

ESCOBAR - URIBE ASOCIADOS

A B O G A D O S

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As. 2455/P.

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO DIVISIÓN DE NUEVAS CREACIONES

E. S. D.

SUPERINTENDENCIA Y COMERCIO
Radicación: 01009849 0505004 Folios: 2
Fecha (AGB): 2004-02-03 15:57:03
Trámite: 002 PATENTES D 1 REGISTRO/ 338 PETICION
Dependencia: 2003 DIVISION DE NUEVAS CREACIONES

Ref.: Expediente No. 01-089.849

Solicitud de Patente a nombre de

Johnson & Johnson Industria e Comercio Ltda.

Yo, JIMENA ESCOBAR URIBE, identificada como aparece al pie de mi firma, domiciliada en Bogotá, en la Carrera 11 A No. 94-76 Of. 305, obrando como apoderada de la sociedad Johnson & Johnson Industria e Comercio Ltda., domiciliada en Sao Paulo, SP, Brasil, solicitante de la patente de la referencia, pido a usted que se proceda a examinar si la invención, cuya patente se tramita en el expediente de la referencia, es patentable.

Adjunto al presente memorial el recibo No. 04 - 4,434 de enero 21 de 2004, por la suma de \$353.000.00, con lo cual queda cubierta la tasa oficial correspondiente a dicho estudio.

Señor Superintendente,


JIMENA ESCOBAR URIBE

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Cod. 5376

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NIT : 800176089-2

SUPERINTENDENCIA Y COMERCIO
Radicacion : 01609049 00000004 Folios: 2
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Dependencia: 2020 DIVISION DE NUEVOS CRECIMIENTOS

RECIBO OFICIAL DE CAJA : 04 - 4,434
FECHA : ENERO 21 DE 2004

***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PAGO	Vr. PAGO
ESCOBAR URIBE ASOCIADOS	CONSIGNACION	BANCO POPULAR	050-00110-6	8896559	21/01/2004	2,496,000.00

***** CONCEPTO *****

CANT.	RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1	50005-01-01 SOLICITUDES	112 PTC CAP-I EXAMEN DE PATENTIBILIDA	353,000.00
		TOTAL :	353,000.00

SON: TRESCIENTOS CINCUENTA Y TRES MIL PESOS

RESPONSABLE : 

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

DIVISION DE NUEVAS CREACIONES

RADICACIÓN EXPEDIENTE No. 01-89849

EL EXTRACTO DE LA PRESENTE SOLICITUD DE PATENTE DE INVENCION FUE PUBLICADO

EN LA GACETA DE PROPIEDAD INDUSTRIAL No 531, DE FECHA 29 DE AGOSTO DE 2003,

EL TERMINO HABIL SEÑALADO POR LA LEY EXPIRA EL 26 DE NOVIEMBRE DE 2003.

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 488/2000.

SE PRESENTARON OPOSICIONES POR PARTE DE TERCEROS.

SI

NO **X**

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**SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIVISIÓN DE NUEVAS CREACIONES**

2020

Bogotá D.C., Diciembre 23 de 2005

Doctora

JIMENA ESCOBAR URIBE

Apoderado **JOHNSON & JOHNSON INDUSTRIA E COMERCIO**

ASUNTO	Radicación	01-89849
	Trámite	002
	Evento	001
	Actuación	430
	Oficio	13978
	Folios	031

Como resultado del examen de fondo, realizado con fundamento en el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica:

1. Documentos estudiados:

- A. Para el presente estudio se tuvo en cuenta el capítulo descriptivo, comprendido en los folios 5 a 15 del expediente correspondiente a la solicitud en estudio, tal como fue radicado al inicio del trámite.
- B. Dibujos en los folios 19 a 26.
- C. El capítulo reivindicatorio tomado en cuenta para el presente estudio comprende 5 reivindicaciones y se encuentra en los folios 16 y 17, tal como fue radicado al inicio del trámite.
- D. Conforme lo establecen los artículos 9, 10 y 11 de la Decisión 486 de la Comisión de la Comunidad Andina, la presente solicitud en estudio fue presentada el 18 de octubre de 2001, en el momento de la radicación se reclamó prioridad. La copia certificada de la solicitud cuya prioridad fue reivindicada (BR PI 0100992-3 de marzo 16 de 2001) aparece junto con su traducción en los folios 30 a 74.

2. Objeto de la Invención:

- A. Las reivindicaciones 1 a 5 de la solicitud en estudio se refieren a: una disposición de sujeción mecánica para artículos absorbentes, con una capa impermeable externa, una capa interna permeable y un núcleo absorbente intercalado entre ellas, el artículo que define las partes frontal y posterior unidas por una parte entre las plemas, la disposición de sujeción caracterizada por el hecho de que abarca una primera porción superficial y una segunda porción de sujeción, la primera porción superficial ubicada en la parte posterior del artículo, la segunda porción de sujeción ubicada sobre los lados de la parte frontal y formada por una pluralidad de elementos sobresalientes fijables por yuxtaposición de enganche.
- B. El objeto de la solicitud se puede clasificar según la clasificación internacional como A 61 F 13/15.

3. Claridad de la Solicitud:

- A. El artículo 28 de la Decisión 486 de la Comisión de la Comunidad Andina establece "la descripción deberá divulgar la invención de una manera suficientemente clara y completa para su comprensión y para que una persona capacitada en la materia técnica correspondiente pueda ejecutarla"**

En la página 5 de la descripción, folio 9, se puede leer: "tal provisión resuelve la limitación de colocar para fijar el artículo absorbente". No es claro cuál es esa limitación de colocar. ¿colocar qué?

No es claro qué significa "tensionados de estirados". (ver página 8, folio 12). En la página 8 de la descripción, folio 10, se puede leer: "no es necesario una fabricación separada de la parte de anilla la cual tiene que fijada". Esto no es claro.

No es claro cómo pueden estar agarradas las partes interna y externa con sonido, como se ha indicado en la página 8, folio 12 de la descripción.

No es claro cuál es el concepto de la palabra "anilla" que se usa en la solicitud. De acuerdo con el Diccionario de la Real Academia, anilla significa: 1. f. Cada uno de los anillos que sirven para colocar colgaduras o cortinas, de modo que puedan correrse y descorrerse fácilmente. 2. f. Anillo al cual se ata un cordón o correa para sujetar un objeto. 3. f. Faja de papel litografiado que se coloca a cada cigarro puro para indicar su vitola y la marca de fábrica. 4. f. Pieza comúnmente metálica que se coloca en la pata de un ave para estudiar sus desplazamientos migratorios. 5. f. pl. En gimnasia, aros, generalmente de metal, de unos 25 cm de diámetro, pendientes de cuerdas o cadenas, en los que se hacen diferentes ejercicios. Así las cosas, los filamentos de elementos de anilla dejan duda sobre su significado y le resta claridad al texto.

En la página 10, folio 14 se lee: "los elementos de anilla pueden ser previstos en dos o más regiones dedicadas". No se entiende ni el término previsto ni el término dedicadas en el contexto de la solicitud.

Allí mismo se lee: "el resto de la región de cintura puede ser fabricado de otro material tal como un plástico que no es de entrelazamiento llenan". No es claro qué quiere expresar el solicitante.

En general se presentan muchos errores de traducción, redacción o transcripción que dejan dudas sobre la claridad del texto por lo cual se requiere del solicitante que se haga una revisión total de todo el texto y se corrijan los errores anotados y todos los otros que no se hubieran detectado en el presente examen.

De acuerdo con lo anterior, la descripción no cumple con el requisito de claridad según lo establecido en el artículo 28 de la Decisión 486.

4. Determinación del estado de la técnica:

El artículo 16 de la Decisión 486 de la Comisión establece que: "El estado de la técnica comprenderá todo lo que haya sido accesible al público por una descripción escrita u oral, utilización, comercialización o cualquier otro medio antes de la fecha de presentación de la solicitud de patente o, en su caso, de la prioridad reconocida."

"Solo para el efecto de la determinación de la novedad, también se considerará dentro del estado de la técnica el contenido de una solicitud de patente en trámite ante la oficina nacional competente, cuya fecha de presentación o de prioridad fuese

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anterior a la fecha de presentación o de prioridad de la solicitud de patente que se estuviese examinando, siempre que dicho contenido esté incluido en la solicitud de fecha anterior cuando ella se publique o hubiese transcurrido el plazo previsto en el artículo 40"

La fecha para determinar el estado de la técnica es el 16 de marzo de 2001, tomando en cuenta la prioridad reivindicada.

Consultadas las bases de datos y los archivos con que cuenta la entidad, especialmente bajo las clasificaciones A 61 F 13/15, se encontró que antes del 16 de marzo de 2001 habían sido publicados los documentos enumerados en la siguiente tabla.

No.	Documento	Título	Fecha de publicación
D1	WO 97/25893	Female component for refastenable fastening device	1997-07-24
D2	US 5,988,031	Disposable absorbent article	1999-10-19
D3	US 6,142,983	Disposable absorbent article	2000-11-07
D4	US 5,209,743	Reusable diaper	1993-05-11
D5	US 4,923,456	Adjustable combination fastener	1990-05-08
D6	US 5,899,896	Absorbent article with fastening system	1999-05-04

5. Evaluación de los requisitos de patentabilidad:

El artículo 14 de la Decisión 486 de la Comunidad Andina establece que: *"Los Países Miembros otorgarán patentes para las invenciones, sean de producto o de procedimiento en todos los campos de la tecnología, siempre que sean nuevas, tengan nivel inventivo y sean susceptibles de aplicación industrial"*.

En cumplimiento del artículo 14 de la Decisión 486, se procedió a evaluar los requisitos de novedad, nivel inventivo y aplicación Industrial con el fin de establecer la patentabilidad del objeto de la solicitud reivindicado en la solicitud en estudio.

A. Evaluación de la Novedad:

El artículo 16 de la decisión 486 de la Comisión de la Comunidad Andina establece:

"Una invención se considerará nueva cuando no esté comprendida en el estado de la técnica." "El estado de la técnica comprenderá todo lo que haya sido accesible al público por una descripción escrita u oral, utilización, comercialización o cualquier otro medio antes de la fecha de presentación de la solicitud de patente o, en su caso, de la prioridad reconocida."

1. El documento D1 trata de un sistema de ajuste igual al reivindicado por el solicitante. En la página 7, desde la línea 35, hasta la página 11, línea 13, es posible leer que el sistema de ajuste comprende una multiplicidad de filamentos, como una primera porción la cual se ajusta a una segunda porción por enganche.
2. El documento D2 también habla de un sistema de ajuste en donde se encuentran

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dos porciones, una primera superficial y otra porción tipo gancho que se engancha a la primera.

3. Así mismo en D3, D4, D5 y D6 se revelan sistemas de ajuste que caen bajo la formulación hecha por el solicitante de su invención. Luego, la novedad del objeto de la solicitud se ve afectada también por ellos

Por lo tanto, el objeto de la solicitud no cumple con el requisito establecido en el artículo 16 de la decisión 486.

B. Evaluación del nivel inventivo:

El artículo 18 de la Decisión 486 de la Comisión de la Comunidad Andina dispone que: "Se considerará que una invención tiene nivel inventivo, si para una persona del oficio normalmente versada en la materia técnica correspondiente, esa invención no hubiese resultado obvia ni se hubiese derivado de manera evidente del estado de la técnica".

A partir de lo divulgado en cualquiera de los documentos encontrados en el estado de la técnica, un técnico medio en la materia habría derivado de manera obvia la disposición de sujeción mecánica reclamada por el solicitante, puesto que todos revelan de una manera o de otra las dos porciones, siendo una de las cuales hecha de filamentos o elementos que se enganchan a la otra porción. A partir de los dibujos que aparecen en cada uno de los dibujos de los documentos citados es posible ver que todos tienen sistemas de sujeción muy parecidos que hacen del objeto reclamado en la solicitud estudiada apenas una realización particular de cualquiera de ellos.

Por lo tanto, la solicitud en estudio no cumple con el requisito de nivel inventivo establecido por el artículo 18 de la Decisión 486.

C. Evaluación de la Aplicación Industrial:

El artículo 19 de la Decisión 486 de la Comisión de la Comunidad Andina establece: "Se considerará que una invención es susceptible de aplicación industrial cuando su objeto puede ser producido o utilizado en cualquier tipo de industria, entendiéndose por industria, la referida a cualquier actividad productiva, incluidos los servicios".

Indicar el contenido de las reivindicaciones sobre las cuales se va a pronunciar. Argumentar el motivo por el cual la invención no podría tener aplicación industrial, si solo se trata de unas reivindicaciones, indicar cuáles y la causa de este hecho.

D. Resumen

En conclusión los requisitos de patentabilidad de la presente solicitud podrían encontrarse afectados así:

No.	Documento	Reivindicaciones afectadas	Requisito afectado
D1	WO 97/25893	1 a 5	Novedad y nivel inventivo
D2	US 5,968,031	1 a 5	Novedad y nivel inventivo
D3	US 6,142,983	1 a 5	Novedad y nivel inventivo

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No.	Documento	Reivindicaciones afectadas	Requisito afectado
D4	US 5,209,743	1 a 5	Novedad y nivel inventivo
D5	US 4,923,456	1 a 5	Novedad y nivel inventivo
D6	US 5,899,896	1 a 5	Novedad y nivel inventivo

Se anexa copia de las anterioridades mencionadas.

6. Notificación

En cumplimiento del artículo 45 de la decisión 486 de la Comisión de la comunidad Andina, se le indica que debe dar respuesta dentro del término de sesenta días contados a partir de la fecha de la notificación de la presente comunicación. En caso de no dar respuesta al presente requerimiento, o si a pesar de la respuesta subsistieran los impedimentos para la concesión, se denegará la patente.

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e) del capítulo quinto del título primero de la circular única No. 10 de 2001.


CLARA CECILIA CASTELLANOS DE JAIMES
Jefe de la División de Nuevas Creaciones (e)

El anterior requerimiento fue notificado por fijación en lista, de
fecha 29 DIC. 2005

CONCEPTO TÉCNICO Número: 2067	EXAMINADOR TÉCNICO Código: 202043
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WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : A44B 18/00		A1	(11) International Publication Number: WO 97/25893
			(43) International Publication Date: 24 July 1997 (24.07.97)
(21) International Application Number: PCT/US97/00635			(51) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).
(22) International Filing Date: 16 January 1997 (16.01.97)			
(30) Priority Data: 08/588,481 18 January 1996 (18.01.96) US			
(71) Applicant: THE PROCTER & GAMBLE COMPANY [US/US]; One Procter & Gamble Plaza, Cincinnati, OH 45202 (US).			
(72) Inventors: WEIRICH, David, Michael; 8287 Grey Fox Drive, West Chester, OH 45069 (US). ALLEN, Patrick, Jay; 8667 Arcurus Drive, Cincinnati, OH 45249 (US).			
(74) Agents: REED, David, T. et al.; The Procter & Gamble Company, 5299 Spring Grove Avenue, Cincinnati, OH 45217 (US).			Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
(54) Title: FEMALE COMPONENT FOR REFASTENABLE FASTENING DEVICE HAVING REGIONS OF DIFFERENTIAL EXTENSIBILITY			
(57) Abstract			
A female component for a refastenable fastening device having an elastomeric adhesive backing (34) and a multiplicity of fibrous elements (30) extending from the backing. The female fastening component is formed by a method comprising the steps of: providing a first lamina comprising an elastomeric, pressure-sensitive adhesive film having a first adhesive surface (31) and a second adhesive surface (33) opposed to said first adhesive surface, a relaxed orientation, an elongated orientation and preferably at least two regions of differential elongations; stretching said first lamina from said relaxed orientation to said elongated orientation; contacting a second lamina comprising a nonwoven web (30) with said first surface of said first lamina in said elongated orientation, thereby directly joining said second lamina and said first lamina to form a laminate; and relaxing said first lamina such that said second lamina is shifted to form catching regions capable of entangling the hooks (26) of a complementary male fastening component (20).			

