused by one or more of the following factors: moisture, occlusion, chafing, continued contact with urine, feces, or both, or mechanical or chemical irritation (see 21 C.F.R. 333.503). When absorbent articles are worn to absorb and contain the body exudates, the skin under the absorbent articles is held in direct contact with body exudates and other irritants, under an occluded condition. Often, the skin is subjected to such condition for extended periods of time, that is, until the soiled article is changed. As the skin under the absorbent article becomes overhydrated or irritated by such prolonged and repeated exposures, the skin condition is compromised, i.e., the skin becomes more susceptible to skin disorders or damages. While this condition is best known in infants, it is not limited to infants. Similar conditions occur with, for example, incontinent or bed-ridden adults.

To address the concerns of skin abnormalities associated with wearing absorbent articles, the practical approaches often attempt to address multiple causes or important cofactors. Reducing skin overhydration by frequent changing of diapers, the use of moisture absorbing powders, the use of superabsorbent materials, and the improvement of air flow in diapers are some of the well known approaches.

A typical approach is to apply a topical cream, ointment, lotion or paste by hand to the buttocks, genitals, anal and/or

other regions before placing the absorbent article on the wearer. This procedure usually provides some degree of physical barrier protection to the skin against direct contact with urine, feces or other irritants. However, the barrier approach may be occlusive in itself. It has been found that occlusive barrier material may interfere with the healing and repair of skin's natural barrier function once skin barrier function is compromised or skin disorders have developed.

It is recognized that a skin care composition for skin disorders associated with skin overhydration should have good barrier properties. Petrolatum is a well known barrier protectant which forms a water repellant layer on the skin surface and minimizes moisture loss from the skin. Petrolatum also forms a barrier against large molecules (e.g., fecal enzymes) and particulate matters in body exudates. But this petrolatum layer over skin is occlusive such that it may interfere with the barrier repair capability of the skin. Lanolin is another good barrier protectant as well as a nourishing substance, but lanolin is also occlusive. Many other fats and oils derived from natural sources, such as plants or animals, have been shown to have nourishing and/or occlusive properties, but they often are oxidatively unstable and require hydrogenation or stabilizers. However, hydrogenation tends to increase the viscosity of the substance and reduce its spreadability, and stabilizers may cause other skin problems, such as irritation or allergy.

Another well known barrier substance derived from nature is "vernix caseosa" or "vernix caevsa" (hereinafter "vernix"), which is the substance that covers the entire body of human and mammalian fetuses at or near full term. Vernix on fetal skin exhibits some unique characteristics not found in fully developed or mature skin. It has been shown that vernix has a very low transepidermal water loss (TEWL) value. It is believed that vernix helps the new born infant maintain body temperature by reducing water loss, which is accompanied by heat loss, from the epidermis. Vernix is also a very effective barrier against moisture penetration. Mature skin becomes overhydrated and develops maceration or irritant dermatitis after just a couple of days' exposure to water. In contrast, the full or near term fetus' skin is healthy, smooth and supple, even though it has been exposed to the total immersion environment in the uterus for an extended period of time. Moreover, vernix is a naturally occurring substance that has none of the side effects such as irritation, sensitization and allergy.

Various skin creams, lotions and ointments are available for treating skin disorders. Most of them are moisturizing preparations that enhance water retention in the skin, and thus, are not effective for skin disorders associated with overhydration, such as erythema or diaper rash. However, skin preparations for overhydration problem have been focused mostly on the barrier approach. Hence these preparations tend to be occlusive and hinder the natural barrier repair function of the skin. Moreover, the lotions, creams or ointments have always been applied by hand to the targeted areas. The topical application by hands tends to leave a thick sticky coating or a layer of white residue that is aesthetically displeasing. This procedure is also wasteful, messy, time-consuming and often forgotten.

Attempts have also been made to prepare absorbent articles which contain a transferable skin care composition on the skin-capacity surface so that the hand-application procedure is not necessary. However, many lotions, creams and ointments generally are not suitable for delivery via an absorbent article because they are fluid or substantially mobile at room temperature. These fluid and mobile substances do not remain localized on the surface of the article

but instead may migrate into the interior of the article. Accordingly, these substances can interfere with the absorbency of the interior core layer of the article due to their hydrophobic, barrier properties.

Also a higher level of such compositions must be applied to the article surface in order to provide enough transfer to the skin to achieve a protective coating. This higher add-on level not only increases the cost per article, but also increases the possibility of migration into and through the packaging or wrapper materials, creating an article that smears and leaks greasy substances.

U.S. Pat. No. 4,760,096 to Sakai et al. teaches a moisturizing skin composition comprising a phosphatide (such as lecithin) and one or more C10-C30 carboxylic acid sterol esters. Such compositions preferably contain a caprylic/capric acid triglyceride for enhanced moisturization. A major disadvantage of the composition disclosed by Sakai is that the composition is a moisturizer which enhances the water retention in the skin. Accordingly, it does not prevent or minimize the overhydration problem of the skin under an absorbent article.

U.S. Pat. No. 5,409,903 to Polak et al. teaches a method and a composition for treatment or prevention of skin rash or dermatitis wherein urease containing bacteria, bacterial components and by-products are implicated. The composition may be applied to skin in combination with an adhesive, film-forming or barrier compound. A major disadvantage of Polak et al. is that a thin film coating is required to achieve water vapor or gas permeability, and the composition is only effective as a barrier against enzymes or large particulate materials.

U.S. Pat. No. 3,896,807 to Buchalter teaches a skin-contacting article impregnated with a solid oil phase of a cream formulation which forms a cream upon addition of moisture thereto. A major disadvantage of the article disclosed by Buchalter is that the substance is an occlusive barrier protectant. Another disadvantage of Buchalter is that the transfer of a beneficial substance from the article to the skin is delayed until fluids are absorbed by the solid oil phase.

U.S. Pat. No. 3,489,148 to Duncan et al. teaches a disposable diaper comprising a "hydrophobic and oleophobic" topsheet wherein a portion of the topsheet is coated with a discontinuous film of oleaginous substance. A major disadvantage of the of the diaper disclosed by Duncan et al. is that the hydrophobic and oleophobic topsheet is slow in promoting transfer of urine to the underlying absorbent core.

U.S. Pat. No. 5,643,588 to Roe et al. teaches an absorbent article having a skin treating composition on the surface of a disposable diaper that is solid or semi-solid at ambient temperature, and is transferable to the wearer's skin by contact, wearer motion and/or body heat. However, some of the compositions disclosed by Roe et al. may be occlusive.

In light of the foregoing, it would be desirable to have an article-deliverable skin care composition that is breathable or non-occlusive. Such a skin care composition should also have good barrier properties against urine, feces, or other body exudates or irritants. Such composition should also minimize skin overhydration, maintain the integrity of skin barrier function, and thus effectively prevent secondary irritation or infection when skin is compromised or damaged, and promote the barrier repair function of the skin.

Moreover, it would be desirable that the skin care composition can be immobilized on an absorbent article for hands-free transfer to the wearer's skin during use, for minimizing adverse effects on the absorbency of the article, and for avoiding stains on clothing, bedding or packaging.

It would also be desirable for the skin care composition not to irritate or sensitize the skin and be oxidatively stable for long shelf life of the product.

It would be further desirable to have an absorbent article having a breathable, barrier type skin care composition disposed thereon for hands-free transfer to the wearer's skin by contact, normal wearer motion and/or body heat.

It would also be desirable to have an absorbent article having one or more types of skin care composition disposed thereon, wherein at least a portion of the composition is transferable to the wearer's skin to provide desired skin benefits including a prevention and/or reduction in erythema, a reduction in BM adherence to the skin for easier removal of BM, reduction in occlusion, overhydration and/or abrasion of the skin, and the like.

It would also be desirable to have a skin care composition which is solid or semi-solid at ambient temperature so that it is immobilized on the surface of an absorbent article. The skin care composition should be able to become fluid or plastic at or near skin temperature, or when slight force is applied, so that it is readily transferable to the skin. The skin care composition should also be substantially flowable at the processing temperature so that it can be successfully applied to the article surface, i.e., without tearing or otherwise damaging the article.

SUMMARY OF THE INVENTION

The present invention relates to articles having a skin care composition disposed on at least a portion of the article. The skin care composition provides a breathable, barrier protectant, can be immobilized on the article and is transferable to the wearer's skin via contact, normal wearer motion and/or body heat. Particularly, the skin care composition is solid or semi-solid at 20° C., and a Water Vapor Permeation Rate of at least about 0.1 gm/m²/hr, and a barrier property of at least about -25 on Hunter b-scale, as measured by a Methylene Blue Dye Method.

It has been found that the water vapor permeability of such composition can be enhanced by adding agents such as branched esters, branched hydrocarbons, polysiloxanes, phospholipids or mixtures thereof, while maintaining barrier property and immobility/transferability characteristics of the composition.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows an absorbent article in the form of a diaper according to the present invention.

FIG. 2 shows a schematic representation illustrating a preferred process for applying the skin care composition used in the present invention to diaper topsheet and/or cuffs.

FIG. 3 shows a schematic representation illustrating an alternative process for applying the skin care composition used in the present invention to diaper topsheet and/or cuffs.

DETAILED DESCRIPTION OF THE INVENTION

1. Definitions

As used herein, the term "comprising" means that the various components, ingredients, or steps can be conjointly employed in practicing the present invention. Accordingly, the term "comprising" encompasses the more restrictive terms "consisting of" and "consisting essentially of".

As used herein, the term "occluded skin" means skin in areas under an absorbent article when the article is worn, As

used herein, the term "compromised skin" is not limited to a particular area of the body; the term "compromised skin" means skin that has been subjected to repeated or chronic exposures, or one or more acute episodes of exposure, to body exudates (e.g., urine, feces, menstrual fluids, sweat), moisture, irritants, etc. such that the skin develops redness, chaffing, roughness, wrinkled appearance or itchiness.

As used herein, the term "absorbent articles" means diapers, training pants, sanitary napkins, pantyliners, incontinence articles, diaper holders, and the like.

As used herein, the term "skin care agent" means a substance or a mixture of substances, when applied to a subject's skin, either alone or incorporated into a skin care composition, provides skin condition benefits such as actual or perceived changes in appearance, cleanliness and attractiveness. The term is also directed to substances that soothe, calm, or promote feelings of relief when applied to the skin, e.g., herbal, mineral or aromatic ingredients.

As used herein, the term "effective amount" of the skin care composition means an amount large enough to significantly or positively bring about the desired effect or to modify the condition to be treated such that the skin appears cleaner, more attractive or in better condition. The effective amount varies with the specific ingredient or composition used, the preventative or prophylactic effect desired, the type of condition or problem to be treated, the age and physical condition of the individual being treated, the severity of the condition to be treated, the intensity and duration of the treatment, and like factors.

As used herein, the terms "dermatologically acceptable" or "safe" means the amount of a skin care composition or the components therein is low enough that it produces no undue (i.e., at a reasonable benefit to risk ratio) side effects, such as toxicity, irritation, or allergic response, in a general population.

Other terms are defined herein where initially discussed.

All percentages, ratios and proportions used herein are defined by weight of the composition unless otherwise specified.

II. Absorbent Article

As used herein, the term "absorbent article" refers to a device which absorbs and retains body exudates. The term "disposable" is used herein to describe absorbent articles which are not intended to be laundered or otherwise restored or reused as an absorbent article after a single use. Examples of disposable absorbent articles include feminine hygiene garments such as sanitary napkins, pantyliners and tampons, diapers, incontinence briefs, diaper holders, training pants, and the like.