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The fastening device 20 is opened by peeling the male component 24 away from the female component 22 (or by peeling the female component 22 away from the male component 24). If the male component 24 has resilient hooks, the peeling action may cause the hooks to be bent so that they are disengaged from entanglement with the fibers 36 of the nonwoven web 30. In other cases (particularly if the hooks 28 are relatively inflexible), the hooks 28 may be separated by breaking the fibers 36 of the female component 22. In either case, the hooks 28 are disengaged and the male component 24 is completely detached from the female component 22. The fastening device 20 is then capable of being refastened in the manner described above.

The Female Fastening Component

The term "nonwoven female component", as used herein refers to a female component for a refastenable fastening device that comprises a nonwoven web joined to a backing. (The nonwoven female component may also be referred to as a loop fastening material or simply, a loop fastener.) The term "nonwoven web" refers to fabrics made of fibers held together by interlocking or inter-fiber bonding which are not woven, knitted, felted, or the like. However, the nonwoven web referred to herein may comprise fibers that are initially substantially unbonded which are subsequently bonded to each other.

FIG. 1 shows the backing 34 and the nonwoven web 30 used to form the female component 22 prior to their association. The backing 34, preferably an elastomeric adhesive, is shown in an elongated orientation (stretched in a direction parallel to the line designated A-A). As used herein, the term "elastomeric" refers to materials that extend in at least one direction when a force is applied and return to approximately their original dimensions after the force is released. The nonwoven web 30, as shown in FIG. 1, preferably comprises a multiplicity of filaments 36 that are joined with each other by inter-fiber bonds 32 prior to being associated with the backing 34. As used herein, the term "joined" encompasses configurations whereby an element is directly secured to another element and configurations whereby an element is indirectly secured to another element by affixing an element to intermediate member(s) which in turn are affixed to another element. The term "inter-fiber bonds" refers to bonds that join one or more filaments to one or more other filaments.

FIG. 2 shows a preferred embodiment of the female component 22 where the backing 34 is in its elongated orientation after the nonwoven web 30 has been

positioned on and joined to the first surface 31 of the backing 34. Preferably, the filaments 36 of the nonwoven web 30 are aligned essentially parallel to each other and essentially perpendicular to the path of response of the backing 34. However, other configurations are contemplated wherein the filaments 36 are essentially parallel to the path of response of the backing 34, or are randomly or otherwise oriented with regard to each other and the path of response of the backing 34. (The term "essentially parallel" is used herein to mean the filaments, any individual filament(s), or portions of any filament(s) need not extend absolutely parallel to each other or the path of response so long as the majority of the filaments 36 extend generally perpendicularly to each other or the path of response. "Essentially perpendicular" is used herein to indicate that the filaments, any individual filament(s), or portions of any filament(s) need not extend absolutely perpendicular to each other or the path of response so long as the majority of the filaments 36 extend generally perpendicularly to each other or the path of response. As used herein, the term "path of response" refers to the direction in which an elastomeric material in an elongated orientation will respond when the forces acting to elongate the elastomeric material are removed. Further, the filaments 36 of the nonwoven web 30 are preferably in an untensioned state when they are joined to the elongated backing 34.) The embodiment described above wherein the filaments 36 are essentially parallel to each other and essentially perpendicular to the path of response of the backing 34 helps to ensure that the filaments 36 will become "shirred" when the backing 34 contracts to its relaxed orientation (shown in FIG. 3). The term "shirred" as used herein, refers to the gathering of the filaments 36 of the nonwoven web 30 caused by the contraction of the backing 34 from its elongated orientation to its relaxed orientation such that portions of the filaments 36 that are not secured to the backing 34 or other filaments 36 bend away from the first surface 31 of the backing 34. The shirred filaments 36 form unsecured catching regions 37 (loops) capable of entangling the hooks 28 of a complementary male fastening component 24.

FIG. 3 shows a preferred embodiment of the present invention after the nonwoven web 30 and the backing 34 have been joined and after the forces acting to elongate the backing 34 have been removed such that the backing 34 has contracted to its relaxed orientation. The shirred filaments 36 form a multiplicity of fibrous elements 35 extending outwardly from the first surface 31 of the backing 34. Each of the fibrous elements 35 comprises a pair of fixed regions 42 (joined to the backing 34) and an unsecured catching region 37 disposed between the pair of fixed

regions 42. The catching regions 37 are capable of securely engaging the hooks of a complementary hook fastening component to provide a fastening device 20, as is shown in FIG. 4.

FIG. 6 shows an alternative embodiment of the female component 22 of the present invention comprising a second lamina 80 joined to the second surface 33 of the elastomeric adhesive backing 34 to form a tri-laminate 85. Joining a second lamina 80 to the elastomeric adhesive backing 34 provides the female fastening component with additional advantages. For instance, the tri-laminate material 85 may be incorporated into a disposable absorbent article, such as a diaper as an elastomeric waistband capable of engaging the hooks of a complementary male fastening component. Further, the tri-laminate 85 provides an elastomeric female fastening component 22 capable of engaging the hooks 28 of a complementary male fastening component 24 on two opposing surfaces.

In an especially preferred alternative embodiment of the present invention, the second lamina 80 comprises a nonwoven web such as the nonwoven web 30 described above with respect to the female fastening component 22. However, a suitable lamina may be manufactured from a wide range of materials, including plastic films; woven webs of natural fibers (e.g. wood or cotton), synthetic fibers (e.g. polyester or polypropylene), or a combination of natural and synthetic fibers; foams; or natural or synthetic rubber.

The second lamina 80 may be joined to the elastomeric adhesive backing 34 in the manner described with respect to the nonwoven web 30 or any other method as is known in the art. Further, the second lamina 80 may be joined to the backing 34 contemporaneously with the nonwoven web 30 when the backing 34 is in an elongated orientation or at any other time after the adhesive backing 34 is formed. Embodiments are also contemplated wherein the tri-laminate 85 comprises the backing described below including regions of differential elongation. In a preferred embodiment, however, the lamina 80 is joined to the backing 34 after the nonwoven web 30 has been joined to the backing 34 and after the backing 34 has been at least partially relaxed. (An elastomeric material in an elongated orientation is "partially relaxed" when the forces stretching the elastomeric material are reduced, allowing the material to contract but not completely relax. Thus, an elastomeric material in a partially relaxed condition is still capable of contracting further to its relaxed orientation after the forces are completely removed.) Joining the second lamina 80 after the backing 34 has been at least partially relaxed ensures that the fibrous elements 35 of the nonwoven web 30 will remain shirred when the female fastening

component 22 is stretched. This is because the second lamina 80 will become fully extended to its elastic limit before the nonwoven web 30, thus maintaining at least some shirring in the filaments 36 of the nonwoven web 30. Thus, an elastomeric nonwoven female component 22 is provided that will maintain its ability to entangle the hooks 28 of a complementary male fastening component 24 even after the female component 22 has been stretched to a point where the second lamina 80 is fully extended. (If the second lamina 80 is joined to the backing 34 when the backing 34 is in its fully relaxed orientation, the female component 22 will lose its elastomeric qualities. Thus, such an embodiment is not preferred where the female component must be capable of stretching.)

FIGS. 11 and 12 show the backing 34 of the present invention comprising two or more regions which are subjected to differing amounts of elongation in the cross-machine direction. (In FIG. 11, the backing 34 has regions 34a and 34b, in FIG. 12, the backing 34 has regions 34a, 34b and 34c.) The differential elongation can provide the female component 22 with a number of unique characteristics. (As used herein, the terms "differential elongation" or "differential stretch" refer to regions of a material that have been subjected to unequal amounts of elongation.) One unique characteristic that may be provided by differentially stretching the backing 34 is a female component 22 having regions that elongate to different extents when a given stretching force is applied. For example, region 34a of the backing 34, as shown in FIG. 11, could provide less resistance, and thus elongate more than region 34b for any given force applied to elongate the female component 22 in the cross-machine direction. Likewise, as shown in FIG. 12, region 34b would generally elongate more than either region 34a or 34c of backing 34 for any given force applied to the female component 22. Thus, an elastomeric female component 22 could be configured such that portions elongate more than other portions which could, in turn, provide different engaging characteristics with regard to mating male components 24.

Another unique characteristic provided by differentially stretching the backing 34 is a female component 22 having regions comprising catching regions 37 of different loft. (As used herein, the term "loft" refers to the height or distance that a portion of a filament 36 is away from the backing 34.) When a nonwoven 30 is joined with the backing while the backing 34 is in an elongated configuration, certain filaments of the nonwoven will become shirred when the elongation force is removed. If the pattern which joins portions of the filaments 36 is uniform throughout the differentially stretched regions of the backing, those portions of the

female component comprising the most elongated portions of the backing 34 should comprise shirred filaments 36 with the greatest loft. (Nonuniform patterns of joining the filaments 36 to the backing may be used to exaggerate or reduce the difference in the loft attained by the different regions of the female component.) Thus, for example, the filaments 36 joined to the region 34a would generally have more loft than the filaments 36 joined to the region 34b of the backing shown in FIG. 11 if a similar pattern were used to join the nonwoven to the entire backing 34. This could provide an elastomeric female component 22 with different engaging characteristics with regard to mating male components 24.

Yet another unique characteristic made possible by differentially stretching the backing 34 is an elastomeric female component 22 that is capable of maintaining its ability to engage a mating male component 24 when elongation forces are applied. As noted above, when a nonwoven web 30 is joined with a backing 34 having regions of differential stretch, the loft of the filaments 36 may vary throughout the female component 22. Thus, where the filaments 36 have less loft, that portion of the female component 22 will generally reach its elastic limit prior to the regions of greater loft when a force is applied to elongate the female component 22 in the cross-machine direction. (As used herein, the term "elastic limit" refers to the point at which a material has been elongated to the point at which the material can no longer be stretched without rupture, tearing or substantial deformation of the filaments 36 and/or the backing 34.) In some instances, an elastomeric female component or portions of an elastomeric female component that have been elongated will lose the ability to effectively engage a mating male component 24 because the catching regions 37 comprising shirred filaments 36 have been elongated so as to remove the loft associated with the shirring of the filaments 36. Therefore, it is advantageous to be able to configure an elastomeric female component 22 such that certain designated low loft regions stretch to their elastic limit before other higher loft regions, thus preventing the higher loft regions from losing the ability to engage a mating male component 24. (The above-mentioned examples should not be considered to limit the scope of the invention in any way. It is understood that a female component could be configured such that the low loft regions stretch to their elastic limit with the same or less force than some or all of the higher loft regions do. Thus, it is not important which region(s) reach their elastic limit with the least force, but rather that at least one region has sufficient lofted filaments 36 so as to provide a suitable entanglement zone for the specified need considering the forces that the whole or portions of the female component will be subjected to.

one preferred embodiment, the first fastening element 72a comprises a male component 24. The male component 24 provides hooks 28 that extend from the tab 74 disposed in the second waist region 58. The nonwoven female component 22 of the present invention comprises the second fastening element 72b disposed in the first waist region 56. However, the positions of the components of the fastening device 20 of the present invention could be reversed so that the first fastening element 72a comprises the nonwoven female component 22 and the second fastening element 72b comprises the male component 24.

In an especially preferred embodiment of the disposable diaper 50, the filaments 36 in the nonwoven web 30 of the female component 22 are aligned in a single direction. The female component 22 is oriented so that the filaments 36 in the nonwoven web 30 extend essentially parallel to the longitudinal edges 60 of the diaper 50. This orientation aligns the filaments 36 generally perpendicular to the direction of shear forces applied to the fastening device 20 during use. In this configuration the filaments 36 provide the maximum peel and shear force resistance.

Several examples of well known diaper configurations to which the present invention can be readily adapted are described in U.S. Patents 5,151,092 and 5,221,274 both entitled "Absorbent Article With Dynamic Elastic Waist Feature Having A Predisposed Flexural Hinge", issued to Kenneth B. Buell, et al. on September 29, 1992 and June 22, 1993, respectively; co-pending U.S. Patent Application Serial No. 08/155,048 entitled "Absorbent Article With Multi-Directional Extensible Side Panels", filed November 19, 1993; and co-pending U.S. Patent Application Serial No. 08/203,456 entitled "Absorbent Article With Multiple Zone Structural Elastic-Like Film Web Extensible Waist Feature" filed on February 28, 1994. Each of the above mentioned patents and co-pending patent applications are hereby incorporated by reference herein. It should be understood, however, that the fastening device of the present invention is not limited to use with any specific diaper structure or configuration.

The female fastening component 22 of the present invention may also be used to provide an inexpensive waistband, or any other elastomeric element (or a portion thereof) of an absorbent article, capable of engaging the hooks 28 of a complementary male fastening component 24. (As used herein, the term "waistband" refers to that portion of an absorbent article that partially or wholly encircles the waist of the wearer.) FIG. 8 shows a diaper 50 having a waistband 62 comprising the female fastening component 22 of the present invention. Further examples of diapers suitable for use with the present invention are described in U.S.

Patent 4,699,622 entitled "Disposable Diaper Having An Improved Side Closure" which issued to J. W. Toussaint, et al. on October 13, 1987; U.S. Patent 5,019,065 entitled "Disposable Absorbent Article With Combination Mechanical and Adhesive Tape Fastener System", issued to Scripps on May 28, 1991; and U.S. Patent 5,242,436 entitled "Absorbent Article With Fastening System Providing Dynamic Elasticized Waistband Fit", issued to Weil et al., on September 7, 1993; each of which is hereby incorporated by reference herein.

Method of Making the Female Fastening Component

10 The female fastening component 22 of the present invention is made by contacting a nonwoven web comprising inter-fiber bonds with an elastomeric, pressure sensitive adhesive film. The adhesive film is formed and elongated in at least the cross machine direction before it is brought in contact with the nonwoven web. When the adhesive film and the nonwoven web are brought into contact with
15 each other, they are joined to form a laminate comprising the nonwoven web and an elastomeric adhesive backing. The laminate is then contracted such that regions of the nonwoven web become shirred and thus capable of entangling the hooks of a complementary male fastening component.

The following is a detailed description of the process for making the female
20 fastening component 22 of the present invention. Although the description refers to the elastomeric adhesive backing as an "adhesive film", this terminology should not be construed to limit the scope of the invention. As mentioned above, the adhesive backing 34 may take on a number of different configurations including films, laminates, webs, strands, or the like.

25 The female component 22 of the present invention may be produced on the illustrated apparatus 110, as shown in FIG. 9. The apparatus 110 comprises two separate process modules, process module 111 for the elastomeric adhesive backing 34 (or "adhesive film"), and process module 112 for the nonwoven web 30. The process module 111 comprises an extrusion head 116 and a release surface upon
30 which the extruded adhesive is formed, such as the forming belt 117, to form the elastomeric adhesive backing film 34. (In an alternative embodiment, the elastomeric adhesive backing could be pre-formed and supplied to the line from a roll. This would eliminate the extrusion head 116 and the forming belt 117.)

Examining process module 111 in greater detail, the extrusion head 116 has a
35 slot through which the molten elastic adhesive of the adhesive film 34 is extruded to form a thin film of about 0.03 to about 1.0 millimeters (about 0.001 in. to about 0.04

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US005968031A

United States Patent [19]
Schmitz

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[54] **DISPOSABLE ABSORBENT ARTICLE
HAVING AN EXTENSIBLE LANDING
MEMBER FORMED FROM AN EXTENSION
OF THE INNER LAYER**

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[*] **Notice:** **This patent is subject to a terminal disclaimer.**

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[22] **Filed:** **Dec. 3, 1998**

Related U.S. Application Data

[62] **Division of application No. 08/894,293, Aug. 15, 1997, Pat. No. 5,897,547.**

Foreign Application Priority Data

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[51] **Int. Cl.⁶** **A61F 13/15**

[52] **U.S. Cl.** **604/391; 604/386**

[58] **Field of Search** **604/385.1, 386, 604/391**

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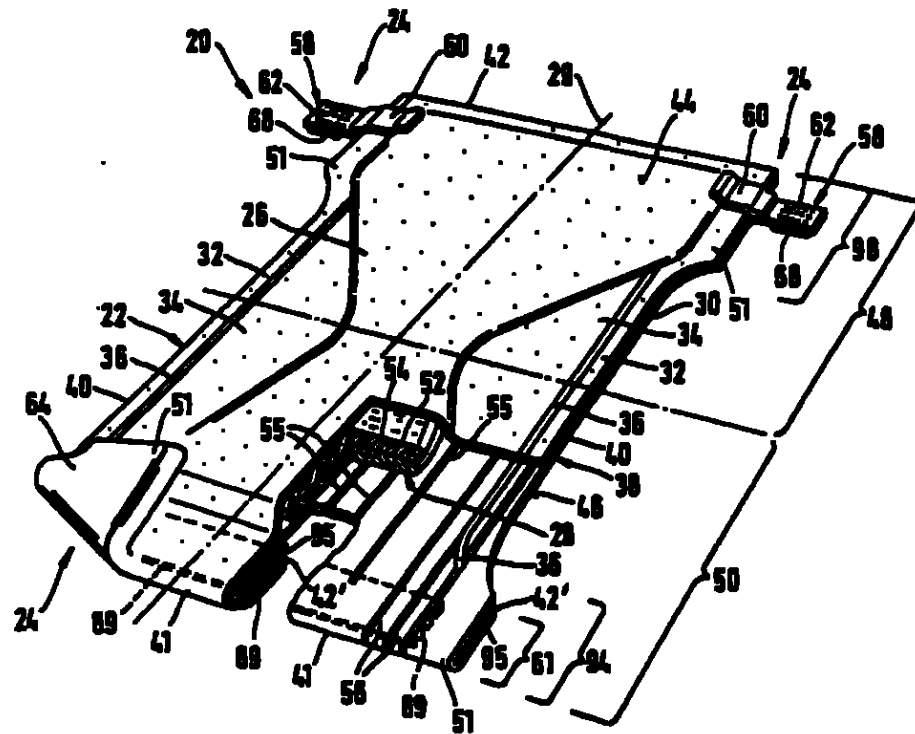
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[57] **ABSTRACT**

An absorbent article comprising: a backsheet having a user-facing side, a garment-facing side, two longitudinal sides, a first transverse edge, a first waist region located along the first transverse edge, a second transverse edge, and a second waist region located along the second transverse edge. The absorbent article includes an inner layer covering at least a part of the user-facing side of the backsheet, an absorbent core located adjacent the user facing side of the backsheet, and a mechanical fastening system. The fastening system comprises at least one hook-type fastening member located in the second waist region and extending transversely beyond one longitudinal side, and an extensible landing member located in the first waist region for mechanically engaging with the hook-type fastening member. The landing member is formed from an extension of the inner layer which extends beyond the front transverse edge of the backsheet.

13 Claims, 19 Drawing Sheets



**DISPOSABLE ABSORBENT ARTICLE
HAVING AN EXTENSIBLE LANDING
MEMBER FORMED FROM AN EXTENSION
OF THE INNER LAYER**

This is a division of application Ser. No. 08/894,293, filed on Aug. 15, 1997 now U.S. Pat. No. 5,897,547.

FIELD OF THE INVENTION

The invention relates to disposable absorbent articles comprising a mechanical fastening system.

Such disposable absorbent articles are known from EP-A-0 321 234.

Known mechanical fastening systems for use in disposable absorbent articles comprise tape tabs comprising a hook-type fastening element in the back waist region wherein the hooks mechanically engage with a landing member. The landing member is a loop-type material located in the front waist region on the garment-facing side of the article which entangles with the hooks of the tape tabs to form a closure having resistance against peel forces and shear forces.

The loop-type materials used for the landing members of the known mechanical fastening systems are relatively expensive materials.

Furthermore, the known loop-type materials are attached to the garment-facing side of the backsheet and form an extra layer that increases the bulk of the absorbent articles upon compression-packaging of these articles in a compressed array.

By attaching relatively small sized patches of loop-type material to the backsheet, the complexity of the production process for making an absorbent article is increased. The addition of larger patches, or strips of loop-type material to the garment-facing side of the backsheet, may cause the elastic expansion of the materials in the front waist region of the absorbent article to be impaired.

Finally, when an elasticated front waist region is provided in an absorbent article, the material of the backsheet in this region will comprise a number of gathers or surface irregularities, caused by the contraction of the elastic element in the front waist region. Patches of loop-type material cannot properly be attached to such irregularly shaped surfaces.

It is therefore an object of the present invention to provide an absorbent article having a mechanical fastening system which allows good conformability of the front waist region to the movements of the user and which allows dynamic and self-adjusting fit of the front waist region.

It is another object of the present invention to provide an absorbent article having a mechanical fastening system which can easily be applied in the region of an elasticated front waist region.

It is again another object of the invention to provide a mechanical fastening system which is of relatively simple construction and which is cost-effective.

It is a further object of the invention to provide an absorbent article comprising a mechanical fastening system which is of low bulk when packed in a compressed array.

SUMMARY OF THE INVENTION

An absorbent article according to the invention comprises a garment-facing backsheet having two longitudinal sides, a front transverse edge, and a back transverse edge. The article

has a mechanical fastening system for attaching the article to a wearer, comprising at least two hook-type fastening members located in the region of the back transverse edge and extending transversely beyond each longitudinal side. A loop-type landing member is located in the region of the front transverse edge for mechanically engaging with the hook-type fastening members, wherein the landing member is elastically extensible by at least 5% in the direction of the front transverse edge.

The landing member may be made of an elastic loop-type material, such as for instance an elastic non-woven material. The elastic loop-type material in such an embodiment forms the front waist elastic element of the front waist region while simultaneously allowing the hook-type material to fasten the absorbent article on the wearer. Alternatively, the landing member comprises a non-elastic loop-type material, which is laminated to an elastic film.

The above landing members may be attached to the garment-facing side of the front waist region of the backsheet in a pre-stretched manner, such that the contraction of the landing member contracts the front waist region in a number of gathers. Alternatively, the landing member may be attached to the backsheet in a relaxed state, and may be subsequently mechanically deformed or pre-strained to impart extensibility to the landing member. Mechanical deformation may for instance be imparted by passing the landing member between a pair of intermeshing, grooved rolls, such as described in U.S. Pat. No. 5,196,000 and U.S. Pat. No. 5,236,430.

The landing member may also comprise a patch or strip of loop-type material that is superimposed on a front waist elastic element applied to the topsheet or the backsheet of the absorbent article in the front waist region, such that the loop-type material is contracted by the waist elastic element in gathers. The contraction of the front waist elastic element will cause the loops, or fibers, on the surface of the landing member to project outwardly, and thereby improves the fastening characteristics thereof.

In one embodiment of an absorbent article according to the invention, an inner layer is located on the garment-facing side of the backsheet. The landing member comprises at least one cut-out section extending through the backsheet and exposing the underlying inner layer. The part of the underlying layer located below the at least one cut-out section, is adapted to mechanically engage with the hook-type fastening members and forms a part of the landing member.

By cutting an aperture through the backsheet material, the inner layer below the backsheet is exposed through the aperture. The inner layer, which for instance comprises a fibrous non-woven layer, may be the topsheet which covers the absorbent core or may be a layer located between the topsheet and the backsheet. Alternatively, the inner layer may be a layer which is located below the absorbent core or may be a high wet-strength tissue which envelopes the core. By selecting the hook-type fastening members to match the non-woven material that is regularly employed as an inner layer, the hooks can mechanically engage with these layers to fasten the absorbent article around a wearer.

In another embodiment of an absorbent article according to the invention, the landing member defines a landing zone for receiving the hook-type fastening members, wherein the backsheet does not extend into the landing zone. The inner layer extends beyond the front transverse edge of the backsheet into the landing zone to form the landing member.

By employing a backsheet which is shorter than the inner layer, the fibrous inner layer is exposed in the front waist

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Both the upper layer 52 and the lower layer 54 preferably comprise an absorbent layer encased in a tissue layer. It should be understood, however, that the size, shape, configuration, and total absorbent capacity of the upper layer 52 or the lower layer 54 may be varied to accommodate wearer's ranging from infants through adults. Therefore, the dimensions, shape, and configuration of both the upper layer 52 and the lower layer 54 may be varied (e.g., the upper layer or the lower layer may have a varying caliper, a hydrophilic gradient, a rapid acquisition zone or may contain absorbent gelling material).

The absorbent core 28 is superposed on the backsheet 30 and is preferably associated thereto by a core attachment means 55 such as those well known in the art, for example, pressure-sensitive adhesives, hot melt adhesives or other adhesives; ultrasonic bonding; or heat/pressure sealing. The absorbent core 28 may be secured to the backsheet 30 by a uniform continuous layer of adhesive, a patterned layer of adhesive, or any array of separate lines or spots of adhesive. And adhesive which has been found to be satisfactory is preferably a hot-melt adhesive such as manufactured by Eastman Chemical Products Company of Kingsport, Tenn. and marketed under the tradename of Eastobond A-3 or by Century Adhesives, Inc., of Columbus, Ohio and marketed under the tradename Century 5227. The core attachment means 55 preferably comprise an open pattern network of filaments of adhesive as is shown in U.S. Pat. No. 4,573,986 entitled "Disposable Waste-Containment Garment" which issued to James A. Minetola and David R. Tucker on Mar. 4, 1986.

The backsheet 30 is impervious to liquids and is preferably manufactured from a thin plastic film, although other flexible liquid impervious materials may also be used. The backsheet 30 prevents the exudates absorbed and contained in the absorbent core 28 from soiling articles which contact the diaper 20 such as bedsheets and undergarments. Preferably, the backsheet 30 is a polyethylene film having a thickness of from 0.012 mm (0.5 mil) to 0.051 mm (2.0 mils), although other flexible, liquid impervious materials may be used. As used herein, the term "flexible" refers to materials which are compliant and which will readily conform to the general shape and contours of the human body.

A suitable polyethylene film is manufactured by Monsanto Chemical Corporation and marketed in the trade as Film No. 8020. The backsheet 30 is preferably embossed and/or matte finished to provide a more clothlike appearance. Further, the backsheet 30 may permit vapors to escape from the absorbent core 28 while still preventing exudates from passing through the backsheet 30.

The size of the backsheet 30 is dictated by the size of the absorbent core 28 and the exact diaper design selected. In a preferred embodiment, the backsheet 30 has a modified hourglass shape extending beyond the absorbent core a minimum distance of at least 1.3 cm to 2.5 cm (0.5 to 1.0 inch) around the entire diaper periphery 38.

The topsheet 26 of the body portion 22 of the present invention is compliant, soft feeling, and non-irritating to the wearer's skin. Further, the topsheet 26 is liquid pervious permitting liquids to readily penetrate through its thickness. A suitable topsheet 26 may be manufactured from a wide range of materials such as porous foams, reticulated foams, apertured films, natural fibers (e.g. wood or cotton fibers), synthetic fibers (e.g., polyester or polypropylene fibers) or from a combination of natural and synthetic fibers. Preferably, it is made of a hydrophobic material to isolate the wearer's skin from liquids retained in the absorbent core 28.

A particularly preferred topsheet 26 comprises staple length polypropylene fibers having a denier of about 1.5, such as Hercules Type 151 polypropylene fibers marketed by Hercules, Inc. of Wilmington, Delaware. As used herein, the term "staple length fibers" refer to those fibers, having a length of at least 15.9 mm (0.625 inches).

There are a number of manufacturing techniques which may be used to manufacture the topsheet 26. For example, the topsheet 26 may be woven, non-woven, spunbonded, carded, hydroformed or the like. A preferred topsheet 26 is carded and thermally bonded by means well-known to those skilled in the fabric art. Preferably, the topsheet 26 has a basis weight from 15 to about 30 grams per square meter, a minimum dry tensile strength of at least 400 grams per centimeter in the machine direction and a wet tensile strength of at least 55 grams per centimeter in the cross-machine direction.

The topsheet 26 and the backsheet 30 are associated together in any suitable manner as is well known in the diaper manufacturing art. As used herein, the term "associated" encompasses configurations whereby the topsheet 26 is directly joined to the backsheet 30 by affixing the topsheet 26 directly to the backsheet 30, and configurations whereby the topsheet 26 is indirectly joined to the backsheet 30 by affixing the topsheet 26 to intermediate members which in turn are affixed to the backsheet 30. In a preferred embodiment, the topsheet 26 and the backsheet 30 are joined directly to each other in the diaper periphery 38 by a flap attachment means 56 such as an adhesive or any other attachment means as is known in the art. In general, the core attachment means 55 that affixes the absorbent core 28 to the backsheet 30 is the same means as the flap attachment means 56 that affixes the topsheet 26 to the backsheet 30. Thus, for example, a uniform continuous layer of adhesive, a patterned layer of adhesive, an array of separate lines or spots of adhesive, or a network of adhesive filaments such as shown in the above-referenced U.S. Pat. No. 4,573,986 may be used.