Disposable absorbent articles typically comprise a liquid pervious topsheet, a liquid impervious backsheet and an absorbent core positioned between the topsheet and the backsheet. Disposable absorbent articles and components thereof, including the topsheet, backsheet, absorbent core, and any individual layers of these components, have a body facing surface and a garment facing surface. As used herein, "body facing surface" means that surface of the article or component which is intended to be worn toward or adjacent to the body of the wearer, while the "garment facing surface" is on the opposite side and is intended to be worn toward or placed adjacent to the wearer's clothing or undergarments when the disposable absorbent article is worn.

The following description generally discusses the absorbent core, topsheet, and backsheet materials that are useful

in disposable absorbent articles of the present invention. It is to be understood that this general description applies to these components of the specific absorbent articles shown in FIG. 1 and further described below, in addition to those of other disposable absorbent articles which are generally described herein.

In general, the absorbent core is capable of absorbing or retaining liquids (e.g., menses, urine, and/or other body exudates). The absorbent core is preferably compressible, conformable, and non-irritating to the wearer's skin. The absorbent core may be manufactured in a wide variety of sizes and shapes (e.g., rectangular, oval, hourglass, "T" shaped, dog bone, asymmetric, etc.). In addition to the absorbent composites of the present invention, the absorbent core may include any of a wide variety of liquid-absorbent materials commonly used in absorbent articles, such as comminuted wood pulp, which is generally referred to as airfelt. Examples of other suitable absorbent materials for use in the absorbent core include creped cellulose wadding; meltblown polymers including coform; chemically stiffened, modified or cross-linked cellulosic fibers; synthetic fibers such as crimped polyester fibers; peat moss; tissue including tissue wraps and tissue laminates; absorbent foams; absorbent sponges; superabsorbent polymers; absorbent gelling materials; or any equivalent material or combinations of materials, or mixtures of these.

The configuration and construction of the absorbent core may also be varied (e.g., the absorbent core may have varying caliper zones and/or have a profile so as to be thicker in the center; hydrophilic gradients; gradients of the absorbent composite of the present invention, superabsorbent gradients; or lower average density and lower average basis weight zones, e.g., acquisition zones; or may comprise one or more layers or structures). The total absorbent capacity of the absorbent core should, however, be compatible with the design loading and the intended use of the absorbent article. Further, the size and absorbent capacity of the absorbent core may be varied to accommodate different uses such as diapers, training pants, incontinence pads, pantliners, regular sanitary napkins, and overnight sanitary napkins, and to accommodate wearers ranging from infants to adults.

The absorbent core can include other absorbent components that are often used in absorbent articles, for example, a dusting layer, a wicking or acquisition layer, or a secondary topsheet for increasing the wearer's comfort.

The topsheet is preferably compliant, soft feeling, and non-irritating to the wearer's skin. Further, the topsheet is liquid pervious, permitting liquids (e.g., menses and/or urine) to readily penetrate through its thickness. A suitable topsheet may be manufactured from a wide range of materials such as woven and nonwoven materials (e.g., a nonwoven web of fibers), including apertured nonwovens; polymeric materials such as apertured formed thermoplastic films, apertured plastic films, and hydroformed thermoplastic films; porous foams; reticulated foams; reticulated thermoplastic films; and thermoplastic scrims. Suitable woven and nonwoven materials can be comprised of natural fibers (e.g., wood or cotton fibers), synthetic fibers (e.g., polymeric fibers such as polyester, polypropylene, or polyethylene fibers) or from a combination of natural and synthetic fibers. When the topsheet comprises a nonwoven web, the web may be manufactured by a wide number of known techniques. For example, the web may be spunbonded, spunlace, carded, wet-laid, melt-blown, hydroentangled, hydroformed, hydroapertured, combinations of the above, or the like.

The backsheet is impervious to liquids (e.g., menses and/or urine) and is preferably comprises a thin plastic film,

disclosed in U.S. Pat. No. 4,556,146, issued to Swanson et al. on Dec. 3, 1985, U.S. Pat. No. 4,589,876, issued to Van Tilburg on Apr. 27, 1993, U.S. Pat. No. 4,687,478, issued to Van Tilburg on Aug. 18, 1997, U.S. Pat. No. 4,950,264, issued to Osborn, III on Aug. 21, 1990, U.S. Pat. No. 5,009,653, issued to Osborn, III on Apr. 23, 1991, U.S. Pat. No. 5,267,992, issued to Van Tilburg on Dec. 7, 1993, U.S. Pat. No. 5,389,094, issued to Lavash et al. on Feb. 14, 1995, U.S. Pat. No. 5,413,568, issued to Roach et al. on May 9, 1995, U.S. Pat. No. 5,460,623, issued to Emenaker et al. on Oct. 24, 1995, U.S. Pat. No. 5,489,283, issued Van Tilburg on Feb. 6, 1996, U.S. Pat. No. 5,569,231, issued to Emenaker et al. on Oct. 29, 1996, and U.S. Pat. No. 5,620,430, issued to Bamber on Apr. 15, 1997, the disclosure of each of which is incorporated by reference herein.

III. Skin Care Composition

The skin care compositions used in the articles of the present invention provide various skin benefits intended to maintain and/or improve the skin condition of the skin areas under an absorbent article or chronic exposure to body waste, moisture, irritants, etc. It is preferred that the skin care composition should provide a protective, and preferably non-occlusive function (e.g., a relatively liquid impervious but vapor pervious barrier) to avoid skin overhydration and skin exposure to materials contained in body exudates; an abrasion minimizing function to reduce skin irritation in the areas where the absorbent article is in contact with the wearer's skin; and should contain ingredients that deliver, either directly or indirectly, skin care benefits. For example, direct benefits may be directed towards overhydration reduction, redness reduction or skin conditioning, and indirect benefits may be directed towards removal or reduction of skin irritants in body exudates. It is also preferred that the skin care composition contains emollients that maintain or improve the skin condition against chaffing, roughness, wrinkled appearance or itchiness. Furthermore, the skin care composition preferably has a smooth, silky, non-grainy skin feel to minimize abrasion of sensitive or compromised skin due to conditions such as chaffing, roughness, or rashes.

The preferred skin care composition for use in the present invention should contain sufficient emollients so that it maintains skin in its normal, healthy condition or improves the skin condition against chaffing, roughness, redness, wrinkled appearance or itchiness. Specifically, the preferred composition should contain emollients that are barrier protectants against overhydration and external irritants, their derivatives or by-products, particularly those existing or developed in body exudates. Barrier protection is particularly effective in preventing skin abnormalities and damages associated with overhydration, and subsequent break-down of skin's protective barrier function. The preferred composition should also contain non-occlusive or breathable (i.e., water vapor and gas permeable) agents so that the skin covered by the composition is subjected to a local environment closely simulating that of untreated skin, i.e., the treated skin can "breathe" like the untreated skin. Breathability is an important factor in the healing of overhydrated and/or damaged skin and maintaining skin appearance or condition. It is surprising to find that the skin care compositions used in the present invention can achieve both barrier protection and breathability to provide an optimal environment for diapered skin.

Because the skin care composition is applied to the skin via a delivery vehicle such as an absorbent article, the preferred skin care composition for the present invention should have a melting/rheological profile that meets the

following requirements: the composition should preferably be solid or semi-solid at room temperature (i.e., about 20° C.) so that "migration" on the substrate surface and the adverse effects to the absorbency of the article are minimized; the preferred composition should also be readily transferable to the skin by contact, normal wear motions and/or body heat; therefore, the skin care composition is preferably plastic or fluid at skin temperature (i.e., about 34–36° C.) to facilitate the transfer to the skin; and the preferred composition should have storage stability, typically up to at least about 45° C.

Typically, the skin care compositions used in the present invention will have a breathability of at least about 0.1 gm/m²/hr, preferably at least about 1 gm/m²/hr, and more preferably at least about 10 gm/m²/hr, as measured by the collagen water vapor transmission rate (WVTR) test, which is described in the Test Methods Sections hereinafter.

The skin care compositions used in the present invention should also have a moisture barrier property ranging from about 5 to about -25, preferably from about 5 to about -15, more preferably from about 5 to about -5, as measured on the Hunter's "b" coordinate, using a Methylene Blue Dye Method described in the Test Methods Section hereinafter. As measured by this Method, a skin care composition having a poorer water barrier property would give a larger negative "b" value.

As will be discussed hereinafter, the skin care compositions useful in the present invention will generally have a melting profile such that they are relatively immobilized and localized on the wearer-contacting surface of the article at room temperature, are readily transferable to the skin at skin temperature, and yet are not completely liquid under "stressful" storage conditions. Preferably, the compositions are easily transferable to the skin by way of contact, shear, normal wearer's motions and/or body heat. Because the composition preferably is substantially immobilized on the article's surface, a relatively low level of composition is needed to impart the desired skin care benefits. In addition, special barrier or wrapping materials may be unnecessary in packaging the treated articles useful in the present invention.

The compositions useful herein are generally solid, or more often semi-solid at room temperature, i.e., at 20° C. Being solid or semi-solid at room temperature, such compositions do not have a tendency to flow and migrate to a significant degree to undesired locations of the article, and thus avoid significant interference with the absorbency of the article. This means less skin care composition is required for imparting desirable appearance, protective or conditioning benefits. Preferably, the compositions of the present invention have a zero shear viscosity at room temperature between about 1.0×10⁶ centipoise and about 1.0×10⁸ centipoise. More preferably, the zero shear viscosity is between about 5.0×10⁶ centipoise and about 5.0×10⁷ centipoise.

The term "semisolid", as used herein, means that the composition has a rheology typical of pseudoplastic or plastic liquids. When no shear is applied, the compositions can have the appearance of a semi-solid but can be made to flow as the shear rate is increased. Without intending to be bound by theory, it is believed that while such compositions contain primarily solid components, they also include some liquid components.

To enhance the immobility of the preferred compositions, the viscosity of the formulated compositions should be as high as necessary to prevent substantial flow within the article to undesired locations. One the other hand, too high a viscosity may inhibit transfer of composition to the skin.

Therefore, a balance should be achieved so the viscosities are high enough to keep the compositions localized on the surface of the article, but not so high as to impede transfer to the skin. In addition, the compositions preferably have a final melting point above skin temperature, more preferably above potential "stressful" storage conditions that can be greater than 45° C. (e.g., warehouse in Arizona, car trunk in Florida, etc.). Specifically, preferred compositions will have the following melt profile:

Characteristic	Preferred Range	Most Preferred
% liquid* at room temp. (20° C.)	2-50	3-25
% liquid* at body temp. (37° C.)	25-95	30-90
final melting point (° C.)	≥38	≥45

The skin care compositions useful in the present invention will generally comprise an emollient or mixture of emollients, a permeability enhancing agent and an immobilizing agent. Other optional ingredients may also be included, such as skin care agents, theological agents, antioxidants, and the like.

A. Emollients

As used herein, the term "emollient" means a material that protects against wetness or irritation, softens, soothes, supple, coats, lubricates, moisturizes, protects and/or cleanses the skin. In a preferred embodiment, these emollients will have either a plastic or liquid consistency at ambient temperatures, i.e., 20° C.

Emollients may maintain the normal, healthy skin condition. Emollients may also improve the dry skin condition by restoring its moisture level as well as its softness, smoothness and flexibility. One type of emollients, generally referred to as moisturizers or moisturizing emollients, attract moisture from the surrounding atmosphere and enhance the water absorption of the stratum corneum (i.e., the outer, corny layer of the skin). Another type of emollients, generally referred to as barrier protectants, form an occlusive (i.e. non-water-permeable) layer when deposited on the surface of the skin, which prevent or retard moisture losses from the deeper layers of the skin to the atmosphere. These emollients also act as barriers protecting the skin from larger molecules, such as fecal matter, enzymes, and other irritants.

Representative barrier protectant type emollients useful in the present invention include, but are not limited to, petroleum-based emollients; fatty acid esters; fatty alcohol emollients; alkyl ethoxylate emollients; fatty alcohol ethers; polyol polyesters; glyceryl esters; free sterols, sterol esters and their derivatives; triglycerides and derivatives; sphingolipids; vegetable or animal oils; hydrogenated vegetable oils; kaolin and its derivatives; vitamins such as B₃ (niacinamide), C (ascorbic acid), D₃, E (tocopherol), E ester (tocopheryl nicotinate); or mixtures of these emollients.

Suitable petroleum-based emollients include paraffins, i.e., hydrocarbons or mixtures of hydrocarbons; particularly preferred are hydrocarbons having chain lengths of from 16 to 32 carbon atoms. Petroleum-based hydrocarbons having these chain lengths include mineral oil (also known as "liquid petrolatum") and petrolatum (also known as "mineral wax," "petroleum jelly" and "mineral jelly"). Mineral oil usually refers to less viscous mixtures of hydrocarbons having from 16 to 20 carbon atoms. Petrolatum usually refers to more viscous mixtures of hydrocarbons having from 16 to 32 carbon atoms. Petrolatum and mineral oil are

preferred emollients for compositions of the present invention. Petrolatum is particularly preferred because of its good barrier property (based on the Methylene Blue Test described hereinafter). When employed, petrolatum comprises no less than about 15 wt %, preferably no less than about 20 wt %, more preferably no less than about 30 wt % of the skin care composition.

Suitable fatty acid ester type emollients include those derived from C₁₂-C₂₈ fatty acids, preferably C₁₆-C₂₂ saturated fatty acids, and short chain (C₁-C₈, preferably C₁-C₃) monohydric alcohols. Representative examples of such esters include methyl palmitate, methyl stearate, isopropyl laurate, isopropyl myristate, isopropyl palmitate, ethylhexyl palmitate and mixtures thereof. Suitable fatty acid ester emollients can also be derived from esters of longer chain fatty alcohols (C₁₂-C₂₈, preferably C₁₂-C₁₆) and shorter chain fatty acids (e.g., lactic acid), such as lauryl lactate and cetyl lactate.

Suitable alkyl ethoxylate type emollients include C₁₂-C₂₂ fatty alcohol ethoxylates having an average degree of ethoxylation of from about 2 to about 30. Preferably, the fatty alcohol ethoxylate emollient is selected from the group consisting of lauryl, cetyl, and stearyl ethoxylates, and mixtures thereof, having an average degree of ethoxylation ranging from about 2 to about 23. Representative examples of such alkyl ethoxylates include laureth-3 (a lauryl ethoxylate having an average degree of ethoxylation of 3), laureth-23 (a lauryl ethoxylate having an average degree of ethoxylation of 23), ceteth-10 (a cetyl alcohol ethoxylate having an average degree of ethoxylation of 10) and steareth-10 (a stearyl alcohol ethoxylate having an average degree of ethoxylation of 10). When employed, these alkyl ethoxylate emollients are typically used in combination with the petroleum-based emollients, such as petrolatum, at a weight ratio of alkyl ethoxylate emollient to petroleum-based emollient of from about 1:1 to about 1:5, preferably from about 1:2 to about 1:4.

Suitable fatty alcohol type emollients include C₁₂-C₂₂ fatty alcohols, preferably C₁₆-C₂₂ fatty alcohols. Representative examples include cetyl alcohol and stearyl alcohol, and mixtures thereof. When employed, these fatty alcohol emollients are typically used in combination with the petroleum-based emollients, such as petrolatum, at a weight ratio of fatty alcohol emollient to petroleum-based emollient of from about 1:1 to about 1:5, preferably from about 1:1 to about 1:2.

Suitable fatty alcohol ether type emollients include ethers derived from C₁₂-C₁₈ fatty alcohols or C₁₂-C₁₈ fatty alcohols and lower alcohols.

Suitable fatty ester type emollients also include polyol polyesters, particularly the "liquid" polyol polyesters which has a complete melting temperature at or below body temperature (i.e., about 37° C.). Exemplary polyols include, but are not limited to, polyhydric alcohols such as pentaerythritol; sugars such as raffinose, maltodextrin, galactose, sucrose, glucose, xylose, fructose, maltose, lactose, mannose and erythrose; and sugar alcohols such as erythritol, xylitol, malitol, mannitol and sorbitol. Such polyols are esterified with fatty acids and/or other organic radicals having at least 2 carbon atoms and up to 30 carbon atoms. While it is not necessary that all of the hydroxyl groups of the polyol be esterified, preferred polyol polyester emollients of the present invention have substantially all (e.g., at least about 85%) of the hydroxyl groups esterified. Particularly preferred are sucrose polyol polyesters such as sucrose polycottonate, sucrose polysoyate, and sucrose polybehenate. Mixtures of such polyol polyesters are also

suitable emollients for the present invention. Other suitable polyol polyesters are disclosed in U.S. Pat. No. 5,609,587, issued to Roe on Mar. 11, 1997, and in U.S. Pat. No. 5,607,760, issued to Roe on Mar. 4, 1997, the disclosure of each is incorporated herein by reference. Other ester materials are further described in U.S. Pat. No. 2,831,854, U.S. Pat. No. 4,005,196, to Jandacek, issued Jan. 25, 1977; U.S. Pat. No. 4,005,195, to Jandacek, issued Jan. 25, 1977; U.S. Pat. No. 5,306,516, to Letton et al., issued Apr. 26, 1994; U.S. Pat. No. 5,306,515, to Letton et al., issued Apr. 26, 1994; U.S. Pat. No. 5,305,514, to Letton et al., issued Apr. 26, 1994; U.S. Pat. No. 4,797,300, to Jandacek et al., issued Jan. 10, 1989; U.S. Pat. No. 3,963,699, to Rizzi et al., issued Jun. 15, 1976; U.S. Pat. No. 4,518,772, to Volpenhein, issued May 21, 1985; and U.S. Pat. No. 4,517,360, to Volpenhein, issued May 21, 1985; all of which are incorporated by reference herein in their entirety.

Also useful herein are various C_{12} - C_{30} monoesters and polyesters of glycerin and derivatives thereof, including glyceride, acetoglycerides, and ethoxylated glycerides of C_{12} - C_{28} fatty acid, triethylene glycol, and derivatives thereof. These esters are derived from glycerin and one or more carboxylic acid moieties. Depending on the constituent acid and glycerin, these esters can be in liquid, semi-solid or solid form at room temperature. Solid or semi-solid glyceryl esters are also suitable for use herein as immobilizing agents. Nonlimiting examples include glyceryl trihehenate, glyceryl stearate, glyceryl palmitate, glyceryl distearate, glyceryl dipalmitate, and the like.

Also useful herein are sphingolipids, such as ceramides, sphingosines, phytosphingosines, and the like.

An effective emollient having superior barrier properties may be a mixture of components which simulate the skin's natural water-barrier forming lipid complex, particularly vernix (i.e., the substance covering the bodies of fetuses or newborns of human or other mammals). A preferred emollient is a simulate of vernix in a mixture of sterols, sterol esters and triglycerides. However, other substances occurring naturally in the stratum corneum are also preferred, such as sodium pyrrolidone carboxylic acid, sodium lactate/lactic acid, free fatty acids, L-proline, guanidine, pyrrolidone, ceramide, and urea. Other emollients derived from natural sources are also suitable for use herein, such as hydrolyzed protein and other collagen-derived proteins; keratin and derivatives; acetamide MEA, and the like.

A preferred emollient for use herein comprises (based on the total weight of the emollient in the skin care composition):

- (i) triglycerides ranging from about 1 to about 90 wt %, preferably from about 5 to about 50 wt %, more preferably from about 10 to about 25 wt %;
- (ii) sterols ranging from about 1 to about 40 wt %, preferably from about 3 to about 30 wt %, more preferably from about 5 to about 20 wt %;
- (iii) sterol esters ranging from about 1 to about 90 wt %, preferably from about 5 to about 50 wt %, more preferably from about 10 to about 25 wt %; and
- (iv) petroleum-based emollient from about 1 to about 90%, preferably from about 5 to about 50 wt %, more preferably from about 10 to about 25 wt %.

Nonlimiting examples of triglycerides suitable for use herein are typically alkanolic triglycerides, and other triglycerides that exist in vegetable or animal oils. A particularly preferred triglyceride is capric/caprylic triglyceride mixtures, available as Myritol® 318, from Henkel Corp., Ambler, Pa.

Vegetable oils and hydrogenated vegetable oils and waxes are also useful herein. Some of the fully or partially hydro-

genated vegetable oils may be solid or semi-solid (i.e., having a waxy consistency) at ambient temperature. Non-limiting examples of vegetable oils and hydrogenated vegetable oils and waxes include safflower oil, castor oil, coconut oil, cottonseed oil, menhaden oil, palm kernel oil, palm oil, peanut oil, soybean oil, rapeseed oil, linseed oil, rice bran oil, pine oil, sesame oil, sunflower seed oil, jojoba oil, tea tree oil, avocado oil, olive oil, canola oil, their hydrogenated products, cocoa butter, shea butter, and mixtures thereof.

Also useful herein are animal oils such as shark liver oil, cod liver oil, and the like.

Nonlimiting examples of sterols suitable for use herein include cholesterol, ergosterol, sitosterol, cholecalciferol, and other sterols found in phytosterols, soy sterols or tall oil sterols; lanosterols and other sterols found in lanolin and hydrogenated lanolin; and derivatives thereof, such as acetylated lanolin (available as Acylan® from Croda Inc., Parsippany, N.J.). Since high concentration of sterols tends to crystallize at cold spots along the processing equipment, the sterols are typically used in combination with the petroleum-based emollients, such as petrolatum, at a weight ratio of sterol to petrolatum from about 1:1 to about 1:4, preferably from about 1:1 to about 1:3.

Nonlimiting examples of sterol esters suitable for use herein include stearate, palmitate, acetate, lanolate, macadamiate, nonanoate, oleate, butyrate, hydroxystearate, isostearate, sulfate, isostearate carbonate of cholesterol and other sterols. A particularly preferred sterol esters is a mixture of C_{10} - C_{30} carboxylic acid esters of sterols, which is predominantly a cholesterol/lanosterol mixture (available as Super Sterol Ester® from Croda, Inc., Parsippany, N.J.). Super Sterol Ester® is derived from wool wax by a process disclosed in part in U.S. Pat. No. 4,138,416 issued to Koresawa et al., which is incorporated herein by reference.

The emollient component of the compositions used in the present invention should preferably be substantially anhydrous. As used herein, the term "substantially anhydrous" means the emollients or mixtures thereof typically has a water content of less than about 10%, preferably less than about 5%, more preferably less than about 1%, and most preferably less than about 0.5% by weight of the emollient component. The substantially anhydrous character of the emollients avoids overhydration of the already susceptible skin which is chronically exposed to a high relative humidity micro-environment. Furthermore, the substantially anhydrous character of the emollients avoids the wicking effect of the highly absorbent core, which may preferentially draw the emollient components towards the core, interfering with the absorbency of the core and keeping the emollients away from the topsheet surface and the wearer's skin.

The amount of emollient included in the composition will depend on a variety of factors, including the particular emollient involved, the skin benefits desired, the other components in the composition, and like factors. The emollients will generally comprise from about 5 to about 95 wt % of the skin care composition. Preferably, the emollients comprise from about 10 to about 90 wt %, more preferably from about 20 to about 80 wt %, and most preferably from about 30 to about 75 wt %, of the skin care composition.

B. Permeability Agents

Typically, the skin care compositions of the present invention will also include a permeability agent. The permeability agent is a substance which, when incorporated in a composition, increases the water vapor permeation from the skin or collagen film surface through the composition that covers it. Preferably the permeability agent is also miscible with the emollients of the present invention.