Elastically contractible leg cuffs 32 are disposed adjacent the periphery 38 of the body portion 22, preferably along each longitudinal edge 40, so that the leg cuffs 32 tend to draw and hold the diaper 20 against the legs of the wearer. While the leg cuffs 32 may comprise any of several means as are well known in the diaper art, a particularly preferred leg cuff construction comprises a side flap 34 and one or more elastic members 36, as is described in detail in the hereinbefore referenced U.S. Pat. No. 3,860,003. In addition, a method and apparatus suitable for manufacturing a disposable diaper having elastically contractible leg cuffs are described in U.S. Pat. No. 4,081,301 entitled "Method and Apparatus For Continuously Attaching Discrete, Stretched Elastic Strands to Predetermined Isolated Portions of Disposable Absorbent Articles" which issued to Kenneth B. Buell on Mar. 28, 1978.

In a preferred embodiment, the elastically contractible leg cuff 32 comprises a side flap 34 and an elastic member 36 comprising an elastic thread.

The diaper 20 comprises a front waist elastic element 89, which in FIG. 1 is formed by the elastic landing member 64. The front waist elastic element 89 preferably extends between 5% and 60% at a force of between 30 and 280 g per inch, preferably about 30% at a force of 150 g per inch and contracts the front waist region 94 in gathers to provide an elasticated fit of the waist region 94 against the waist of a wearer.

Generally, the front waist elastic element 89 may be located on the garment-facing side or on the user-facing side

of the topsheet 26 and the backsheet 30, or may be comprised between the topsheet and the backsheet.

The diaper 20 is provided with a fastening system 24 for forming a side closure. By applying the hook-type fastening members 58 to the loop-type landing member 64, the diaper 20 is fitted to the wearer and the first end region 48 and the second end region 50 are maintained in an overlapping configuration when the diaper 20 is worn.

In a preferred embodiment of the present invention as shown in FIG. 1, the fastening system 24 comprises a fastening member 58, preferably comprising a tape tab 60 and a hook-type fastening element 62, disposed adjacent each longitudinal side 40 of the body portion 22 in the back waist region 98 of the first end region 48; a landing member 64, engageable with the hook-type fastening element 62, disposed on the outside surface 46 of the body portion 22 in the front waist region 94. Additional fastening/disposal means 68 may be positioned on the tape tab 60, for allowing the diaper 20 to be secured in a disposal configuration so as to provide convenient disposal of the diaper 20.

Each fastening member 58 is intended to provide a mechanical fastening means for engaging the landing member 64 so as to provide a secure side closure for the diaper 20.

The fastening member 58 may comprise a combination of a hook-type fastening element and adhesive attachment means positioned on the body portion 22 of the diaper 20. The hook-type fastening element 62 of each fastening member 58 is joined to the body portion and preferably covers an area 25 mm wide (i.e., generally perpendicular to the longitudinal centerline 29) by 62.5 mm long (i.e., generally parallel to the longitudinal centerline 29) at the panels 51 of the body portion 22. An exemplary embodiment of a hook-type fastening member 62 is described in U.S. Pat. No. 4,699,622 entitled "Disposable Diaper Having an Improved Side Closure" issued to John W. Toussant and Margaret H. Hasse on Oct. 13, 1987.

As shown in FIGS. 1 and 2, the fastening member 58 most preferably comprises a tape tab 60. Any of the well known configurations and constructions of a tape tab may be used. A preferred tape tab 60 is a Y-shaped tape tab as described in detail in GB-A-1458566. Alternatively preferred tape tabs are described in detail in co-pending European Patent Application No. 87300450.1.

A particularly preferred tape tab 60 is illustrated in FIG. 2 and has a fastening surface 70 and a backing surface 72. The fastening surface 70 is that surface of the tape tab 60 designed to engage the landing member 64 of the present invention. Thus, the fastening surface 70 of the tape tab 60 will generally correspond to the garment-facing side 44 of the body portion 22. The backing surface 72 is that surface opposite of the fastening surface 70 and generally corresponds to the outside surface 46 of the body portion 22. The backing surface 72 is thus generally exposed during wear of the diaper 20.

The preferred tape tab 60 illustrated in FIG. 2 is one which is anchored to both the user-facing side 44 and the garment-facing side 46 of the body portion 22 to create a manufacturer's end (i.e., that attachment of the tape tab 60 to the diaper 20 made during manufacture of the diaper 20). The tape tab 60 has another element which forms the user's end i.e., that joint made by the person in securing the diaper to the wearer). Thus, the preferred tape tab 60 of the present invention has at least three elements, a first fixed portion 74, a second fixed portion 76, and a connective portion 78. The first fixed portion 74 is that portion of the tape tab 60 which

is attached to the user-facing side 44 of the body portion 22. The second fixed portion 76 is that portion of the tape tab 60 which is attached to the garment-facing side 46 of the body portion 22. The first fixed portion 74 and the second fixed portion 76 thus form the manufacturer's end of the tape tab 60. The connective portion 78 is that portion of the tape tab 60 which is attached to another portion of the diaper 20, generally the landing member 64 by the user when securing the diaper 20 on the wearer. The connective portion 78 thus forms the user's end. Additionally, the outer surface of the second fixed portion 76 and the outer surface of the connective portion 78 form the backing surface 72 of the tape tab 60 while the inner surface of the first fixed portion 74 and the inner surface of the connective portion 78 form the fastening surface 70 of the tape tab 60.

The preferred Y-shaped tape tab 60 of the present invention can be constructed in several ways. The first fixed portion 74, the second fixed portion 76, and the connective portion 78 can each be separate tapes which meet and are joined adjacent the longitudinal edge 40 of the body portion 22 in an area of joinder. A more practical structure for the tape tab 60 is one in which the connective portion 78 and either the first fixed portion 74 or the second fixed portion 76 are a unitary strip of tape material. If the connective portion 78 is unitary with the second fixed portion 76 as shown in FIG. 2, then the first fixed portion 74 is a separate element which is attached to the combined connective portion and the second fixed portion adjacent to the longitudinal side 40 of the body portion 22.

FIG. 2 also shows tab attachment means for securing the tape tab 60 to the body portion 22. These tab attachment means are any of those attachment means which provide an adequate bond, and preferably are any of the pressure-sensitive adhesives well-known to those of ordinary skill in the adhesive art. The outer surface of the first fixed portion 74 is affixed to the user-facing side 44 of the body portion 22 by a first tab attachment means 80. The inner surface of the second fixed portion 76 is affixed to the garment-facing side 46 of the body portion 22 by a second tab attachment means 82. The connective portion is provided with a first fastening element 62 joined to it preferably by the second tab attachment means 82 (alternatively, a third tab attachment means if the connective portion 78 is a separate element from the second fixed portion 76), although an adhesive attachment means may be placed on the first fastening element 62 separately and the combined material joined to the connective portion 78.

Preferred materials for the tape tabs 60 comprises a tape material such as tape code numbers XPF 14.43.0, Y-9376, or Y-9030 available from The Minnesota Mining and Manufacturing Company, St. Paul, Minn. The tape material in the embodiments are preferably a polyethylene film having a tab attachment means tailored to bond to the polyethylene positioned on the tape material. The tape tab attachment means may comprise any of those adhesives which provide an adequate bond with other portions of the diaper, and is preferably any of the pressure-sensitive adhesives well-known to those of ordinary skill in the art. Preferred tab attachment means is a pressure-sensitive adhesive such as code number XPF 1.42.34 available from The Minnesota Mining and Manufacturing Company, St. Paul, Minn.

As shown in FIG. 2, the tape tab 60 may also have a grip tab 83 at the distal edge 71 in the connective portion 78. The grip tab 83 may be formed by folding over a small margin of the distal edge 71 of the connective portion 78 and attaching it to itself. This forms an end on the connective portion 78 which is easier to grasp by the diaper user when

referred to in this test method as the leading edge of the tape tab 60. No actual grip tab needs be present at the leading edge of the tape tab 60 during testing. If the hooks of the hook-type material are angled with respect to the tape tab, the hooks are oriented to be inclined away from the leading edge.

The hook-type material is placed on the loop-type landing member. Subsequently, a rubber-coated steel roller of diameter of 3.25 in., a width of 1.75 in. and a weight of 4.5 lbs is rolled back and forth in the length direction of the tape tab 60 twice (a total of four passes).

The steel plate with the attached hook-type and loop-type materials is mounted horizontally into the lower jaw of an INSTRON test apparatus, Model 4201, which is set to have a cross-head speed of 12 in./minute, a Load Cell of 10.0 kg and a gage length of 2 in.

The leading edge of the tape tab 60 is placed in the upper jaw of the INSTRON apparatus.

The upper cross head is set in motion to pull the leading edge of the tape tab 60 off the loop-type landing member at an angle of 1850 with respect to the loop-type landing member. When the maximum pull force has been reached, the crosshead is returned to the pre-set gage length.

The peak force, in grams, is recorded for at least four samples and is averaged.

FIGS. 3 to 7 show cross-sectional views of different embodiments of the front waist region 94 of the diaper of FIG. 1 along a line or cross-section parallel to the front transverse edge 42' and running through the front waist elastic member 89. In FIGS. 3-6, the front waist section 94 is shown in its flattened state, i.e. the elastic elements 89 in the front waist region 94 are stretched.

In the embodiment of FIG. 3, the landing member 64 is made of an elastic loop-type material, which may be an elastic non-woven material or which may be a loop-type material comprising elastic strands or elastic fibers. The landing member 64 is located on the garment-facing side 46 of the backsheet 30 and forms the front waist elastic element 89.

FIG. 4 shows an embodiment wherein the landing member 64 comprises a laminate of an elastomeric film 96 and a loop-type material 97. The loop-type material 97 is bonded to the film 96 for instance by adhesive bonding or by ultrasonic bonding. A suitable film is available from EXXON as type no. 500 a suitable loop-type material is available from Amoco as fabric type no. P6. The laminate 96,97 may be formed by attaching the loop-type material 97 to the elastomeric film 96 while the film is in a pre-stretched state, such that the loop-type material is contracted by the film 96 to form gathers. Alternatively, the laminate 96,97 may be formed by attaching the loop-type material 97 to the film 96 while the film is in its relaxed state. Such a laminate material may be activated, to impart extensibility thereto prior to attaching it to the topsheet or the backsheet, or after attaching it to the topsheet or backsheet, by mechanically deforming the fibrous layer 97 by drawing it, or by passing it through a pair of corrugated rolls. By such a treatment, a number of fibers of the layer 97 will break or will become disentangled, so that this layer becomes extensible in the direction of the front transverse edge 42'. Mechanically activating a so-called "zero strain" elastic laminate has been described in European patent application no. 93117656.4 and in U.S. Pat. No. 5,196,000 and U.S. Pat. No. 5,236,430.

Another type of elastic laminate comprises a fibrous layer 97 attached to a film 96, which film is heated such that it elastically contracts to form an elastic laminate.

In the embodiment of FIG. 5, the front waist elastic element 89 is connected to the user-facing side 44 of the

topsheet 26. The landing member 64 is connected to the garment-facing side 46 of the backsheet 30, and is contracted by the elastic element to form transverse gathers, which run generally perpendicular to the front transverse edge 42'. The landing member 64 is in itself non-elastic, but is elastically extensible by at least 5%, preferably by at least 30%.

In the embodiment of FIG. 6, the elastic element 89 is sandwiched between the topsheet 26 and the backsheet 30. The landing member 64 is located on the garment-facing side 46 of the backsheet 30.

In the embodiment of FIG. 7, the elastic element 96 is shown in its relaxed state, the backsheet 30 and the landing member 64 being gathered by the contracted elastic element 96. Instead of the gathers in the topsheet 26 and the backsheet 30 being caused by contraction of the elastic element 96, the corrugations as shown in FIG. 7 may also have been imparted by passing the backsheet 30, the loop-type material 97 and the elastic film 96 through a pair of intermeshing grooved rolls while the elastic film 96 is in its relaxed state, as described in U.S. Pat. No. 5,236,430.

FIG. 8 shows an embodiment wherein the backsheet 30 comprises cut-out sections 90 in the front waist region 94. The topsheet 26 is exposed at the garment-facing side 46 of the backsheet 30 in the region of the cut-out sections 90 to form the landing member 64. The elastic element 89 contracts the topsheet in transverse gathers, which will cause the fibers of the topsheet 26 to stand away from the topsheet surface and which will cause parts of the topsheet 26 to project outwardly from the cut-out sections 90. This will improve the fastening of the hook-type fastening member 58 to the landing member 64.

FIG. 9 shows a cross-sectional view of the front waist region 94 of the diaper of FIG. 8 along a line or cross-section parallel to the front transverse edge 42' and running through the front waist elastic member 89. The cut-out sections, or holes, 90 through the backsheet 30 expose the topsheet 26 which forms an inner layer on the user-facing side 44 of the backsheet 30 which can engage with the hooks of the fastening member 58. In the embodiment of FIG. 10, and additional layer 92 is located between the topsheet 26 and the backsheet 30. The layer 92 may for instance be a polyethylene film, located between the topsheet and the core 28 along the front transverse edge of the core to prevent leakage therefrom, the layer 92 being in this case a so-called "waist shield". Alternatively, the layer 92 may be a tissue underlying the core and being co-extensive with the backsheet 30. In again another embodiment, the inner layer 92 is co-extensive with the backsheet 30 and is laminated to the user-facing side 44 of the backsheet 30, and may comprise a thermoplastic film. In this case the backsheet 30 is preferably formed by a non-woven layer, which provides a soft and cloth-like garment-facing surface 46. In case the inner layer 92 is unsuitable for becoming mechanically attached to the hook-type fastening members 58, the cut-out sections 90 extend through the inner layer 92 up to the inner layer which is adapted to entangle with, and to attach to the hook-type fastening members 58.

FIG. 11 shows a cross-sectional view of the front waist region 94 along a line of cross section parallel to the front transverse edge 42', wherein an elastic laminate 96,97 is comprised along the front waist edge 42' between the topsheet 26 and the backsheet 30. The laminate comprises a nonwoven layer 97 and an elastomeric film 96 attached to the nonwoven layer 97. The elastic laminate contracts the front waist edge 42' in a number of gathers such that the fibers of the layer 97 project outwardly into the apertures 90.

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FIG. 12 schematically shows a plan view of the garment-facing side of an absorbent article 20 wherein the landing member 64 is comprised of a single strip-shaped aperture in the backsheet 30 alongside the front transverse edge 42'. In the embodiment of FIG. 13, the landing member 64 comprises a number of individual cut out regions 99, 100, 101 and 102 located in the front waist region 94.

FIG. 14 shows an embodiment wherein the front transverse edge 42' of the backsheet 30 is curved. The cut-out sections 103, 104 are placed at an angle with respect to that front transverse edge 42' to receive the angled fastening members 58. An absorbent article of this shape fits well below the belly of the wearer and will be located in the low-motion zone of the wearer. Hence the front waist region 94 will be subject to little movement and will stay properly in place.

The fastening members 58 may comprise a loop-type material 68 on their backing surface 72, as shown in FIG. 1. This has as an advantage that the closure members 58 can be used to mutually engage for keeping the diaper 20 in a rolled-up disposal configuration as described in EP-A- 321 234.

In the embodiment of FIG. 15, the backsheet 30 comprises a front transverse edge 42' which is located below the topsheet 26 inboard from the front transverse edge 42" of the topsheet 26. The backsheet 30 does not extend into the landing zone 61, which is defined by the garment-facing surface to which the hook-type fastening members 58 can attach when the article 20 is placed on a wearer. The topsheet 26 extends beyond the front transverse edge 42' of the backsheet and forms the landing member 64. The front waist elastic element 89 is connected to the user-facing side 44 of topsheet 26.

FIG. 16 shows a cross-sectional view of the absorbent article of FIG. 15 along the longitudinal center line 29. The elastic element 89 is located on the garment-facing side 46 of the topsheet 26, and is for instance formed by a laminate of an elastomeric film 96 and a fibrous layer 97 to which the hook-type fasteners may engage. In this case the underlying topsheet material may be comprised of an apertured plastic film or of a fibrous material which is in itself unsuitable for attachment to the hook-type fastening members 58.

In FIG. 17 it is depicted that the elastic member 89 is located on the user-facing side 44 of the topsheet 26, as is also shown in FIG. 1. FIG. 18 depicts an embodiment wherein an inner layer 91 forms a waist shield against leakage of exudates from the front transverse edge 59 of the core 28. The inner layer 91 projects beyond the front transverse edge 59 of the core 28 and beyond the front transverse edge 42' of the backsheet 30 and forms the fastening member 64. In the embodiment of FIG. 19, the elastic element 89 is comprised between an inner layer 91, which is co-extensive, but not coterminous with the backsheet 30 and the topsheet 26. The inner layer 91 in this case may be a core-reinforcement layer or may be a non-woven inner layer, laminated to the backsheet 30. The elastic element is comprised between the inner layer 91 and the topsheet 26.

FIG. 20 shows an embodiment wherein the backsheet 30 comprises a curved front transverse edge 42' which defines the contour of a waist panel. The inner layer 91, which is uncovered by the backsheet 30 in the front waist region 94, forms the landing member 64. The inner layer 91 extends between edge 93 and front edge 42". In FIGS. 21 and 22, a cross-sectional view along the line 20—20 of FIG. 20 is shown. The inner layer 91 may be made of an elastic material and may be flat, i.e. without gathers, as shown in

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FIG. 21. In this case the front waist elastic element 89 is formed by the elastic layer 91.

Alternatively, the inner layer 91 is in itself non-elastic, but is contracted along a number of transverse gathers by a separate front waist elastic element 89, as shown in FIG. 22. The transverse gathers causes the fibers of the inner layer 91 to stand-up and project outwardly and thereby increase the fastening capacity of the hook-type material thereto. The transverse gathers may be formed by elastic contraction of the elastic material 87. Alternatively, the transverse gathers may be obtained by mechanical pre-straining of the inner layer to form parallel corrugations. In case the pre-straining imparts a degree of elasticity to an originally non-elastic web, the front waist elastic member 89 may be omitted, the pre-strained inner layer 91 forming the waist elastication.

FIG. 23 shows a partial enlarged plan view of a pre-strained inner layer 91 in the front waist region 94. The inner layer 91 comprises a number of parallel corrugations 120, 121. In case the inner layer 91 is not elastically extensible, these corrugations 121, 122 impart a degree of elastic extensibility of between 0-50%, preferably between 10% and 20% to the layer 91. Additionally, the mechanical treatment of the inner layer 91 by which the fibers of the inner layer become disentangled to a larger or smaller degree in the process of forming the corrugations 120, 121, will tend to improve the surface texture of the inner layer 91 for improved fastening of the hook-type material thereto. The process for imparting such surface structure has been described in detail in U.S. Pat. No. 5,196,000 and U.S. Pat. No. 5,236,430 and U.S. application Ser. No. 08/155406, filed on Nov. 19, 1993 in the name of The Procter & Gamble Company.

FIG. 24 shows an embodiment wherein the inner layer 91 comprises a number of parallel corrugations 120, 121 and forms an elasticated waist panel in the front waist region. In one embodiment, the layer 91 in FIG. 24 is a laminate of a non-elastic non-woven layer such as the polypropylene fibrous topsheet material and a non-elastic thermoplastic film, such as the polyethylene backsheet film.

In the embodiment of FIG. 25, the backsheet 30 comprises a first backsheet section 31 and a second backsheet section 31'. The first and second sections are mutually attached in the region of a front peripheral edge 43 of the first backsheet section 31. The front backsheet section 31' extends into the landing zone 61, which is indicated in FIG. 25 by dashed line 49. The front backsheet section 31' comprises a loop-type material for engaging with the hook-type fasteners 58. The front backsheet section 31' may be comprised of an elastic non-woven material or may comprise an extensible, non-elastic material which is gathered by a front waist elastic element 89.

FIGS. 26-28 show cross-sectional views of different embodiments of the absorbent article of FIG. 25, along the longitudinal centerline 29. The front backsheet section 31' is attached to the backsheet section 31 with attachment means 65, which may be adhesive, ultrasonic or heat-seal attachment means. The backsheet section 31 terminates at front peripheral edge 43, which is located outboard from the landing zone 61. The front backsheet section 31' is attached to the garment-facing side 46 of the backsheet section 31. In the embodiment of FIG. 26, the backsheet section 31 underlies the absorbent core 28 and is made of a liquid-impervious thermoplastic film, the front backsheet section 31' being made of a breathable elastic non-woven material.

In the embodiment of FIG. 27, a front waist elastic element 89 is located on the user-facing side 44 of the second section 31' of the backsheet 30. The first backsheet

104
107



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United States Patent [19]
Suprise et al.

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[54] **DISPOSABLE ABSORBENT ARTICLE
HAVING AN ABSORBENT SUPPORT
SYSTEM**

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[*] **Notice:** This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

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[52] **U.S. Cl.** 604/385.03; 604/385.21;
604/385.23; 604/385.26; 604/385.28; 604/386;
604/391; 604/392; 604/398

[58] **Field of Search** 604/385.1-386;
604/391-402, 385.01-385.03, 385.21-385.31;
602/70

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Primary Examiner—John G. Weiss

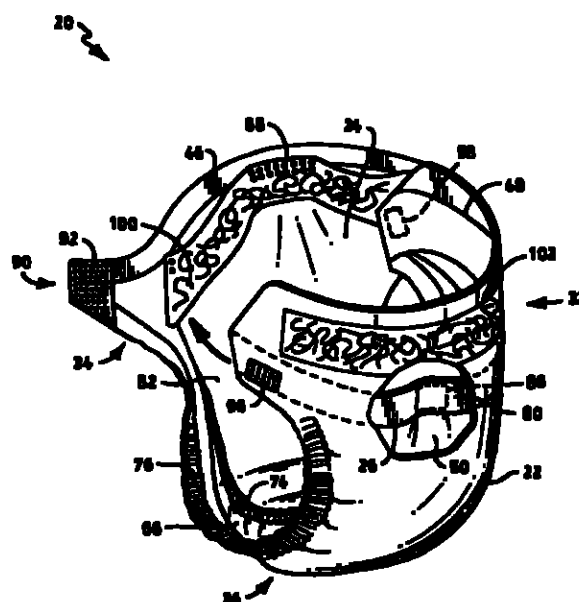
Assistant Examiner—K. M. Reichle

Attorney, Agent, or Firm—Jeffrey B. Curtin

[57] **ABSTRACT**

A disposable absorbent article defines an outer cover, an absorbent chassis and an absorbent support member which is configured to maintain the absorbent chassis close to a wearer's body in use. The absorbent chassis includes a backsheet, a bodyside liner which is connected to the backsheet in a superposed relation and an absorbent core disposed between the backsheet and the bodyside liner. The absorbent chassis is attached to the outer cover at the waist edges and remains at least partially unattached from the outer cover between the waist edges. The absorbent support member is attached to the absorbent chassis and extends between and connects the absorbent chassis to the side edges of the outer cover. The absorbent support member maintains the absorbent chassis in a close, conforming fit with the wearer's body even after the chassis becomes saturated with body exudates while the outer cover is free to move independently from the absorbent chassis. Thus, the disposable absorbent article has an aesthetically pleasing garment-like appearance and has improved fit and containment during use.

37 Claims, 3 Drawing Sheets



aspects of the present invention further includes a fastening system 90 for securing the absorbent article about the waist of the wearer. Typically, the fastening system 90 includes fasteners which are located on the outer cover 22 of the diaper 20 and which are configured to be refastenable. The use of fasteners which are refastenable or releasably engageable allows for ease of securing and removing the diaper 20 from the waist of the wearer.

For example, the fastening system 90 of the present invention, as representatively illustrated in FIGS. 1-3, includes a pair of primary fasteners 92 and 94 which are located on the outermost corners of the back waist region 34 of the outer cover 22. The primary fasteners 92 and 94 are configured to encircle the hips of the wearer and engage an outer surface of the front waist region 32 of the outer cover 22 for holding the diaper 20 on the wearer. Desirably, as representatively illustrated in FIGS. 1-3, the primary fasteners 92 and 94 are releasably engageable directly with the outer surface of the outer cover 22 to provide improved ease of fastening. Alternatively, the disposable diaper 20 of the present invention may include a fastening panel 102 on the outer surface of the front waist region 32 of the outer cover 22. In such a configuration, the primary fasteners 92 and 94 are releasably engageable with the fastening panel 102 to maintain the diaper 20 about the waist of the wearer. When the primary fasteners 92 and 94 are releasably engaged, the side edges 28 and 30 of the outer cover 22 encircle the legs of the wearer thereby defining the leg openings.

Suitable fasteners are well known to those skilled in the art and can include tape tab fasteners, hook and loop fasteners, mushroom fasteners, snaps, pins, belts and the like, and combinations thereof. For example, as representatively illustrated in FIGS. 1-3, the primary fasteners 92 and 94 may be hook type fasteners and the outer cover 22 or fastening panel may be configured to function as a complementary loop type fastener.

Desirably, the primary fasteners 92 and 94 are hook type fasteners which are releasably engageable with the outer cover 22. Such an arrangement provides the ability to vary the size of the waist opening in very small increments over a wide range to fit the waist of the wearer. The primary fasteners 92 and 94 may have any shape and size which provides the desired fastening of the diaper 20 about the waist of the wearer.

The fastening system 90 on the disposable diaper 20 of the present invention may further include a pair of secondary fasteners 96 and 98 to provide improved securement of the diaper 20 about the waist of the wearer and to provide additional support to maintain the absorbent chassis 24 in contact with the wearer. For example, as representatively illustrated in FIGS. 1-3, the diaper 20 may include a pair of secondary fasteners 96 and 98 which are located on the side edges 28 and 30 of the front waist region 32 of the outer cover 22. The secondary fasteners 96 and 98 are configured to encircle the hips of the wearer and engage a bodyfacing surface 100 of the rear waist edge 48 of the absorbent chassis 24 to maintain the absorbent chassis 24 of the diaper 20 in a close conforming fit to the buttocks of the wearer. Desirably, as representatively illustrated in FIGS. 1-3, the secondary fasteners 96 and 98 are hook type fasteners which are releasably engageable directly with the bodyfacing surface 100 of the absorbent chassis 24 to provide improved ease of fastening. Alternatively, the disposable diaper 20 of the present invention may include one or more fastening panels (not shown) on the bodyfacing surface of the rear waist edge 48 of the absorbent chassis 24 to which the secondary fasteners 96 and 98 are releasably engageable.

When the secondary fasteners 96 and 98 are releasably engaged, the absorbent chassis 24 is supported by both the absorbent support member 26 and the secondary fasteners 96 and 98 to ensure the absorbent chassis 24 remains in close contact with the wearer's buttocks in use.

Desirably, the absorbent support member 26, as discussed above and representatively illustrated in FIGS. 1-3, is attached to the side edges 28 and 30 of the outer cover 22 at or adjacent the location of the fasteners 92 and 94 or 96 and 98. For example, as illustrated in FIGS. 1-3, the absorbent support member 26 may include a strip of material 80 whose ends have been attached to the side edges 28 and 30 of the outer cover 22 adjacent the location of the secondary fasteners 96 and 98. In such a configuration, the forces exerted on the support member 26 are transferred to the fasteners 96 and 98 which more evenly distribute the forces to the rest of the diaper 20. In particular, the forces are distributed through the fasteners to the waist regions and leg regions of the outer cover 22.

The disposable diaper 20 of the different aspects of the present invention may further include elastics at the waist edges and side edges 30 and 32 of the outer cover 22 to further prevent the leakage of body exudates and support the absorbent chassis 24. For example, as representatively illustrated in FIGS. 1-3, the diaper 20 of the present invention may include a pair of leg elastic members 76 and 78 which are which are connected to the laterally opposed side edges 28 and 30 in the crotch region 36 of the outer cover 22. The leg elastics 76 and 78 are generally adapted to fit about the legs of a wearer in use to maintain a positive, contacting relationship with the wearer to effectively reduce or eliminate the leakage of body exudates from the diaper 20.

Materials suitable for use as the leg elastics 76 and 78 are well known to those skilled in the art. Exemplary of such materials are sheets or strands or ribbons of a polymeric, elastomeric material which are adhered to the outer cover 22 in a stretched position, or which are attached to the outer cover 22 while the outer cover is pleated, such that elastic constrictive forces are imparted to the outer cover 22. The leg elastics may also include such materials as polyurethane, synthetic and natural rubber. In a particular aspect of the invention, the elastics may be composed of individual strands of 620 decitex LYCRA elastomer which are commercially available from E. I. DuPont de Nemours Co. When individual strands of elastic are used, the waist and leg elastics may include any suitable number of elastic strands to provide containment of the body exudates. For example, the leg elastics 76 and 78 may include from 1 to 10 elastic strands. The leg elastics may be elongated prior to being attached to the outer cover 22. For example, the leg elastics may be elongated at least about 150 percent and desirably from about 200 to about 500 percent before being attached such that the elastics gather the outer cover 22 when relaxed. The leg elastics 76 and 78 may be joined to the outer cover 22 by any means known to those skilled in the art. For example, adhesive, thermal or ultrasonic bonding techniques may be used to join the elastics to the outer cover. Suitable adhesives include Findley H-2096 or H2525A hot melt adhesives which are commercially available from Findley Adhesives, Inc.