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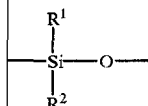
Representative permeability agent useful in the present include branched or unsaturated fatty acid esters, such as branched chain aliphatic esters derived from C1-C30 alcohols and C1-C30 mono- or di- carboxylic acids; C7-C40 branched hydrocarbons; polysiloxanes; phospholipids; and mixtures thereof.

Branched fatty acid esters suitable for use herein may have branching in the acid chain, the alcohol chain, or both. Branching also has the effect of lowering the melting temperature of the fatty acid esters such that the fatty acid esters suitable for use herein may be liquids at room temperature. Fatty acid esters suitable for use herein may also have unsaturation in the acid chain, the alcohol chain, or both. Branched or unsaturated structures within the fatty acid esters have been found to be effective to increase WVTR of the skin care composition, therefore, are effective as permeability agents. However, unsaturation in the chain structure often leads to oxidative instability, which may require the incorporation of stabilizers or antioxidants. Certain stabilizers or antioxidants may cause skin irritation or sensitization in some individuals. Where unsaturated permeability agents are used, antioxidants such as vitamin E and derivatives are preferred because of their non-irritating and/or non-sensitizing characters. Nonlimiting examples of antioxidants suitable for use herein are ascorbic acid, tocopherol, tocopherol acetate, and mixed tocopherol (available as COVIOX T-50 or T-70 from Henkel, Ambler, Pa.).

Particularly preferred fatty acid ester permeability agents are derived from C8-C22 fatty alcohols and C8-C22 fatty acids, including branched and/or unsaturated alcohols, branched and/or unsaturated acids, and mixtures thereof. Nonlimiting examples of fatty acid esters useful herein include diisopropyl adipate (available as Ceraphyl 230 from ISP Van Dyk, Belleville, N.J.), octyldodecyl stearoyl stearate, isononyl isononanoate (available as Salacos 99 from Ikeda Corp., Island Park, N.Y.), isostearyl isononanoate, octyl palmitate, octyl hydroxystearate, stearyl heptanoate, ceterayl octanoate, butyl octanol, 2-ethylhexyl-12-hydroxy stearate, decyl oleate, dioctyl adipate, dioctyl succinate, isocetyl stearate, octyl cocoate, octyl palmitate, and mixtures thereof.

Also useful herein as permeability agents are C7-C40 branched hydrocarbons, such as isoparaffins, squalane, squalene, and the like. Squalene, being the partially unsaturated form of squalane, is oxidatively unstable and may require incorporation of anti-oxidants such as those described above.

Other suitable types of permeability agents for use herein include polysiloxane compounds. In general, suitable polysiloxane materials for use in the present invention include those having monomeric siloxane units of the following structure:



wherein, R¹ and R², for each independent siloxane monomeric unit can each independently be hydrogen or any alkyl, aryl, alkenyl, alkaryl, arakyl, cycloalkyl, halogenated hydrocarbon, or other radical. Any of such radicals can be substituted or unsubstituted. R¹ and R² radicals of any particular monomeric unit may differ from the corresponding functionalities of the next adjoining monomeric unit. The radicals R¹ and R² can additionally independently be

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other silaceous functionalities such as, but not limited to siloxanes, polysiloxanes, silanes, and polysilanes. The radicals R¹ and R² may contain any of a variety of organic functionalities including, for example, alcohol, carboxylic acid, phenyl, and amine functionalities. Preferably, the polysiloxane suitable for use as permeability agents herein has a branched, cyclic and/or unsaturated structure in at least one of the R radicals.

Exemplary alkyl radicals are methyl, ethyl, propyl, butyl, pentyl, hexyl, octyl, decyl, octadecyl, and the like. Exemplary alkenyl radicals are vinyl, allyl, and the like. Exemplary aryl radicals are phenyl, diphenyl, naphthyl, and the like. Exemplary alkaryl radicals are tolyl, xylyl, ethylphenyl, and the like. Exemplary aryl radicals are benzyl, α-phenylethyl, β-phenylethyl, α-phenylbutyl, and the like. Exemplary cycloalkyl radicals are cyclobutyl, cyclopentyl, cyclohexyl, and the like. Exemplary halogenated hydrocarbon radicals are chloromethyl, bromoethyl, tetrafluoroethyl, fluoroethyl, trifluoroethyl, trifluorotolyl, hexafluoroxylyl, and the like.

In a preferred embodiment, the permeability agent may be a substituted polymethylsiloxane wherein at least one substituent is a functional group selected from the group consisting of methyl, phenyl, amino, other alkyl, carboxyl, hydroxyl, ether, polyether, aldehyde, ketone, amide, ester, thiol, and mixtures thereof. Particularly preferred for use herein is polydimethylsiloxane.

Viscosity of polysiloxanes useful for the present invention may vary as widely as the viscosity of polysiloxanes in general vary, so long as the polysiloxane is flowable or can be made to be flowable for application to the absorbent article. This includes, but is not limited to, viscosity as low as 5 centistokes (at 37° C. as measured by a glass viscometer) to about 20,000,000 centistokes. Preferably the polysiloxanes have a viscosity at 37° C. ranging from about 5 to about 5,000 centistokes, more preferably from about 5 to about 2,000 centistokes, most preferably from about 100 to about 1000 centistokes. High viscosity polysiloxanes which themselves are resistant to flowing can be effectively deposited upon the absorbent articles by such methods as, for example, emulsifying the polysiloxane in surfactant or providing the polysiloxane in solution with the aid of a solvent, such as hexane, listed for exemplary purposes only.

Particularly suitable for use as permeability agents in the compositions of the present invention are polysiloxane compounds having long linear alkyl groups or phenyl groups, including phenyl-functional polymethylsiloxane compounds (e.g., Dow Corning 556 Cosmetic-Grade Fluid: polyphenylmethyl siloxane) and cetyl or stearyl functionalized dimethicones such as Dow 2502 and Dow 2503 polysiloxane waxes, respectively. In addition to such substitution with phenyl-functional or alkyl groups, effective substitution may be made with amino, carboxyl, hydroxyl, ether, polyether, aldehyde, ketone, amide, ester, and thiol groups. Of these effective substituent groups, the family of groups comprising phenyl, amino, alkyl, carboxyl, and hydroxyl groups are more preferred than the others; and phenyl-functional groups are most preferred. Other preferred polysiloxane compounds for use in the present invention are disclosed in U.S. Pat. No. 5,059,282 (Ampulski et al), issued Oct. 22, 1991, which is incorporated herein by reference.

Nonlimiting examples of phospholipids suitable for use herein as permeability agents include a material selected from the group consisting of lecithin, cephalin, phosphatidylserine, phosphatidylinositol, phosphatidic acid, sphingomyelin, and mixtures thereof. Lecithin is available in its pure form or in mixtures with oils and other components

(from American Lecithin, Oxford, Conn.). Soy lecithin and egg lecithin are mixtures containing lecithin and are also suitable for use herein.

The amount of permeability agent included in the composition will depend on a variety of factors, including the particular emollients and/or immobilizing agents involved, the skin benefits desired, the other components, if any, in the composition (e.g., skin care actives), and like factors. The permeability agent will comprise from about 1 to about 95 wt % of the skin care composition. Preferably, the permeability agent will comprise from about 5 to about 75 wt %, and more preferably from about 5 to about 50 wt %, of the skin care composition.

C. Immobilizing Agents

Another optional, preferred component of the skin care compositions useful in the present invention is an agent capable of immobilizing the skin care composition in the desired location in or on the treated article. Because certain of the preferred emollients in the composition have a plastic or liquid consistency at 20° C., they tend to flow or migrate, even when subjected to modest shear. When applied to a wearer-contacting surface or other location of an absorbent article, especially in a melted or molten state, the emollient will not remain primarily in or on the treated region. Instead, the emollient will tend to migrate and flow to undesired regions of the article and adversely affect the absorbency of the article.

Specifically, if the emollient migrates into the interior of the article, it can cause undesired effects on the absorbency of the article core due to the hydrophobic characteristics of many of the emollients and other skin conditioning agents used in the compositions useful in the methods of the present invention. It also means that much more emollient has to be applied to the article to get the desired skin smoothness benefits. Increasing the level of emollient not only increases the cost, but also exacerbates the undesirable effect on the absorbency of the article's core and undesired transfer of composition during processing/converting of the treated articles.

The immobilizing agent counteracts this tendency of the emollient to migrate or flow by keeping the emollient primarily localized on the surface or in the region of the article to which the composition is applied. This is believed to be due, in part, to the fact that the immobilizing agent raises the melting point and/or viscosity of the composition above that of the emollient. Since the immobilizing agent is preferably miscible with the emollient (or solubilized in the emollient with the aid of an appropriate emulsifier or dispersed therein), it entraps the emollient on the surface of the article's wearer-contacting surface or in the region to which it is applied.

In addition to being miscible with (or solubilized in) the emollient, the immobilizing agent preferably has a melting profile that will provide a composition that is solid or semisolid at room temperature. In this regard, preferred immobilizing agents will have a melting point of at least about 35° C. This is so the immobilizing agent itself will not have a tendency to migrate or flow. Preferred immobilizing agents will have melting points of at least about 40° C. Typically, the immobilizing agent will have a melting point in the range of from about 50° to about 150° C.

It is also advantageous to microscopically "lock or entrap" the emollient in the immobilizing agent on the wearer-contacting surface or the region of the article to which the composition is applied. This can be accomplished by using immobilizing agents which tend to form fine crystals or have high crystallinity. Upon cooling, the immo-

bilizing agent forms multiple seeds or nuclei, from which the crystalline structures grow, and entrap the emollients. In addition, outside cooling of the treated article via blowers, fans, cold rolls, etc. can speed up crystallization rate of the immobilizing agent. In this approach, the faster cooling or crystallization rate may be sufficient to overcome the tendency of the components to separate or segregate and to "lock-in" the composition in a substantially homogeneous mixture (i.e., immiscible components can still provide a substantially homogeneous skin care composition suitable for use in the present invention).

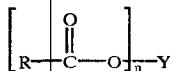
Preferred immobilizing agents will comprise a member selected from the group consisting of C₁₄-C₂₂ fatty alcohols, C₁₂-C₂₂ fatty acids, and C₁₂-C₂₂ fatty alcohol ethoxylates having an average degree of ethoxylation ranging from 2 to about 30, and mixtures thereof. Preferred immobilizing agents include C₁₆-C₂₂ fatty alcohols, most preferably crystalline high melting materials selected from the group consisting of cetyl alcohol, stearyl alcohol, behenyl alcohol, and mixtures thereof. (The linear structure of these materials can speed up solidification on the treated absorbent article.) Cetearyl alcohol (a mixtures of cetyl alcohol and stearyl alcohol) and behenyl alcohol are particularly preferred. Other preferred immobilizing agents include C₁₆-C₂₂ fatty acids, most preferably selected from the group consisting of palmitic acid, stearic acid, and mixtures thereof. Mixtures of palmitic acid and stearic acid are particularly preferred. Still other preferred immobilizing agents include C₁₆-C₂₂ fatty alcohol ethoxylates having an average degree of ethoxylation ranging from about 5 to about 20. Preferably, the fatty alcohols, fatty acids and fatty alcohols are linear. Importantly, these preferred immobilizing agents such as the C₁₆-C₂₂ fatty alcohols increase the rate of crystallization of the composition causing the composition to crystallize rapidly onto the surface of the substrate.

Other suitable immobilizing agents that may be used herein include alpha-hydroxy fatty acids and fatty acids having from about 10 to about 40 carbons include 12-hydroxystearic acid, 12-hydroxylauric acid, 16-hydroxyhexadecanoic acid, behenic acid, stearic acid, palmitic acid, oleic acid, linoleic acid, myristic acid, ricinoleic acid, eurcic acid, lauric acid, isostearic acid, and mixtures thereof. Nonlimiting examples of suitable fatty acids are further described in U.S. Pat. No. 5,429,816, issued to Hofrichter et al. on Jul. 4, 1995, and U.S. Pat. No. 5,552,136, issued to Motley on Sep. 3, 1996, disclosure of each is herein incorporated by reference.