The different aspects of the present invention can advantageously provide a disposable absorbent article which has an absorbent chassis that maintains a close conforming fit with the wearer. The absorbent article also has a garment-like appearance. As a result, the disposable absorbent article of the present invention effectively contains body exudates while maintaining an optimum fit and an aesthetically pleas-

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US005209743A

United States Patent [19]
Hardison

[11] **Patent Number:** **5,209,743**
[45] **Date of Patent:** **May 11, 1993**

[54] **REUSABLE DIAPER AND THE LIKE**

[56]

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[22] **Filed:** **Aug. 23, 1991**

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A41B 9/00; A41B 9/04**

[52] **U.S. Cl.** **604/291; 604/358;
604/386; 604/385.1; 604/385.2; 604/390;
2/111; 2/406; 2/408; 2/DIG. 6; 2/DIG. 7**

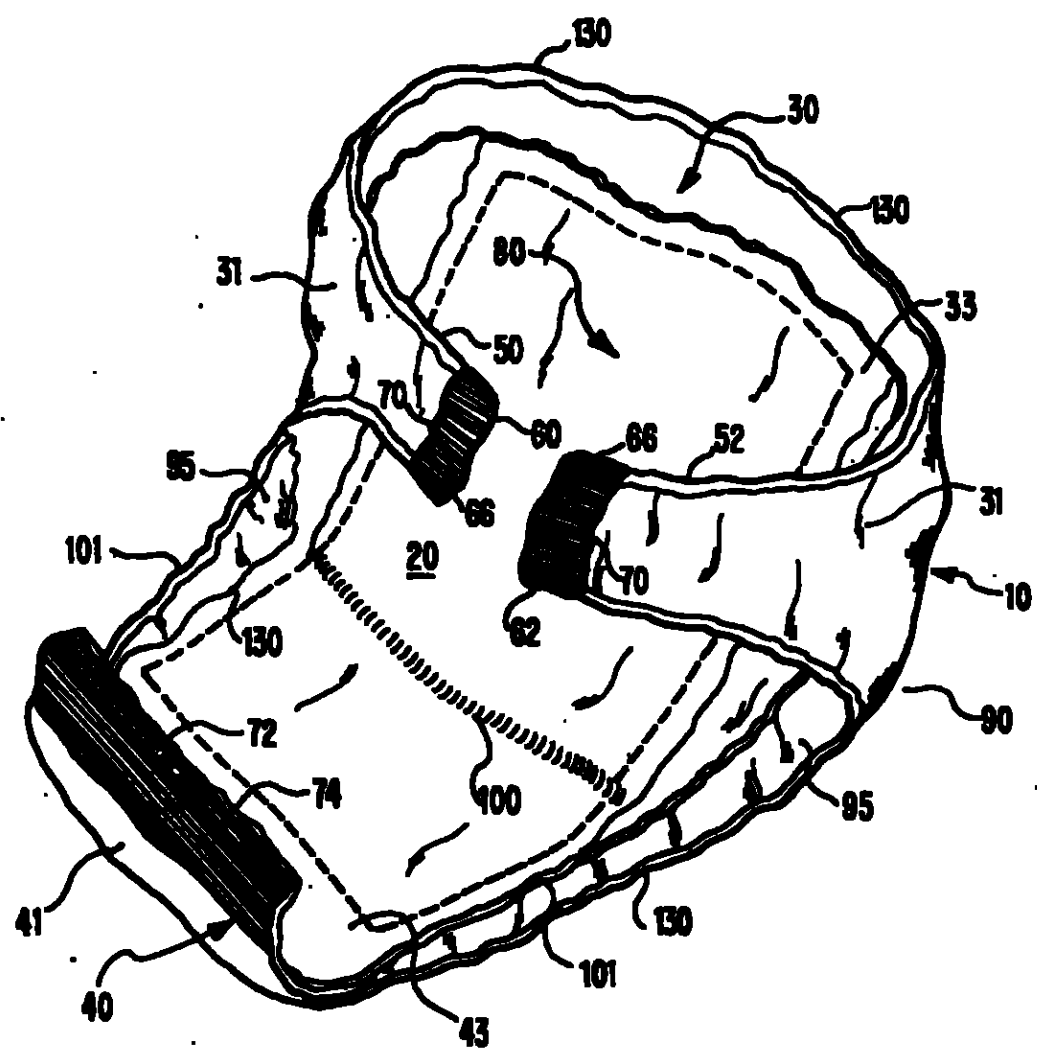
[58] **Field of Search** **2/111, 406, 408, DIG. 7,
2/DIG. 6; 604/391, 385.1, 385.2, 378, 386, 390,
358**

[57]

ABSTRACT

Reusable infant garment such as a diaper, or undergarment, the like configured to have loop means for securement by separate, detachable hook means.

18 Claims, 2 Drawing Sheets



REUSABLE DIAPER AND THE LIKE

FIELD OF THE INVENTION

This invention relates to diapers, diaper covers and pants-like garments for infants. More particularly the present invention relates to reusable such diapers, diaper covers, garments and the like.

BACKGROUND OF THE INVENTION

Reusable diapers and the like have been made with integral hook and loop members, e.g. the VELCRO™ for securely closing the diaper about an infant.

When the garment is removed from the infant and laundered, in the process of laundering the hook member readily links to other garments being laundered, causing these garments to be damaged and accumulating lint and rovings on the hook and agglomerating the laundered articles into a difficult to separate mass.

Commercially, when washing and/or drying hundreds of pounds of diapers or the like, the agglomeration can result in a "snow balling" effect in which one or more large "balls" of diapers, etc. are created. Such "balls" preclude the proper washing and/or drying and generate excessive vibratory motion which can lead to damaging the washing and/or drying machines.

SUMMARY OF THE INVENTION

The present invention relates to a reusable diaper, diaper cover or infant garment which comprises a cover member which includes a front portion which will, in use, be next to the front of the infant, and a rear portion. Tabs are provided on the sides of the rear portion which will overlap the front portion when the diaper or the like is worn by an infant. The outer surface of the front portion and the outer surfaces of the tabs are provided with loop means, e.g. of the VELCRO™ type, and separate hook means are completely detachable from the garment and are removed completely from the diaper or the like when it is to be washed, thus avoiding the above-noted problems of lint gathering damage and agglomeration of articles during washing.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a reusable diaper or the like in accordance with the present invention;

FIGS. 1(A)-1(D) show individual elements of FIG. 1;

FIG. 2 is a front view of the embodiment of FIG. 1 when arranged for wear on an infant;

FIGS. 2(A)-2(F) show individual elements of FIG. 2; and

FIGS. 2(A), 2(B) show a holder element for closure members of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to FIG. 1 a garment or reusable diaper in accordance with the present invention is shown at 10 having a cover member 20 which includes a rear portion 30 with an outer surface 31 and an inner surface 33 and a front portion 40 with an outer surface 41 and an inner surface 43. Rear portion 30 has tabs 50, 52 extending laterally away therefrom, to which are affixed at their end portions respective loop means 60, 62 suitably of the VELCRO™ type shown also in FIGS. 1(A) 1(B). In FIGS. 1(A), 1(B) the loop means 60, 62 are shown each having a loop upper portion 66 and a plain

lower surface 68, i.e. having neither loops or hooks. The loop portions 60, 62 can be cut from a commercially available strip shown in FIG. 1(C) at 59. The loop portions 60, 62 can be suitably affixed to the tabs 50, 52 by stitching indicated at 70 or other suitable means or techniques such as adhesives, etc. Front cover portion 40 has across its front peripheral edge 72, spaced away from rear portion 30, a band of loop means 74 of similar material to loop portions 60, 62 shown also in FIG. 1(D). Diaper 10 is suitably configured in a general L-shape 90 and held in this shape by gussets 95 joining and pulling together rear portion 30 and front portion 40 and forming a partial fold 100 as shown in FIG. 1. Optionally, additional absorbent means, such as panel 80 (shown in phantom) may be suitably secured in place within the diaper 10. Elastic edge trim 101 on the free edge of gussets 95 wrap securely and tightly about the infant's legs so as to preclude leakage. Preferably such trim 101 is of greater elasticity than the elastic edge trim 120.

In use, with reference to FIG. 2 the garment or diaper 10, e.g. a reusable diaper is wrapped around infant 15 so that rear portion tabs 50, 52 and loop portions 60, 62 are contiguous to loop portion 74 of front portion 40. Hook portions 102, 104 having hooks 110 shown also in the bottom views of FIGS. 2(A), 2(B), suitably of the VELCRO™ type can be cut from a strip of the type shown at 99 in FIG. 2(C) having a surface with hooks 110 and a plain opposite surface 68 with loop portions 60, 62 of rear portion 30 overlying loop portion 74 of front portion 30, the hook surfaces 102, 104 of hook means 102, 104 are pressed onto loop means 74 to secure the garment 10 to the infant. When removal for washing is required, the hook means 102, 104 are completely separated from the diaper and its completely hook-free periphery 120 can be washed without risk of lint gathering and agglomeration with other garments and damage to other garments or to the washing and/or drying machines. A single strip of hook means 125 as shown in FIG. 2(C) affixed to the outer surface 41 of front portion 40 can be utilized instead of a pair of hook means 60, 62, to join loop means 60 and 62 to loop means 74 as shown in FIG. 2(D). The garment, e.g. a reusable diaper and the like in accordance with the present invention is made of one or more layers of conventional materials such as a soft absorbent material like cotton absorbent flock or velvet, flannel, etc. for the cover means 20, and the outer surface 41 which may be a separate layer of a different material such as an impervious material like rubber or a soft pliable plastic material, etc. In one embodiment a single layer may comprise an absorbent inner side and an impervious outer side. Further in a diaper cover, one impervious layer may be utilized. Suitably stitched substantially about the periphery of the diaper gusset at 120 as shown in FIG. 1 is an elastic edge trim which serves to form fit the garment to the body. As best shown in FIG. 1, the gussets 95 are stitched together with the elastic edge trim 120 to the portions of the diaper structure which form leg openings when in use.

The present invention further includes, in combination, a strip of loop material shown at 200 in FIG. 2(A) with loops indicated at 205, the opposite surface of the strip 200 indicated at 210 is plain except for an end band portion 220 which has hook material 225 affixed to the strip 200 on the side opposite the loop material. The strip 200 is suitably wrapped around a member 230, which can be part of a baby changing table, crib, chair

United States Patent [19]
Proxmire

[11] Patent Number: 4,923,456
[45] Date of Patent: May 8, 1990

- [54] ADJUSTABLE COMBINATION FASTENER
FOR A DISPOSABLE DIAPER
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- [73] Assignee: Kimberly-Clark Corporation,
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- [21] Appl. No.: 140,009
- [22] Filed: Dec. 31, 1987
- [51] Int. Cl.³ A61F 13/16
- [52] U.S. Cl. 604/391; 640/385.2;
2/DIG. 6
- [58] Field of Search 604/385.1, 385.2, 386,
604/387, 389-402, 358, 367, 370; 24/300, 306
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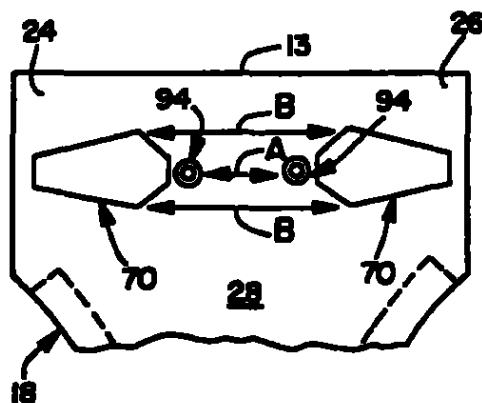
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[57] ABSTRACT

A disposable diaper comprises an absorbent structure integrated within an outer cover. The outer cover includes front and rear elasticized waist panels, an intermediate crotch panel separating the waist panels from one another, a pair of sides extending between and interconnecting the waist panels, a pair of leg openings delimited along the sides and front and rear pairs of ears delimited at the sides of the front and rear waist panels, respectively. The rear pair of ears define elongated shapes with internal, body-facing surfaces, a proximal portion spaced from a line centered on the longitudinal axis of the diaper, user end portions spaced distally from the proximal portions and elastomeric medial portions adjustably spacing and separating the user portions from the proximal portions. The front pair of ears have externally-facing surfaces presenting appointed landing zones, including fixed-position fasteners, cooperable with fixed fasteners provided on the user ends, and including variable-position fasteners selectively engageable with cooperating variable fasteners provided on the proximal portions, wherein the medial portions stretch to allow adjustment and fastening of the fixed-position fasteners once the variable-position fasteners have been selectively fastened.

17 Claims, 7 Drawing Sheets



a basis weight of from about 0.2 to 0.8 oz./yd²; a liquid impermeable barrier 36, for example, a commercially available plastic film of polypropylene or the like; and an absorbent core 38 disposed therebetween. As shown in FIG. 11, the absorbent structure 32 is in the form of a separate insert, typically of materials which are substantially nonstretchable, attached and integrated into the resiliently stretchable outer cover 12, preferably using autogenous bonds of the type generated thermally or ultrasonically, while allowing substantially unrestricted functional stretchability of the outer cover in a manner hereinafter described. A preferably continuous ultrasonic or thermal perimeter bond 40 sealingly secures the absorbent structure 32 together to prevent leakage therefrom by bonding the liner 34 and barrier 36 peripherally to one another, making the liner and barrier coterminous with one another, about the absorbent core 38 disposed therebetween. It is important that the materials of the barrier 36 and liner 34 be compatible with one another and with the material of the outer cover 12 for autogenous bonding. Accordingly, polypropylene and other polyolefins or polyolefin blends have been found to be suitable and economical polymeric materials for use in the liner, barrier and outer cover of the instant garment 10.

The outer cover 12 generally comprises an air-permeable, i.e., "breathable", elastomeric nonwoven material, particularly a stretch-bonded laminar fabric wherein an elastic nonwoven web is joined to one or more gatherable nonwoven webs of the type described in greater detail herein. Preferably, the nonwoven laminate is resiliently stretchable from about 20 to about 200 percent in an essentially cross-body direction 41 which is transverse to a longitudinal axis of the garment.

The longitudinally opposed ears 20, 24; 22, 26, which are engageable about a wearer, are releasably fastenable with one another, forming full-length closures extending substantially from the waist to the leg openings of the outer cover. The full-length closures further provide dimensional integrity to the resiliently stretchable garment during various and even extreme bodily movements and positions of the wearer. Since the garment is form-fitting and self-adjusting, it does not gap or collapse at the hip and waist regions. The various fastening systems used in the invention are also detailed herein.

Preferably, the waist sections 13, 14 of the outer cover 12 have the insert 32 attached and integrated therewith by attachment means according to the present invention as will be set forth more fully below.

With respect to the attachment means of the present invention as shown in FIGS. 2 and 3, it is important to minimize the number of bonds and total bond area used in integrating the relatively unstretchable absorbent insert to the stretchable outer cover or, where forming hems, the number of bonds used to bond the outer cover to itself. The Applicants have discovered that the number of bonds correspondingly affects the stretch elongation in the elastomeric component that is bonded. Not only does a lesser number of bonds result in less stretch loss, but the greater the spacing apart of bond points, the less stretch elongation is affected. Accordingly, bonding patterns should be selected that significantly reduce the amount of stretch lost by means of the density and spacing of the bond points. Specifically, the lower the number and density of the bonds 44 for attaching and integrating the insert 32 along the waist sections 13, 14, the less stretch is inhibited in said waist sections. For example, if the waist section is stretchable

in a cross-body direction and the insert is attached thereto at two points lying on a line extending also in said cross-body direction, then the stretchability of the outer cover waist section along that line is restricted between those two points of attachment by the least stretchable element present between those points, such as the liner and barrier of the insert or, further, the absorbent core which may be glued to the barrier with, e.g., hot melt construction adhesive. Similarly, the insert may also be attached and integrated at the crotch section.