Other suitable immobilizing agents are "solid" polyol polyesters having a plastic or solid consistency at or below body temperature (i.e. about 37° C.), and liquid and solid polyol polyester blends that are solid or semi-solid at room temperature. Examples of suitable polyol polyesters for use as immobilizing agents herein are described in U.S. Pat. No. 5,607,760, issued to Roe on Mar. 4, 1997, which is incorporated herein by reference.

Other suitable immobilizing agents that may be used herein include "solid" glyceryl esters (i.e., plastic or solid at or below skin temperature), particularly glyceryl esters having C8-C30 fatty acid chains. Nonlimiting examples of glyceryl esters include glyceryl monoesters, preferably glyceryl monoesters of C16-C22 saturated, unsaturated and branched chain fatty acids such as glyceryl oleate, glyceryl stearate, glyceryl palmitate, glyceryl behenate, and mixtures thereof; and polyglyceryl esters of C16-C22 saturated, unsaturated and branched chain fatty acids, such as polyglyceryl-4 isostearate, polyglyceryl-3 oleate, diglyceryl monooleate, tetraglyceryl monooleate and mixtures thereof.

Other suitable immobilizing agents that may be used herein include polyhydroxy fatty acid esters, polyhydroxy fatty acid amides, and mixtures thereof. Preferred esters and amides will have three or more free hydroxy groups on the polyhydroxy moiety and are typically nonionic in character. Because of the possible skin sensitivity of those using articles to which the composition is applied, these esters and amides should also be relatively mild and non-irritating to the skin. Suitable polyhydroxy fatty acid esters for use in the present invention will have the formula:



wherein R is a C₅-C₃₁ hydrocarbyl group, preferably straight chain C₇-C₁₉ alkyl or alkenyl, more preferably straight chain C₉-C₁₇ alkyl or alkenyl, most preferably straight chain C₁₁-C₁₇ alkyl or alkenyl, or mixture thereof; Y is a polyhydroxyhydrocarbyl moiety having a hydrocarbyl chain with at least 2 free hydroxyls directly connected to the chain; and n is at least 1. Suitable Y groups can be derived from polyols such as glycerol, pentaerythritol; sugars such as raffinose, maltodextrose, galactose, sucrose, glucose, xylose, fructose, maltose, lactose, mannose and erythrose; sugar alcohols such as erythritol, xylitol, malitol, mannitol and sorbitol; and anhydrides of sugar alcohols such as sorbitan.

One class of suitable polyhydroxy fatty acid esters for use as immobilizing agents in the present invention comprises certain sorbitan esters, preferably the sorbitan esters of C₁₆-C₂₂ saturated fatty acids. Because of the manner in which they are typically manufactured, these sorbitan esters usually comprise mixtures of mono-, di-, tri-, etc. esters. Representative examples of suitable sorbitan esters include sorbitan palmitates (e.g., SPAN 40), sorbitan stearates (e.g., SPAN 60), and sorbitan behenates, that comprise one or more of the mono-, di- and tri-ester versions of these sorbitan esters, e.g., sorbitan mono-, di- and tri-palmitate, sorbitan mono-, di- and tri-stearate, sorbitan mono-, di and tri-behenate, as well as mixed tallow fatty acid sorbitan mono-, di- and tri-esters. Mixtures of different sorbitan esters can also be used, such as sorbitan palmitates with sorbitan stearates. Particularly preferred sorbitan esters are the sorbitan stearates, typically as a mixture of mono-, di- and tri-esters (plus some tetraester) such as SPAN 60, and sorbitan stearates sold under the trade name GLYCOMUL-S by Lonza, Inc. Although these sorbitan esters typically contain mixtures of mono-, di- and tri-esters, plus some tetraester, the mono- and di-esters are usually the predominant species in these mixtures.

Another class of suitable polyhydroxy fatty acid esters for use in the present invention comprises certain glyceryl monoesters, preferably glyceryl monoesters of C₁₆-C₂₂ saturated fatty acids such as glyceryl monostearate, glyceryl monopalmitate, and glyceryl monobehenate. Again, like the sorbitan esters, glyceryl monoester mixtures will typically contain some di- and triester. However, such mixtures should contain predominantly the glyceryl monoester species to be useful in the present invention.

Another class of suitable polyhydroxy fatty acid esters for use as immobilizing agents in the present invention comprise certain sucrose fatty acid esters, preferably the C₁₂-C₂₂ saturated fatty acid esters of sucrose. Sucrose monoesters and diesters are particularly preferred and include sucrose mono- and di-stearate and sucrose mono- and di-laurate.

Suitable polyhydroxy fatty acid amides for use in the present invention will have the formula:



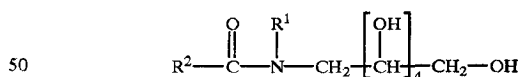
wherein R¹ is H, C₁-C₄ hydrocarbyl, 2-hydroxyethyl, 2-hydroxypropyl, methoxyethyl, methoxypropyl or a mixture thereof, preferably C₁-C₄ alkyl, methoxyethyl or methoxypropyl, more preferably C₁ or C₂ alkyl or methoxypropyl, most preferably C₁ alkyl (i.e., methyl) or methoxypropyl; and R² is a C₅-C₃₁ hydrocarbyl group, preferably straight chain C₇-C₁₉ alkyl or alkenyl, more preferably straight chain C₉-C₁₇ alkyl or alkenyl, most preferably straight chain C₁₁-C₁₇ alkyl or alkenyl, or mixture thereof; and Z is a polyhydroxyhydrocarbyl moiety having a linear hydrocarbyl chain with at least 3 hydroxyls directly connected to the chain. See U.S. Pat. No. 5,174, 927 to Honsa, issued Dec. 29, 1992 (herein incorporated by reference) which discloses these polyhydroxy fatty acid amides, as well as their preparation.

The Z moiety preferably will be derived from a reducing sugar in a reductive amination reaction; most preferably glycyl. Suitable reducing sugars include glucose, fructose, maltose, lactose, galactose, mannose, and xylose. High dextrose corn syrup, high fructose corn syrup, and high maltose corn syrup can be utilized, as well as the individual sugars listed above. These corn syrups can yield mixtures of sugar components for the Z moiety.

The Z moiety preferably will be selected from the group consisting of —CH₂—(CHOH)_n—CH₂OH, —CH(CH₂OH)—[(CHOH)_{n-1}—CH₂OH], —CH₂OH—CH₂—(CHOH)₂—(CHOR³)(CHOH)—CH₂OH, where n is an integer from 3 to 5, and R³ is H or a cyclic or aliphatic monosaccharide. Most preferred are the glycyls where n is 4, particularly —CH₂—(CHOH)₄—CH₂OH.

In the above formula, R¹ can be, for example, N-methyl, N-ethyl, N-propyl, N-isopropyl, N-butyl, N-2-hydroxyethyl, N-methoxypropyl or N-2-hydroxypropyl. R² can be selected to provide, for example, cocamides, stearamides, oleamides, lauramides, myristamides, capricamides, palmitamides, tallowamides, etc. The Z moiety can be 1-deoxyglucityl, 2-deoxyfructityl, 1-deoxymaltityl, 1-deoxylactityl, 1-deoxygalactityl, 1-deoxymannityl, 1-deoxymaltotriosityl, etc.

The most preferred polyhydroxy fatty acid amides have the general formula:



wherein R¹ is methyl or methoxypropyl; R² is a C₁₁-C₁₇ straight-chain alkyl or alkenyl group. These include N-lauryl-N-methyl glucamide, N-lauryl-N-methoxypropyl glucamide, N-cocoyl-N-methyl glucamide, N-cocoyl-N-methoxypropyl glucamide, N-palmityl-N-methoxypropyl glucamide, N-tallowyl-N-methyl glucamide, or N-tallowyl-N-methoxypropyl glucamide.

As previously noted, some of the immobilizing agents may require an emulsifier for solubilization in the emollient. This is particularly the case for certain of the glucamides such as the N-alkyl-N-methoxypropyl glucamides having hydrophilic lipophilic balance (HLB) values of at least about 7. Suitable emulsifiers will typically include those having HLB values below about 7. In this regard, the sorbitan esters previously described, such as the sorbitan stearates, having

HLB values of about 4.9 or less have been found useful in solubilizing these glucamide immobilizing agents in petrolatum. Other suitable emulsifiers include steareth-2 (polyethylene glycol ethers of stearyl alcohol that conform to the formula $\text{CH}_3(\text{CH}_2)_{17}(\text{OCH}_2\text{CH}_2)_n\text{OH}$, where n has an average value of 2), sorbitan tristearate, isosorbide laurate, and glyceryl monostearate. The emulsifier can be included in an amount sufficient to solubilize the immobilizing agent in the emollient such that a substantially uniform mixture is obtained. For example, an approximately 1:1 mixture of N-cocoyl-N-methyl glucamide and petrolatum that will normally not melt into a single phase mixture, will melt into a single phase mixture upon the addition of 20% of a 1:1 mixture of Steareth-2 and sorbitan tristearate as the emulsifier.

Other types of ingredients that can be used as immobilizing agents, either alone, or in combination with the above-mentioned immobilizing agents, include waxes such as carnauba, ozokerite, beeswax, candelilla, paraffin, ceresin, esparto, ouricuri, rezowax, isoparaffin, and other known mined and mineral waxes. The high melt point of these materials can help immobilize the composition on the desired surface or location on the article. Additionally microcrystalline waxes are effective immobilizing agents. Microcrystalline waxes can aid in "locking" up low molecular weight hydrocarbons within the skin care composition. Preferably the wax is a paraffin wax. An example of a particularly preferred alternate immobilizing agent is a paraffin wax such as Paraffin S.P. 434 from Strahl and Pitsch Inc., West Babylon, N.Y. Synthetic waxes such as those derived from polyethylene may also be used herein.

Certain polyol polyesters are also suitable for use as immobilizing agents herein, particularly the higher melting polyol polyesters which are solid or semi-solid at room temperature. Examples of solid or semi-solid polyol polyesters are described in Other suitable polyol polyesters are disclosed in U.S. Pat. No. 5,607,760, issued to Roe on Mar. 4, 1997, the disclosure of which is incorporated herein by reference.

The amount of the optional immobilizing agent that can be included in the composition will depend on a variety of factors, including the emollients and permeability agents involved, the particular immobilizing agent involved, if any, the other components in the composition (e.g., skin care actives), whether an emulsifier is required to solubilize the immobilizing agent in the other components, and like factors. When present, the composition will typically comprise from about 5 to about 95% of the immobilizing agent. Preferably, the composition will comprise from about 5 to about 50%, most preferably from about 10 to about 40%, of the immobilizing agent.

D. Other Optional Components

Compositions can comprise other components typically present in emulsions, creams, ointment, lotions, suspensions, etc. of this type. These components include water, surfactants, emulsifiers, skin care agents, humectants, anti-oxidants, viscosity modifiers, suspending agents, pH buffering systems, disinfectants, antibacterial actives, antiviral agents, vitamins, pharmaceutical actives, film formers, perfumes, soothing agents, pigments, deodorants, opacifiers, astringents, solvents, preservatives, and the like. All of these materials are well known in the art as additives for such formulations and can be employed in appropriate amounts in the compositions for use herein.

Depending on the skin condition to be treated, humectants may be included in the skin care compositions. Humectant is a type of moisturizing emollient which attracts moisture

from the surrounding atmosphere and enhance water absorption of the stratum corneum (i.e., the outer, corny layer of the skin). Nonlimiting examples of humectants useful herein include glycerin; C2-C6 glycols, such as ethylene glycol, propylene glycol, butylene glycol, hexylene glycol; polyethylene glycols (PEGs), such as PEG-2, PEG-3, PEG-30, and PEG-50; polypropylene glycols (PPGs), such as PPG-9, PPG-12, PPG-15, PPG-17, PPG-20, PPG-26, PPG-30, and PPG-34; glycolic esters and ethers, such as C4-C20 alkyl ether of PEG or PPG, C1-C20 carboxylic acid esters of PEG or PPG, di-C8-C30 alkyl ethers of PEG or PPG; sorbitols and sorbitol esters, trihydroxystearin; polyhydric alcohols; other ethoxylated derivatives of lipids; and the like.

Oxidation of unsaturated carbons in substances, such as cellulose derivatives, proteins, lecithin and unsaturated hydrocarbons, may lead to rancidity of the skin care composition. Anti-oxidants can be added to minimize or prevent the oxidation process, which enhances the shelf life of the composition. Anti-oxidants useful herein should preferably be mild and non-irritating. Anti-oxidants from natural sources are preferred, such as Vitamin E and derivatives, including tocopherol, tocopherol acetate, mixed tocopherols (available as COVI-OX T-50 or T-70 from Henkel Corp, Ambler, Pa.), and the like.

Safe and effective skin care agents may be incorporated in the skin care composition for use herein. Such materials include Category I and Category III actives as defined by the U.S. Food and Drug Administration's (FDA) Tentative Final Monograph on Skin Protectant Drug Products for Over-the-Counter Human Use (21 C.F.R. § 347). These monographed materials are known to provide multiple skin benefits, such as skin protection, itch prevention, irritation prevention, via various mechanisms. It will be recognized that several of the monographed actives listed below are "emollients" as defined herein. Category I actives presently include: allantoin, aluminum hydroxide gel, calamine, cocoa butter, dimethicone, cod liver oil (in combination), glycerine, kaolin, petrolatum, lanolin, mineral oil, shark liver oil, white petrolatum, talc, topical starch, zinc acetate, zinc carbonate, zinc oxide, and the like. Category III actives presently include: live yeast cell derivatives, aldioxa, aluminum acetate, microporous cellulose, cholecalciferol, colloidal oatmeal, cysteine hydrochloride, dexpanthenol, Peruvian balsam oil, protein hydrolysates, racemic methionine, sodium bicarbonate, Vitamin A, and the like. These monographed materials are known to provide multiple skin benefits, such as skin protectant, itch prevention, irritation prevention, via various mechanisms.

Other skin care agents are suitable for the present invention may include, but are not limited to, pH control agents or proton donating agents, protease inhibitors, enzyme inhibitors, chelating agents, anti-microbials, skin soothing agents and the like. Some nonlimiting examples of these skin care agents are described in co-pending U.S. application Ser. No. 09/041,509, by McOsker et al. filed on Mar. 12, 1998; U.S. application Ser. No. 09/041,232, by Rourke et al. filed on Mar. 12, 1998; U.S. application Ser. No. 09/041,266, by Roe et al. and U.S. application Ser. No. 09/041,196, by Underiner et al., both filed on Mar. 12, 1998; Patent Application EP 97/120,699 and EP 97/120,700 both by Polumbo et al. and filed on Nov. 26, 1997; U.S. Pat. No. 5,091,193 issued to Enjolras et al. on Feb. 25, 1992; U.S. Pat. No. 4,556,560 issued to Buckingham on Dec. 3, 1985; U.S. Pat. No. 5,376,655 issued to Imaki et al. on Dec. 27, 1994; U.S. Pat. No. 5,091,193 issued to Enjolras et al. on Feb. 25, 1992; U.S. Pat. No. 3,935,862 issued to Kraskin on Feb. 3, 1976;

openings, reducing the ability of the topsheet to transmit liquid to the underlying absorbent core. Also, saturation of the topsheet is not required to obtain the skin care benefits. Similarly, saturation of other treated article components may not be necessary or desired to transfer sufficient composition for desired skin benefits. Particularly suitable application methods will apply the composition primarily to the outer surface of the topsheet of the article.

The minimum level of the composition to be applied to the article's wearer-contacting surface is an amount effective for providing the appearance, protective and/or skin conditioning benefits when the composition is delivered to the skin of the wearer pursuant to the present invention. The level of composition applied will depend on various factors, including the article component treated, the relative amount of surface area of the wearer-contacting surface not treated with the composition, the content of the composition and the like. In general, the composition is applied to the article in an amount ranging from about 0.05 mg/in² (0.0078 mg/cm²) to about 100 mg/in² (15.6 mg/cm²), preferably from about 0.1 mg/in² (0.016 mg/cm²) to about 50 mg/in² (7.8 mg/cm²), more preferably from about 1 mg/in² (0.156 mg/cm²) to about 25 mg/in² (3.9 mg/cm²). It is recognized that the skin care compositions are relatively hydrophobic and to be applied to the topsheet of the article without covering the entire topsheet surface. It will be recognized that higher levels of skin care composition may be applied to other article components where fluid handling properties are not impacted (e.g., cuffs, waist band, side panels, etc.). It will also be recognized that for compositions that are relatively hydrophilic, higher add-on levels or complete coverage may be used on the topsheet without adversely impacting liquid handling properties to an unacceptable degree. Conversely, higher levels of a hydrophilic composition may be undesired when applied to components (e.g., cuff, waist) other than the topsheet, to avoid wicking of exudates to the edges of the article which may result in leakage.

Because the composition is preferably substantially immobilized on the surface of the region treated, relatively small amounts of composition are needed to deliver an effective amount of the active. It is believed that the ability to use low levels to impart the desired skin benefits is due to the fact that the composition is continuously, automatically delivered as articles are worn. As indicated, the ability to use relatively low levels of skin care composition, allows the topsheet of the article to maintain its liquid transfer properties in the liquid discharge region.

The skin care composition containing a active can be applied nonuniformly to the wearer-contacting surface of the article. By "nonuniform" it is meant that the amount, location, pattern of distribution, etc. of the composition can vary over the wearer-contacting surface, and may further vary over specific regions of the article. For example, to maintain the liquid handling performance of the topsheet, it may be desired to apply the composition nonuniformly to the topsheet, particularly if the composition is hydrophobic in nature. In this regard, some portions of the treated surface of the article (and regions thereof) can have greater or lesser amounts of composition, including portions of the surface that do not have any composition on it. When the composition is relatively hydrophobic, in one such preferred embodiment the surface of the topsheet will have regions where no composition is applied, particularly in areas of the topsheet that correspond to the crotch region of the article. As used herein, the crotch region of the article is the rectangle, defined below, that is centered longitudinally and laterally about the article's crotch point. The "crotch point"

is determined by placing the article on a wearer in a standing position and then placing an extensible filament around the legs in a figure eight configuration. The point in the article corresponding to the point of intersection of the filament is deemed to be the crotch point of the article. (It is understood that the crotch point is determined by placing the absorbent article on a wearer in the intended manner and determining where the crossed filament would contact the article.) With regard to incontinence devices (e.g., diapers, training pants, adult incontinent articles), the length of the crotch region corresponds to 40% of the absorbent article's total length (i.e., in the y-dimension). With regard sanitary napkins, the length of the crotch region corresponds to 80% of the absorbent article's total length. The width of the crotch region is equivalent to the width of the widest absorbent core component as measured at the crotch point. (As used herein, "absorbent core" components are those materials involved with acquiring, transporting, distributing and/or storing body liquids. As such, the term absorbent core does not include the topsheet or backsheet of the absorbent article.) By way of illustration, for an incontinence article having a length of 20 in. and a core width at the crotch point of 4 in., the crotch region is the rectangle, centered on the crotch point, having a length of 8 in. and a width of 4 in.

Surprisingly, while the topsheet or other components comprising the skin care composition are treated nonuniformly (e.g., microscopic or macroscopic regions where no composition is applied), during wear of the article, the composition is transferred to the wearer even in regions of the skin corresponding to untreated regions within the topsheet or other components. The amount and uniformity of composition transferred to the skin is believed to depend on several factors, including, for example, application pattern of the skin care composition, contact of the wearer's skin to the treated article surface, friction created during wear time between the wearer's skin and the treated region, warmth generated from wearer to enhance the transfer of the composition, the properties of the composition, the materials which constitute the composition, and the like.

Where the composition is applied nonuniformly, any pattern may be utilized, including, for example, application of small droplets (obtained via, e.g., spraying) discrete dots (obtained via, e.g., gravure printing), stripes that run in the longitudinal or lateral direction of the article (obtained via contact slot coating), spirals that run in the longitudinal or lateral direction, etc., patterned prints, etc. In those embodiments where the topsheet comprises discrete, untreated regions, the percent open area of the region of the topsheet that corresponds to the crotch region of the article can vary widely. (As referred to herein, the "percent open area" of the topsheet is determined by (i) measuring the surface area of the topsheet that overlies the crotch region, (ii) measuring the total surface area of the untreated region(s) in this portion of the topsheet and (iii) dividing the measurement in (ii) by the measurement in (i). As used herein, "untreated" means a region of the topsheet having less than about 0.01 mg/in² (0.0016 mg/cm²) of the composition. In this regard, the percent open area may be from about 1% to about 99%, from about 5% to about 95%, from about 10% to about 90%, from about 15% to about 85%, from about 20% to about 80%, from about 25% to about 75%, from about 30% to about 70%, or from about 35% to about 65%. The percent open area required to achieve the desired composition effect and the desired liquid handling properties of the topsheet will be dictated largely by the characteristics of the composition (in particular the contents of the composition and the relative hydrophobicity/hydrophilicity properties). One

skilled in the art will appreciate that the desired percent open area will be readily determined through routine experimentation.

In general, with compositions that are relatively hydrophobic and are to be applied such that regions of the topsheet are not coated with the composition, the composition is preferably applied to the article topsheet in an amount ranging from about 0.05 mg/in² (0.0078 mg/cm²) to about 100 mg/in² (15.6 mg/cm²), preferably from about 0.1 mg/in² (0.016 mg/cm²) to about 50 mg/in² (7.8 mg/cm²), more preferably from about 1 mg/in² (0.156 mg/cm²) to about 25 mg/in² (3.9 mg/cm²). It will be recognized that for compositions that are relatively hydrophilic, higher add-on levels may be used without adversely impacting liquid handling properties of the topsheet to an unacceptable degree. Of course, for articles having relatively high percent open areas in the crotch, greater add-on levels may be obtainable without adversely affecting liquid handling by the topsheet.

In one preferred embodiment of the present invention, the topsheet of the articles utilized will comprise stripes of the skin care composition that run in the article's longitudinal direction. These longitudinal stripes (or spirals) are separated by longitudinal stripes where little or no skin care composition is applied to the topsheet. In these embodiments, each stripe of composition will typically have a width of from about 0.1 in. to about 0.75 in., more typically from about 0.1 in. to about 0.5 in., and the width of the stripes containing no composition will typically be from about 0.1 in. to about 1 in., more typically from about 0.15 to about 0.5 in. These ranges are applicable to typical infant diaper designs. For larger products such as adult incontinent products, these ranges may be higher.

Skin care composition can also be applied in nonuniform patterns on other article components. In these cases, the open area is calculated by the rectangle defined by the perimeters of the skin care composition.

The composition can be applied to the article at any point during assembly. For example, the composition can be applied to the finished disposable absorbent product before it has been packaged. The composition can also be applied to a given component (e.g., topsheet, cuffs, sides, waist, etc.), at the converting site or by the material supplier, before it is combined with the other raw materials to form a finished disposable absorbent product. Again, the composition can be applied to other zones of the article such that the composition will migrate to one or more wearer-contacting surfaces during use.