Therefore, the garment of the present invention includes attachment means for attaching and integrating the absorbent insert structure 32, which is generally inelastic, into the relatively resiliently stretchable elastomeric outer cover which is used for positioning the insert in a selected bodily registration, while allowing substantially unrestricted functional stretchability thereof. Thus, the total garment is maintained anatomically form-fitting and generally self-adjusting.

These and other objectives have heretofore been addressed by Applicant's prior copending application Ser. No. 947,947, filed Dec. 31, 1986, now U.S. Pat. No. 4,770,656, the entire disclosure of which is expressly incorporated by reference herein and relied upon. Referring to FIGS. 2 and 4-7, full-length closures of the type disclosed in this referenced application may have cooperating primary closures, e.g., snaps, adjacent the waist and leg openings of each full-length closure, and cooperating secondary closures, e.g., hook and loop tapes, extending between each of the cooperating pairs of primary closures.

The instant garment 10 is generally constructed and assembled as shown in FIG. 2 and, with respect to other alternative embodiments, in FIGS. 10 and 11. The bonds 44 attach and integrate the opposed longitudinal ends 48, 50 of the absorbent insert 32 to said outer cover 12 at selected front 52 and rear 54 waist attachment zones along said front 13 and rear 14 waist sections, respectively, defining one or more free-span zones 56 underlying said insert 32 wherein the functional stretchability of said outer cover in said free-span zone 56 is substantially unrestricted. It will be understood that where the insert 32 is integrated only at the waist attachment zones 52, 54, i.e., not at the crotch section 16, the free-span zone wherein the outer cover stretchability is substantially unrestricted underlies the entire longitudinal span of the absorbent insert 32. Significantly, the free-span zone 56 also includes those portions of the waist sections 13, 14 not included in the waist attachment zones 52, 54. It will also be understood that the insert 32 may be adequately held by the outer cover 12 in registration with the body of the wearer without significant sideways shifting. Additional bonding of the insert in the free-span zone 56 to the front 28 or rear 30 panels or the crotch section 16 is not required.

Although the free-span zones 56 can be provided in either of the front 28 and rear 30 panels, it is important that the rear panel 30 have substantially unrestricted stretch properties from waist to leg across the lateral span of the rear panel 30 from one of the rear pair of ears 24 to the other ear 26. Cross-body direction stretch of the crotch section 16 of the outer cover 12 during use is minimally required so that bonding of the insert 32 at or near the leg openings 18 of the crotch section 16 does not significantly affect the overall cross-body stretch properties of the outer cover, that is, the ability to be

resiliently stretchable across the area defined by the front 28 or rear 30 waist panels.

The breathable outer cover 12 which, among other functions, holds the insert 32 in proper bodily registration, is not itself required to provide a liquid waste-containment barrier, unlike the prior art. In fact, application Ser. No. 947,947 also teaches a garment having a disposable insert which may be removed and replaced using snaps or the like, so that the outer cover becomes reusable, in this regard, the garment of the instant invention could also have a reusable outer cover and disposable insert system.

Referring again to FIG. 11, the absorbent insert 32 may further comprise at least one but preferably a pair of front 62 and rear 64 waist attachment flaps respectively situated at the opposed longitudinal ends 48, 50 of the insert 32. The flaps 62, 64 extend longitudinally from and contiguous with the liner 34 beyond the terminal ends of the absorbent composite 38, the flaps being bonded or otherwise attached to said front 13 and rear 14 waist sections, respectively, in said waist attachment zones 52, 54. The front 13 and rear 14 waist sections preferably have finished waist hems 66 along the waist opening wherein the waist attachment flaps 62, 64 are entrapped and bonded. The waist hems 66 comprise inwardly folded-over edges of said waist sections 13, 14. The waist attachment flaps 62, 64 (FIG. 11) may comprise coextensions of the barrier 36 and liner 34 or may comprise extensions of either the barrier 36 or liner 34 alone. Although the flaps 62, 64 typically comprise a nonwoven liner and plastic film materials that are not inherently stretchable relative to the outer cover 12, the flaps 62, 64 themselves need not be contiguous with the liner or barrier material.

Referring to FIGS. 2, 4, 5 and 7, according to the instant invention, there is provided an abdominal support band 65 attached to the front waist panel 28 and extending in the essentially cross-body direction indicated by arrow 41 across at least the central portion of the front waist panel 28. The abdominal support band 65 has a modulus of elasticity which is selected to either be greater or less than the modulus of elasticity of the front waist panel 28 in the essentially cross-body direction 41, depending on the desired fit characteristics of the garment 10. Where contractibility of the garment 10 is employed in order to achieve the desired fit for a range of body sizes, the outer cover 12 will be sized to fit larger body sizes within the given range and then supplemental elasticization in the waist and legs is provided to shorten the garment openings to fit the torso and thighs of a particular wearer. In this case, the supplemental elastics, such as the leg elastics 58 and the abdominal support band 65, must have a modulus of elasticity selected to provide a greater tension than the remaining portions of the outer cover to which the elastics 58, 65 are not attached. Conversely, where expansibility of the garment is employed to achieve the desired fit characteristics of the outer cover, the outer cover 12 is sized to fit smaller sized individuals within the given range of sizes, utilizing the inherent stretchability of the outer cover material to expand and accommodate the dimensions of the torso and legs of a particular wearer. The abdominal support band 65 may be an extruded elastomeric film or nonwoven material which, in the case where the band 65 has a greater tension than the remainder of the front panel, be attached to the front panel in a stretched condition with, for example, adhesive, or, in the case where the support band 65 has

a lower modulus of elasticity than the remainder of the front panel 28, the support band may comprise a band of the outer cover which has been bonded, either autogenously by thermal or ultrasonic means, or adhesively by attaching an adhesive piece to the front waist panel 28, thereby negating the stretch properties of the band which is thus bonded.

Referring to FIG. 1, the waist opening W defined by the front 13 and back 14 waist sections of the diaper is the desired positioning for proper fit of the garment of the present invention. The natural support line for the diaper, designated by the letter S, runs from the small of the back, over the hip and on the lower side of the protruding stomach. The distance from the small of the back up to the waist is represented by the designation d_1 and d_2 represents the distance from the support line S to the waist opening W. The distance d_2 is longer than the distance d_1 by about 1 to 3 inches. By providing disposable diapers with a support band located about 1 to 3 inches below the waistband, the diaper will be held in position better with less front panel drop than is seen in currently available commercial diapers. The panels 28, 30 will be held up from below the support band. The support band can take a number of forms. First, in a conventional unitary disposable diaper, the band could be an elastomeric material stretched then attached to the outer cover so as to contract the plastic film outer cover and provide a contractible force along the support lines (not shown).

The band 65 can be located in the front waist panel only, the rear panel 30 as well or a portion only of the front and back. Elastic waistbands currently provided in disposable diapers do not serve the function of the instant support band 65 since they provide mainly an aesthetic nonsupporting waist line appearance, e.g., along the line W.

Referring again to FIG. 2, additional elastication or bonding between other areas of the outer cover 12 and absorbent insert 32 may be provided. Specifically, supplemental leg elastics 58 may be applied to outermost portions of the crotch section 16 around the inner curvature of the leg openings 18 to gather the garment 10 about the thighs of the wearer. Crotch elastics 60 may be applied to the liner 34 to cause the insert to more closely conform to the contours of the wearer's perineal region.

The leg elastics 58 preferably comprise a breathable elastomeric nonwoven laminate of the type described in said prior copending U.S. patent application Ser. No. 947,947 of applicant. The leg elastic members 58 function cooperably with the stretchable outer cover for gathering the leg openings 18 about the wearer and can be applied in varying tensions relative thereto by adhesive, autogenous or pressure bonding. Leg hems (not shown) may alternatively be formed at the curved leg openings 18 in addition to the waist sections 13, 14, resulting in increased tension due to the increased thickness of the elastomeric material of the outer cover at the folded over hem. For this purpose, additional elasticized gathers (not shown) of, e.g., FULLASTIC®, a trademarked extruded elastomeric film material sold by H. B. Fuller Company of Minneapolis, Minnesota, can be entrapped within the waist hems 66 and any leg hems (not shown) to provide such additional elastic gathering. Although the waist opening has heretofore been discussed in conjunction with waist hems 66 and optional waist elastics entrapped therein, a nonwoven elastomeric laminar material of the type described for

the leg elastics 58 could be applied as a border strip (not shown) along the waist sections 13, 14 defining the waist opening.

As can be seen in FIG. 11, the barrier 36 closely surrounds the bottom 68, and sides 70 of the absorbent core 38 (shown in phantom) with the liner 34 extending across and contacting the top surface of the absorbent core 38, imparting a generally rectangular boat-shaped configuration to the insert 32. The bottom 68 of the barrier 36 may include one or more relaxed localized areas adjacent the bottom 68 of the absorbent core 38 to accommodate swelling of the core occurring during use with, for example, a hydrogel material. The perimeter bond 40 making the liner 34 and barrier 36 coterminous substantially around the absorbent core 38 may comprise either intermittent bonds or, preferably, a continuous autogenous, i.e., ultrasonic or thermal, bond. The perimeter bond 40 is preferably undulatory along the intermediate portion of the core 38, imparting a scalloped edge for greater flexibility therein.

Significantly, the absorbent structure 32 may be integrated into the outer cover 12 in the waist attachment zones 52, 54 while the outer cover is at least partially stretched in the cross-body direction 41. Preferably, the longitudinal length of the free-span zone 56 in the front 28 and rear 30 panels is at least about 2.5 inches or the longitudinal length between the waist and leg openings.

A preferred method of integrating the absorbent insert structure 32 into the resiliently stretchable breathable outer cover 12 and assembling the instant disposable absorbent garment 10 comprises the steps of providing the outer cover 12 with opposed front 13 and rear 14 waist sections, a central crotch section 16, front 28 and rear 30 waist panels extending between the crotch and the waist sections, prestretching the outer cover more than about 20%, preferably from about 20% to about 200%, in the cross-body direction 41 while superposing the insert 32 upon the outer cover, then bonding the longitudinally opposed ends 62, 64 of the insert to the waist sections 13, 14 in the selected waist attachment zones 52, 54, defining one or more free-span zones 56 allowing substantially unrestricted functional stretchability of the outer cover 12 underlying the free-span zones 56 (FIG. 10). One aspect of the present integration method comprises the step of inwardly folding over the outermost edges of the waist sections 13, 14 forming waist hems 66 entrapping the longitudinally opposed ends 62, 64 of the absorbent insert therein and bonding the opposed ends 62, 64 of the insert within the waist hems 66 at the waist attachment zones 52, 54 (FIGS. 10 and 11). As disclosed above, however, the waist opening may be elasticized by a breathable elastomeric nonwoven laminar border strip rather than elastomeric waist hems.

With respect to the physical properties required of the fastening system shown in FIG. 2, it has been found that the primary closures adjacent the leg and waist openings should have a peel strength from about 600 grams to about 2,500 grams, depending upon the outer cover material and the ability or strength of the parent or other user to open the closures. The secondary closures should have a shear strength greater than about 3,750 grams per square inch. The full-length closures maintain the dimensional integrity of the garments with minimal sagging of the waist or gapping and blowout at the hips during wear. The combination of desired peel and shear strength ranges for the fastening system shown in FIG. 2 is also applicable to the alternative

fastening system shown by FIGS. 8-16, that is, the fastening system should have a combined peel strength in the 600 gram to 2,500 gram range and shear strength greater than about 3,750 grams per square inch, as determined by the measurement methods set forth in said application Ser. No. 947,947.

FIGS. 4-7 show a disposable diaper 10 of the instant invention as it would be worn by a baby wherein the disposable diaper has a neat, trim, anatomically form-fitting appearance when viewed from different perspectives. Particularly, there is shown in FIGS. 4, 5 and 7 the proper positioning of the diaper 10 on a wearer during use, as aided by the abdominal support band 65.

Referring to FIG. 4, the elasticized waist sections 13, 14 define a waist opening providing, at least in part, a fit line W which corresponds to the lower umbilical region of a wearer, for optimal anatomical conformity and aesthetic appearance of the garment 10 when securely worn. Spaced from the waist sections 13, 14, the abdominal support band 65 extends angularly downwardly relative to said front waist section 13 defining, at least in part, a natural abdominal support line corresponding generally to a line extending anteriorly about the body from the dorsal side of the transubercular plane over the iliac crests and across the abdominal hypogastric region of a wearer.

FIG. 7 illustrates the self-adjusting functionality of the diaper aided by the abdominal support band 65, as shown by the minimal extent the diaper moves or sags from an initial position as indicated by the dashed lines 18' and 13' after being worn by an infant for a period of time.

Although the abdominal support band 65 discussed above in conjunction with FIGS. 1, 2 and 4-7 does provide a natural support line corresponding to the lower abdominal region of the wearer, the support band 65 provides only a limited degree of distribution of the tensile stresses across the front waist panel when the diaper is worn. During wear, it is desirable to direct tensile stresses away from those portions of the leg and waist openings that typically experience red marking. The placement and positioning of a fastening system which is nonstretchable can reduce forces near the leg opening and direct forces across the outer cover to support the absorbent, especially when wet, resulting in reduced diaper sag and droop, as will be shown herein in conjunction with FIGS. 8-16.

Referring to FIG. 8, there is depicted a disposable diaper 10 having the absorbent structure 32 attached and integrated within the elastomeric nonwoven outer cover 12. The front 28 and rear 30 waist panels are resiliently stretchable in the cross-body direction 41 and are engageable with one another to define a waist opening along the uppermost edges of the waist sections 13, 14. The sides 15 extend between and interconnect the waist sections, delimiting the pair of leg openings 18. The leg openings 18 may be either elastically contractible to gather the garment about the legs of a wearer or may be expansible, depending upon the particular fit parameters desired. The rear pair of ears 20, 22 define elongated shapes presenting inner, body-facing surfaces superposable on externally-facing surfaces 74 of the front pair of ears 24, 26, as shown in FIG. 8. A pair of inelastic landing zones, generally indicated at 70, are appointed within given areas (shown by the phantom lines 72 in FIG. 8A, 10 and 11) of the external surfaces 74 of the front pair of ears. The landing zones 70 have fastening means, generally indicated at 76, provided

thereon which are releasably engageable with fastening means, also indicated at 76, provided on the inner surfaces 78 of the rear pair of ears, as shown in FIG. 11. The landing zones 70 are selectively shaped, sized and oriented on the external surfaces 74 of the front ears so as to impart a tensile force distribution pattern directing stresses away from the leg 18 and waist openings defined by the waist sections 13, 14, while providing a band of abdominal support across the front waist panel 28 when the garment is securely fastened about a wearer, as will be appreciated with reference to the discussion herein.