The composition is typically applied from a melt thereof to the article. In a preferred embodiment, the composition fully melts at a temperature significantly above room temperature, it is usually applied as a heated composition to the article. Typically, the composition is heated to a temperature in the range from about 35° C. to about 150° C., preferably from 40° C. to about 100° C., prior to being applied to the article. Any skin care active ingredients may be added to the composition prior to or after heating. Special care should be taken when heat-sensitive ingredients are used, for example, protease inhibitors or enzyme inhibitors. If added prior to heating, the temperature to which the composition is heated is selected so as not to denature the inhibitors. Alternatively, the inhibitors may be added to the pre-heated composition when it has cooled to a temperature that does not affect the inhibitors but is still sufficiently liquid to be applied to the article. Once the melted composition has been applied to the article, it is allowed to cool and solidify. Preferably, the application process is designed to aid in the cooling/set up of the composition.

In applying compositions to the articles, contact slot coating, spraying, gravure coating, extrusion coating methods are preferred. One such method involves slot coating of the composition on the topsheet of the article, either before or after the topsheet is assembled with the other raw materials into a finished absorbent article.

FIG. 2 illustrates a preferred method involving continuous or intermittent contact slot coating of the skin care composition onto a diaper topsheet and/or leg cuffs during the converting operation. Referring to FIG. 2, conveyor belt 1 advances in the direction shown by the arrows on turning rolls 3 and 4 and becomes returning conveyor belt 2. Conveyor belt 1 carries non-lotioned diaper 5 to contact slot coating station 6 where the topsheet and/or cuffs patch 7 is coated with a hot, molten (e.g., 170° F. or 77° C.) skin care composition. After leaving slot coating station 6, non-lotioned diaper 5 becomes lotioned diaper 8. The amount of skin care composition transferred to patch 7 is controlled by: (1) the rate at which the molten skin care composition is applied from contact slot coating station 6; and/or (2) the speed at which conveyor belt 1 travels under slot coating station 6.

FIG. 3 illustrates an alternate preferred method involving contact slot coating of the skin care composition on the diaper topsheet and/or cuffs before the topsheet and/or cuffs are assembled with other raw materials into a finished product. Referring to FIG. 3, a nonwoven web 21 is unwound from parent roll 22 (rotating in the direction indicated by arrow 22a) and advanced to the contact slot coating station 26 where one side of the web is coated with a hot, molten (e.g., 170° F. or 77° C.) skin care composition. After leaving slot coating station 26, nonwoven web 21 becomes a lotioned web indicated by 23. Lotioned web 23 is then advanced around turning roll 24 and turning roll 28, and then wound up on parent roll 20 (rotating in the direction indicated by arrow 20a).

VI. Test Methods

A. Water Vapor Transmission Rate

The Water Vapor Transmission Rate (WVTR) determines the rate of water evaporation through a collagen film treated with a skin care composition on one side. As indicated hereunder, it is a measure of the "breathability" of the skin care composition when the composition is coated on the skin.

Collagen film with a basis weight of 28 gm/m² (under the designation COFFI, available from Naurin GmbH, Weinheim, Germany, or from Brechteen Company, Chesterfield, Mich.) is used for this test. The collagen film is equilibrated in a controlled environment (72+/-3° F. and 40+/-10% Relative Humidity) for at least 16 hours prior to testing. A sample of about 50 cm² is cut from the collagen film and weighed. Sample cutting devices, such as scissors or sample puncher, may be used. Rubber gloves or finger cots are worn when handling the collagen film.

A skin care composition is applied to the collagen film on one side only. Where the collagen film is textured, the composition is applied to the smoother side only. The composition is applied uniformly till the desired loading level is achieved (e.g., around 1.0 mg/cm²). The coated collagen film is weighed and loading level of the skin care composition is determined.

About 10 milliliter of distilled water is added to a suitable reservoir, such as a Fisher Permeability Cup (available from Fisher Scientific, Pittsburgh, Pa.). The coated collagen film is placed over the opening of the reservoir, with the com-

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United States Patent

[11] 3,585,998

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[21] Appl. No. **717,258**
[22] Filed **Mar. 29, 1968**
[45] Patented **June 22, 1971**
[73] Assignee **The National Cash Register Company**
Dayton, Ohio

[54] **DISPOSABLE DIAPER WITH RUPTURABLE CAPSULES**
2 Claims, 6 Drawing Figs.

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[51] Int. Cl. A61F 13/16
[50] Field of Search 128/156,
260, 261, 268, 284-285, 287, 290, 296; 424/16,
19, 28

[56] **References Cited**
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ABSTRACT: This invention is directed to disposable baby diapers and baby diaper liners, viz., disposable baby diaper components containing encapsulated baby oil.



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FIG. 1

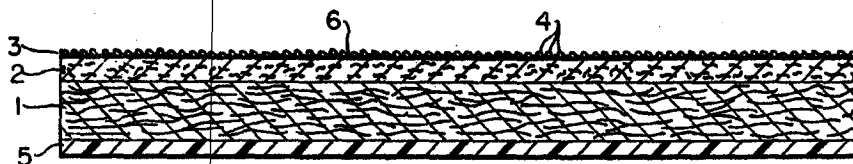


FIG. 2

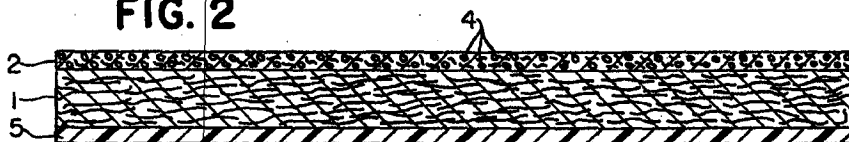


FIG. 3



FIG. 4



FIG. 5



FIG. 6



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DISPOSABLE DIAPER WITH RUPTURABLE CAPSULES

For some time it has been considered desirable to incorporate baby oil into disposable fibrous, esp., absorbent paper, baby diapers. While some conventional prior art absorbent paper baby diapers can be provided with minor amounts of solids, e.g., disinfectants, deodorants, etc.; it has been difficult to incorporate liquids into such baby products. The reason for this is that the liquid tends to be degraded upon exposure to the atmosphere; and when liquid baby oil is incorporated as a liquid onto these porous paper diapers, the oil frequently spoils not only resulting in discoloration but also generating unpleasant odors in such paper diapers. Another objection to direct liquid incorporation is that it tends to restrict the porosity and softness of the baby diaper and make it oily and unpleasant rather than porous and fluffy. Consequently, no satisfactory way has been arrived at prior to the present invention to actually incorporate liquid baby oil formulations into disposable porous absorbent paper diapers.

The present invention incorporates encapsulated liquid baby oil formulations into or coated onto the absorbent, porous, fibrous disposable diapers or diaper liners and in large part overcomes the previously mentioned prior art problems. The baby oil, being encapsulated with a readily pressure rupturable cell wall material, is provided in a condition whereby it is protected from the degradative influences of air until the time it is desired to be used. Consequently, the encapsulated baby oil formulations when incorporated on and/or into the absorbent fibrous, e.g., paper, diapers are present in a condition having a much longer shelf life. Each individual capsule constitutes a generally spherically shaped container having an external phase, viz., cell wall material, and a liquid internal phase, viz., baby oil formulation. Moreover, since the capsules do not significantly alter the soft and porous structure of the paper absorbent diaper core, the overall porosity of the disposable paper diaper is not deleteriously altered from that of articles containing no encapsulated baby oil.

Six typical diaper or diaper liner structures embodying the present invention will be discussed below in conjunction with FIGS. 1 to 6 of the accompanying drawings.

FIGS. 1 to 6 of the drawings are cross-sectional views of various disposable diaper and diaper liner structures incorporating the present invention.

In FIG. 1 there is shown a disposable paper diaper comprised of a centrally located disposable porous, absorbent paper or other fibrous core 1 having moisture-permeable, woven or nonwoven fibrous interior liner 2 (closest liner to the baby's skin) on the outer surface which are located a layer 3 of an array of profusion of pressure-rupturable capsules 4 containing baby oil formulation. An optional moisture-impermeable exterior liner 5 can be used to retain most of the moisture in the core section. A flexible coating binder 6, which is optional, e.g., polyethylene, polyvinyl chloride, etc., can be present to aid in adhering the capsules to the upper portion of the interior liner and providing a partial retaining matrix therefor.

FIG. 2 depicts a similar diaper but wherein the baby oil-containing capsules are located predominantly within the matrix provided by the interior liner, e.g., by inclusion of the capsules on a uniform distribution basis during formation of said liner. The diaper structure of FIG. 2 possesses an additional advantage over that of FIG. 1, viz., it virtually eliminates any source of local irritation due to capsule chaff (broken pieces of capsule cell wall) due to the fact that said chaff is substantially softened and retained by the interior liner which serves as a retaining matrix.

Alternative ways to accomplish this are shown in FIGS. 3 and 6. In FIG. 3 the capsules are located between the interior liner (optional) and the core section with the interior liner protecting against capsule chaff irritation. In the structure of FIG. 6 the baby oil-containing capsules 4 are located predominantly within the upper region of the core 1, e.g., by addition

of the capsules during formation of the upper portion of the core section, e.g., using the basic procedure of South African Pat. No. 63/231. Hence the upper core region acts as a capsule chaff softening and retaining matrix in a manner very similar to interior liner 2 shown in FIG. 2. The capsule-containing core structures as shown in FIG. 6 can be used with or without interior and/or exterior liners.

FIG. 4 illustrates a disposable diaper liner having the same basic capsule-interior liner arrangement as in FIG. 1. Such disposable liners are usually used in conjunction with conventional cloth diapers being located on the inside (next to the baby's skin). FIG. 5 illustrates an alternative disposable liner having the same structure as interior liner 2 in FIG. 2. The variations of FIGS. 2, 3, 5 and 6 are useful for babies with overly tender skin.

The individual capsules are in effect individual generally spherically shaped containers which can vary in size (diameter) from about 5 to about 300 microns. Usually, however, the capsules range in size from about 5 to 200+ microns and more usually from about 10 to about 100 microns. The thickness of the capsule cell wall can range from about 0.1 to about 100 microns, but usually ranges from about 0.3 to about 20 microns. Each individual capsule is comprised of an external phase (cell wall) and an internal phase (baby oil formulation). Clusters or aggregates of capsules can also be used and these clusters or aggregates can have diameters ranging from about 50 to 1,500 microns, usually from about 100 to about 1,500 microns and more usually from about 150 to 1,200 microns. Both the capsules and capsule clusters (or aggregates) are dry to the touch (until broken) as the baby oil is contained within the capsule cell walls. The capsules can contain a liquid payload, viz., a weight concentration of liquid baby oil formulation, ranging anywhere from about 50 to about 99 weight percent. Usually, however, the liquid baby oil payload ranges from about 60 to 95 percent and more usually from about 70 to about 95 percent based on total capsule weight (viz., liquid baby oil formulation plus capsule cell wall).

The "baby oil" which constitutes the internal phase of the capsules, usually is comprised of a water-white (colorless) mineral oil which is comprised chiefly of paraffins, refined lanolin with or without perfume(s), deodorant(s), silicone oil(s), disinfectant(s), and other adjuvant materials. The oil and lanolin are characteristically always present in such baby oil formulations with the perfume(s), silicone oil(s), disinfectant(s), and deodorant(s) being optional components thereof. In place of a mineral oil base, other conventional oils, lubricants or emollients can be used, e.g., isopropyl myristate. A typical baby oil formulation suitable for use in accordance with this invention can contain the following component materials in the below noted weight concentrations.

Component	Concentration ¹
Mineral oil (or other lubricant or emollient)	85-99
Lanolin (or ester thereof)	1-10
Perfume(s) or deodorant(s)	0-0.1
Silicone oil(s)	0-5
Disinfectant(s)	0-1
Preservative(s)	0-1

¹ Weight percent based on total baby oil formulation.

The concentration of baby oil capsules, expressed as weight percent capsules, based on total weight of capsules plus disposable absorbent diaper component, will vary widely, e.g., from about 1 to about 80 weight percent, depending upon the particular structure being prepared. Thus, for example, when making baby diaper liners, e.g., for use with cloth diapers, the capsule concentration can range from 1 to 50 weight percent, but more usually ranges from 20 to 45 weight percent. On the other hand, when making the structures wherein the encapsulated baby oil is incorporated onto or into the absorbent disposable porous paper baby diaper cores; the encapsulated baby oil concentration can range from about 10 to 80 weight

percent, and more usually from about 20 to 45 percent, based on total weight of capsules plus core.

These conventional baby oil formulations can be encapsulated in accordance with a wide variety of encapsulation procedures, such as, for example as indicated in U.S. Pat. Nos. 2,800,457 and 2,800,458, the disclosure of which is incorporated herein by reference. While these encapsulation procedures are chemical in nature, it should be understood that both chemical and mechanical encapsulation procedures can be employed to encapsulate the baby oil formulations in accordance with this invention. A comprehensive discussion of detailed encapsulation procedures which can be used to encapsulate the baby oil to produce the size capsules noted hereinabove can be found in "Microencapsulation" by Anderson et al. (Harvard MBA Candidate's Report), published by Management Reports, Boston, Mass. (1963), the disclosure of which is also incorporated herein by reference.

In similar manner a wide variety of external phase (cell wall) materials can be used to encapsulate the above-mentioned and other conventional baby oil formulations. Suitable exemplary encapsulating materials which can be used in accordance with the invention include, but are not limited to: gelatin and gum arabic; polyethylene; ethyl cellulose; polyvinyl alcohol; polyvinylidene chloride; urea-formaldehyde and other aminoplast condensates; phenol-formaldehyde and other phenolic condensates; etc. The use of gelatin-gum arabic material is frequently preferable, especially in structures of the type shown in FIGS. 1 and 4, as it has less tendency to irritate a baby's tender skin, e.g., as when the capsules are in substantially direct contact therewith.

One typical procedure which can be employed to encapsulate conventional baby oil formulations employs gelatin-gum arabic as the capsule cell wall material. The procedure for forming the capsules is as follows: aqueous solutions of 11 percent by weight gum arabic and 11 percent by weight high bloom strength pigskin gelatin are prepared and held at 55° C. The liquid baby oil formulation is emulsified with the gelatin solution and additional water to give 10-40 microns droplets. This emulsion is added to the gum arabic solution with additional warm water so that the aqueous phase contains 1.2 to 2.2 weight percent gelatin and 1.2 to 2.2 weight percent gum arabic and the weight ratio of oil to gelatin and gum arabic combined is from 1:1 to 20:1. The slurry is cooled with good agitation from above 40° C. to below 25° C. at a rate not greater than 0.1° C./minute.

A wide variety of absorbent, porous paper or other cellulosic fibrous stock materials can be used to constitute the absorbent paper core upon which or into which the encapsulated baby oil capsules are incorporated. The two essential features which must be present in such absorbent porous paper cores is that they must be nonirritating with respect to the baby's skin, and they must absorb a sufficient amount of fluid, e.g., between about 15 and 20 fluid ounces, so that they will be satisfactory for use. Usually these materials are considered disposable. Also natural or synthetic organic fibrous materials can be used alone or in conjunction with cellulosic fibers.

Conventional disposable baby diapers usually contain an absorbent layer(s) of intermingled wood pulp fibers prepared by depositing the fibers in the form of a sliver on a facing or collecting web and then cutting the web and the sliver at spaced intervals to provide diaper pads of a predetermined length. Usually, the wood pulp fibers in the pad are stabilized in some way to prevent them from becoming dislocated in the pad in use and in handling. Suitable absorbent porous paper cores which can be employed in accordance with this invention are those referred to in U.S. Pat. No. 3,065,751.

Such diapers contain a thin, water-permeable facing (liner) sheet covering the interior side of the diaper, viz., the side which is to contact the baby's skin in use, and a thin (usually moisture-impermeable) backing sheet covering the exterior side of the diaper, remote from the baby's skin, with the porous, highly absorbent paper core (pad) being located between the interior and exterior facing (liner) sheets.

Usually, the core pad itself ranges in thickness from about 25 to 100 mils and has a bulk density between about 25 and 50 grains per cubic inch and a Gurley stiffness of less than about 20 milligrams per grain of weight. In general, any cellulose tissue assemblage having a basis weight of about 8 to 10 lbs. per ream (five hundred 24 inches x 36 inches sheets) or multi-ply composite of a plurality of tissues for greater absorption can be employed in accordance with this invention as the porous, absorbent disposable diaper core section.

The moisture-permeable interior diaper liner can be a nonwoven fabric produced according to the procedures indicated in U.S. Pat. Nos. 2,039,312, or 2,788,003, or 2,705,688, the disclosure of which is also incorporated herein by reference. In certain cases, it is desirable to prepare both the interior facing sheet and the backing sheet of the same material, but in such cases usually the backing sheet is provided with a moisture-impermeable coating or layer. Also, both the interior liner and exterior backing sheets can be prepared from soft tissue paper, such as a 13-pound tissue, having a weight of 13 lbs. per ream (four hundred 24 inches x 36 inches sheets). The disposable core can likewise be faced interiorly and/or exteriorly with the thin, but strong nonwoven top sheet described in U.S. Pat. No. 2,039,312. Other woven and nonwoven materials can be used for the interior and exterior liners as well be apparent to those skilled in the art.

The capsules can be incorporated into the disposable diapers or diaper liners by a variety of procedures including the four procedures described hereinbelow:

- A. The capsule aqueous slurry containing the encapsulated liquid baby oil formulation can be continuously roll-coated onto a portion of or the entire surface of the fibrous paper or nonwoven fabric used to form the diaper liner, or the diaper core for the disposable diaper. This procedure is suitable for applying a rather high concentration of small diameter capsules.
- B. The capsule slurry can be sprayed onto the paper or fabric substrate which is subsequently air or oven dried. This procedure is suitable for applying a light to medium concentration of small to medium size capsules.
- C. The capsule slurry can be mixed with the paper or other fibrous slurry prior to formation of the paper web or nonwoven fabric substrate, e.g., in accordance with the procedure of South African Pat. No. 63/231. This method is suitable for incorporating a light to heavy concentration of small to medium capsules. The capsules are entrapped within the matrix of the web structures (as a filler therein) during formation of the web.
- D. The capsule slurry can be sprayed onto the wood pulp fibers used to form the disposable diaper core either during or after mat formation. This procedure is suitable for applying a light to heavy concentration of small to large size capsules.

In all four procedures a flexible binder can be used in conjunction with the capsules. Such a binder is not required, however, because the slight tackiness of wet capsule cell walls, e.g., gelatin capsules, usually provides sufficient adhesion. The first two procedures, A and B, result in a surface coating of capsules which can be applied to either one or both sides of the paper or nonwoven fabric diaper core or liner substrate. The capsule-containing paper or nonwoven fabric resulting from the first three techniques, A, B, and C can be used as a diaper liner for nondisposable diapers, as a liner for disposable diapers, or, in the case of a multi-ply construction, as a core material for disposable diapers. The mat of wood pulp fibers containing capsules in and/or on the matrix resulting from the fourth procedure, D, is most suitable for use as disposable diaper cores. Other deposition procedures for incorporating the capsules onto or into the fibrous diaper core or liner portions will be apparent to those skilled in the art.

The invention will be illustrated in greater detail by the examples which follow. However, it should be understood that the present invention in its broadest aspects is not necessarily limited to these specific baby oil formulations, encapsulation

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procedures; capsule cell wall materials; capsule diameters; liquid pay load; capsule incorporation procedures; capsule cluster diameters; paper stock; liner and facing sheet materials; and concentration of materials and preparation procedures set forth in the examples below:

EXAMPLES 1 THROUGH 4

This example illustrates preparation of a baby diaper liner having encapsulated baby oil coated on the upper, interior surface thereof. 250 milliliters of Johnson's Baby Oil, which is comprised of 1 to 5 weight percent lanolin in mineral oil, 250 milliliters of warm distilled water and 180 milliliters of a warm, 11 percent, by weight, solution of high bloom strength gelatin were mixed in a Waring Blender. Ten to 40 micron droplets were formed immediately. This suspension was then added to a 2-liter beaker containing 550 milliliters of warm distilled water and 180 milliliters of a warm 11 percent by weight solution of spray dried gum arabic. The mixture was stirred with a 4 inch turbine agitator turning at high speed. Then 0.7 milliliters of a 20 percent by weight sodium hydroxide solution was added thereto. The temperature was then allowed to drop, without application of heating or cooling, from 40° C. to 28° C. in 2 hours. Capsule cell wall formation on the droplets occurred at about 30° C. At 28° C. capsule cell wall formation was essentially completed and the capsule slurry was chilled to 7° C. by application of an ice bath. The chilled capsule slurry was sprayed onto Johnson & Johnson "Chix" disposable baby diaper liner tissues with a hand atomizer and the sprayed tissues were allowed to air dry over night. Each 10 inch x 14 inch tissue weighed approximately 1.9 grams (dry weight) and approximately 0.5 grams of dried capsules per tissue were deposited by spraying in the manner indicated above. Under 100-power magnification, the capsules appeared as 600 to 1,000 micron aggregates or clusters of individual capsules having individual diameters ranging from approximately 10 to 40 microns. Capsule cell wall thickness ranged from approximately 0.5 to 2 microns. The liquid pay load was approximately 85 weight percent based on total of internal phase (baby oil formulation) plus external phase (cell wall material). The above procedure is demonstrative of capsule incorporation used to prepare the structures shown in FIGS. 1, 2, and 4. In the case of the FIG. 1 structure, the interior liner containing

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the baby oil capsules coated thereon is layed up on the diaper core 1 with or without an intermediate adhesive. Exterior liner 5 can be joined to the core in conventional manner. In the case of FIG. 3 structure, the procedure of Example 1 is repeated except that the baby oil capsules are deposited onto core 1 (rather than the interior liner). The liner 2 is then applied with or without binder 6.

As noted previously the capsules are readily rupturable by pressure. Slight to moderate pressures will suffice to break most capsules. Of course, the amount of pressure to break the capsule cell walls depends primarily upon capsule cell wall thickness, cell wall material, etc. Usually it is desirable to break a portion of the capsules prior to placing the capsule-containing diaper on the baby to release the baby oil. This can be accomplished readily by use of conventional household items, e.g., rolling pin, hand iron (unheated), etc. Also the baby's weight will usually break a good portion of the capsules. As noted above it is also within the purview of this invention to deposit the capsules on a portion of the diaper, viz., coat the capsules in a predetermined pattern corresponding generally to that portion of the baby's anatomy where the application of oil is most desired.

What we claim is:

1. A disposable baby diaper comprising a centrally located absorbent, porous, fibrous core section; a moisture-impermeable exterior liner positioned on one side thereof; and a moisture-permeable interior liner positioned on the other side thereof, said interior liner having on its inner surface an array of generally spherically shaped, pressure-rupturable capsules ranging in size from about 5 to 300 microns and containing from about 50 to about 99 weight percent liquid baby oil, based on total capsule weight.

2. A disposable baby diaper comprising a centrally located absorbent, porous, fibrous core section; a moisture-impermeable exterior liner positioned on one side thereof; and a moisture-permeable interior liner positioned on the other side thereof, said interior liner comprised of a fibrous matrix containing an array of pressure-rupturable, generally spherically shaped capsules uniformly distributed and retained therein, said capsules ranging in size from about 5 to about 300 microns and containing from about 50 to about 99 weight percent liquid baby oil, based on total capsule weight.

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