Referring again to FIG. 8, the landing zones 70 may be shaped in a generally rounded or angular polygonal area. The width of the polygon (FIGS. 8 and 8A) narrows preferably, tapering in order to gradually concentrate forces away from the waist opening and the leg openings. The placement and positioning of the fastener landing zones 70, which are nonstretchable, define areas in a stretchable diaper, such as the front waist panel 28, which define regions of higher tensile forces therebetween, depending on the distances between points on the landing zones 70 and the stress/strain properties of the materials used for the outer cover 12. In this manner, tensile forces in the diaper can be directed to desired regions. Fastener position can, therefore, reduce forces near the leg openings and/or direct forces in the outer cover across an absorbent pad held therein to reduce diaper sag and droop. This is because a nonstretchable component bonded to a stretchable material eliminates stretch in the bonded region. When a fastener is bonded to a stretchable outer cover such as in the instant invention, the fastener shape generates zones where the outer cover must stretch to a greater extent and thus is at higher tension as defined by its stress/strain curve. Referring to FIG. 12A, triangularly shaped landing zones 70 direct forces across the front panel 28 to increase tension at the hips generally along the line A. The tension generated between the landing zones is proportional to the distance between fixed points on the landing zones, for example, the tension generated between end points of the segment A is greater than that generated along the line B, which is, in turn, greater than that generated along the line C. Such a landing zone placement operates to increase tension in the hip regions of the front panel 28. In similar fashion, the landing zone placement may be selected to increase tension at the waist opening, as shown in FIG. 12B wherein tension is greatest generally along the line A, with lines B and C representing lessening tensions approaching the leg openings 18. To increase tension in a localized region, it is necessary, as discussed above, to define a given area which represents a nonstretchable zone. This may be accomplished with either a bonded piece of material, or simply a bond pattern, as shown in FIG. 8A, wherein the given area 72 is surrounded by a series of autogenous, for example, ultrasonic bonds 80 conforming to the shape of the given area 72 and thereby defining the landing zones 70. The fastener landing zones 70 shown in FIGS. 8, 8A and 12C direct tensile forces away from both the leg and waist openings by providing the landing zones 70 with generally triangular shapes which direct forces along a central line A bisecting the landing zones, wherein the tensile forces generated along the line A are greater than those generated between the landing zones along the lines B (FIG. 12C).

Where the landing zone is delimited by a closed pattern of ultrasonic bonds 80, as shown in FIG. 8A, the hook component 82 of the fastening means 76 may be attached in a strip as shown and need not cover the entire landing zone 70, allowing smaller amounts of costly fastener material to be used; however, as shown in FIGS. 8 and 11, the landing zones 70 could comprise entire pieces of fastener material. The fastening means provided on the landing zones 70 and on the inner surfaces 78 of the rear pair of ears 20, 22, preferably comprises hook and loop fastening tapes of the type which are well known in the art and available from companies such as, for example, Velcro, U.S.A., Inc. Nevertheless, it will be appreciated by those skilled in the art that other forms of mechanical or even adhesive fastening means could be used in the diaper of the present invention. Preferably, where hook and loop fasteners are used, the loop portion 82 should be located on the inner, body-facing surfaces 78 of the rear pair of ears 20, 22 and the harsher hook portions 84 should be located on the landing zones 70, as shown in FIG. 11 to minimize potential skin contact therewith. It is preferable to further isolate the harsh hook portions 84 from possible contact with the skin of a wearer's leg by forming flaps 86 which cover a lower marginal portion of the hook material. The flaps 86 may be formed by outwardly folding over marginal edges of the leg openings 18 adjacent the front waist panel 28, as shown in FIG. 8.

Alternatively, the front ears may be further elongated in a cross-body direction and the landing zones tapered and elongated so that their width narrows distally in a direction away from the centerline, thereby enabling the fastening means to be secured together along substantially the full tapered length of the landing zones to provide a longer closure along the sides of the garment, where desired, between the front and rear waist panels from the leg openings to the waist openings, while avoiding fastener-skin contact (not shown).

Referring to FIGS. 9A, 9B and 12C, there is shown an alternative to the fastening system constructed in accordance with the present invention. Not only is it possible to minimize the amount of material used for the hook component 84 used as a mechanical fastening element on the landing zone 70 (FIG. 8A), but it is also possible to minimize the amount of loop material 82 utilized on the body-facing surfaces 78 of the rear pair of ears, of which a representative ear 22 is illustratively shown. With further reference to FIGS. 9A and 9B, there is shown an adjustable combination fastening system wherein the rear pair of elongated ears 22 comprise proximal portions 88 equidistantly spaced from the centerline, user end portions 90 spaced distally from the proximal portions 88 and elastomeric medial portions 92 adjustably spacing the user portions 90 from the proximal portions 88. The hook component 84 of the mechanical fastening means 76 is provided on the landing zones 70 appointed on the externally-facing surfaces 78 of the front ears 24, 26, of which a single front ear 26 is illustratively shown in FIGS. 9A and 9B. Fixed-position mechanical fastening means, such as the snaps generally indicated at 94, are provided on the external surface 74 of the front ear 26 and the bodyside surface 78 of the rear ear 22. The hook 84 and loop 82 components on the landing zones 70 and the proximal portion 88 of the rear ear 22, respectively, comprise variable-position mechanical fastening means which are initially engaged when fastening the diaper garment 10, as shown in FIG. 9B. Once the strip of loop component 82

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United States Patent [19]
Suprise et al.

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[54] **ABSORBENT ARTICLE WITH FASTENING SYSTEM TO PREVENT DROOPING**

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[*] **Notice:** This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

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[51] **Int. Cl.⁶** A61F 13/15

[52] **U.S. Cl.** 604/391; 604/358

[58] **Field of Search** 604/358, 386, 604/387, 389, 390, 393, 400, 391, 385.2, 385.1

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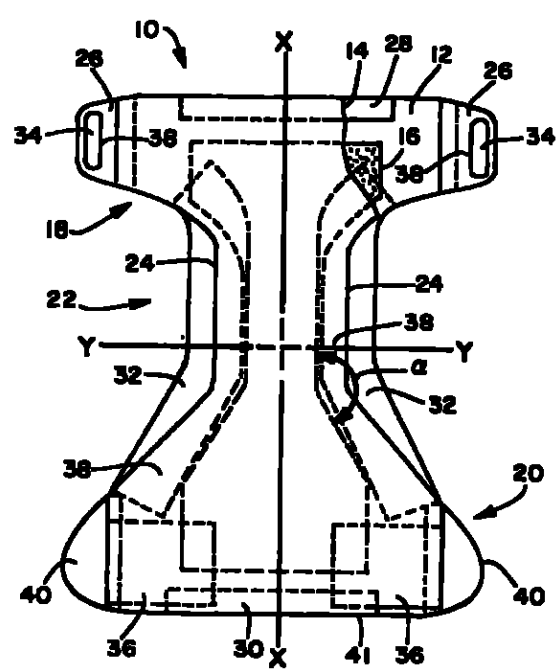
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[57] **ABSTRACT**

The present invention is directed to an absorbent article which is configured to prevent drooping and to improve fit. The article comprises attachment means for attaching the article about the waist of a wearer such that attachment points are located on the sides of the article and behind a transverse center plane of the article.

31 Claims, 4 Drawing Sheets



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members 34 can, alternatively, be located on rear ear 40, while loop members 36 are located on the outer surface of the front portion 18 of diaper 10. In such a situation, rather than having the front-to-back fastening illustrated on the diapers of FIGS. 1 and 2, FIG. 3 illustrates a diaper having a more traditional back-to-front fastening. Nonetheless, the opposed ears 40 located on the rear portion are adapted, in use, to overlap with the front portion of the article. The hook-and-loop members, for attaching the overlap portion of the ears 40 to the front portion 18, form attachment points. The attachment points are located on the side of the diaper behind a transverse center plane of the diaper.

FIG. 3 further comprises containment flaps 46 including proximal edges 48 and distal edges 50. The containment flaps 46 may be formed in a wide variety of configurations known to those skilled in the art. Suitably, proximal edges 48 are attached to, or integrally formed from, the body-side liner 14. The distal edges 50 are generally unattached to the body-side liner 14 at least in the crotch portion 22. In this manner, the containment flaps serve to form a barrier to the lateral flow of body exudates. The containment flaps may further comprise containment flap elastics 52 which serve to maintain the containment flaps 46 in a generally upright configuration. Those skilled in the art will recognize that containment flaps 46 may be separate, add-on flaps or may be integrally formed from the body-side liner 14.

Diaper configurations suitable for use in the present invention are explained in greater detail in the following U.S. patents and patent applications, the disclosures of which are incorporated herein to the extent consistent herewith. U.S. patent application Ser. No. 07/757,760 filed Sep. 11, 1991, in the name of Hanson et al.; U.S. Pat. No. 4,149,335 issued Sep. 22, 1992, to Kallenberger et al.; U.S. Pat. No. 4,798,603 issued Jan. 17, 1989, to Meyer et al.; U.S. Pat. No. 4,704,116 issued Nov. 3, 1987, to Enloe; U.S. Pat. No. 5,147,343 issued Sep. 15, 1992, to Kallenberger; and U.S. patent application Ser. No. 07/997,800, filed Dec. 29, 1992, in the name of McCormack et al. previously incorporated herein by reference.

As generally discussed above, the absorbent article of the present invention comprises attachment means for attaching an overlapped portion of ears located on the front or rear portion of the diaper to a respective rear or front portion of the diaper. This attachment forms attachment points which are located on the side of the diaper behind a transverse center plane of the diaper. As used herein, a transverse center plane of an article, such as a diaper, is intended to refer to a plane which transversely bisects the absorbent article through the crotch portion when the attachment means are attached to form attachment points and, therefore, a three-dimensional article. Specifically, a longitudinal central axis of the article is determined (line X in FIG. 1). A transverse central axis perpendicular to the longitudinal central axis is determined (line Y in FIG. 1). The attachment means are attached to form attachment points and a three-dimensional article. A longitudinal center plane passes through and contains the longitudinal central axis. The transverse center plane described herein is perpendicular in all aspects to the longitudinal central plane and passes through and contains the transverse center axis.

This aspect of the invention can best be understood by reference to FIGS. 4 and 5. FIG. 4 illustrates the absorbent article illustrated in FIG. 1 in place on a wearer. As can be seen from reference to FIG. 4, when the attachment means are attached to form attachment points, that is, when the hook-and-loop members are engaged, a three-dimensional article is defined. The article comprises a front panel 54, a

rear panel 56, and sides 58. A transverse center plane 60 is illustrated in FIGS. 4 and 5. The transverse center plane 60 transversely bisects the article when the attachment means are engaged.

The transverse center plane of the article will, in the preferred embodiment, coincide or nearly coincide with the transverse center plane of the wearer. The transverse center plane of a wearer is that plane which is perpendicular to a plane on which the wearer is standing and passes through the center of both ankles and both ear lobes of the wearer when the wearer is standing upright with feet together.

The front and rear portions of the article, as well as the ears present on the article, are configured so that there is overlap between the front portion and rear portion of the article at sides 58. In the overlapping area defined by the front and rear portions, the attachment means, for example, hook-and-loop members, are attached to form attachment points. Applicants have found that by having at least some, preferably all, of the attachment points located on the side of the article behind a transverse center plane of the article, improved fit and less drooping in the front panel 54 of the article is achieved. As used herein, reference to an area "behind the transverse center plane" is intended to refer to that area which is closer to back panel 56 than to front panel 54 when moving along the outer circumference of the diaper 10. Thus, in both FIGS. 4 and 5, hook members 34 are located "behind the transverse center plane" 60. Moreover, Applicants have found that particularly improved fit is obtained when at least some, desirably a majority, and preferably all, of the attachment points are located within 2.5 inches (6.4 centimeters), beneficially within about 1.5 inches (3.8 centimeters) and preferably within about 1.0 inch (2.5 centimeters) of said transverse center plane. By having the attachment points be located within about 1.0 inch of the transverse center plane, it can be assured that the attachment points are located at the sides of the article 10. In one specific embodiment, at least some of the attachment points are located within about 0.1 inch (0.254 centimeter) of the transverse center plane.

The improved fit obtained by the described positioning of the attachment points is believed to result, at least in part, from the fact that the described positioning results in the attachment points being located on a portion of a wearer which does not flex with movement of the wearer. Specifically, the attachment points are generally located over the hip bones of a wearer, thus, subjecting the attachment points to less movement (shear forces) during movement of the wearer. Further, the force vector created by the attachment illustrated in FIG. 4 is upward and toward the rear of the wearer. This serves to prevent or reduce drooping in the front panel of the diaper.

FIG. 4 illustrates a front-to-back fastening wherein the front portion overlaps the rear portion to engage the attachment means. FIG. 5 illustrates a back-to-front fastening wherein the back portion overlaps the front portion to allow for engagement of the attachment means.

While the invention has been described in detail with respect to specific embodiments thereof, it will be appreciated that those skilled in the art, upon attaining an understanding of the foregoing, may readily conceive of alterations to, variations of, and equivalents to these embodiments. Accordingly, the scope of the present invention should be assessed as that of the appended claims and any equivalents thereto.

What is claimed is:

1. A disposable absorbent article, said article defining a front portion, a rear portion and a crotch portion connecting

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the front and rear portions and having opposed longitudinal side edges, said article comprising:

- an outer cover;
- a liquid-pervious body-side liner;
- an absorbent material located between said outer cover and said body-side liner;
- a pair of opposed ears located on said front portion, said ears being adapted, in use, to overlap with said rear portion of said article to form overlapped portions;
- attachment means for attaching said overlapped portions of said ears to said rear portion to form attachment points, said attachment points being located on a side of said article behind a transverse center plane of said article and within about 2.5 inches (6.4 centimeters) of said transverse center plane;
- a waist elastic member attached to at least one of said front portion or said rear portion; and
- leg elastic members attached to said crotch portion adjacent said opposed longitudinal side edges.

2. The absorbent article according to claim 1 wherein said ears are non-integrally formed with said front portion.

3. The absorbent article according to claim 1 wherein said attachment means comprise a first mechanical fastener attached to said ears and adapted to releasably engage with a second mechanical fastener attached to said rear portion.

4. The absorbent article according to claim 3 wherein said first mechanical fasteners are hook members of a hook-and-loop fastener and said second mechanical fasteners are loop members of a hook-and-loop fastener.

5. The absorbent article according to claim 3 wherein said first mechanical fastener has a length of up to about 3.5 inches (8.9 centimeters).

6. The absorbent article according to claim 1 wherein all of said attachment points are located within about 1.5 inches (3.8 centimeters) of said transverse center plane.

7. The absorbent article according to claim 6 wherein all of said attachment points are located within about 1.0 inch (2.54 centimeters) of said transverse center plane.

8. The absorbent article according to claim 1 wherein said waist elastic member is attached to said front portion and said absorbent article further comprises a waist elastic member attached to said rear portion.

9. The absorbent article according to claim 1 wherein said leg elastic members are separate elements which extend beyond said opposed longitudinal side edges.

10. The absorbent article according to claim 1 wherein said leg elastic members are located between said body-side liner and said outer cover.

11. The absorbent article according to claim 1 wherein said leg elastic members curve outward into the rear portion at an angle of about 75 degrees or less.

12. The absorbent article according to claim 11 wherein said leg elastic members curve outward into the rear portion at an angle of about 60 degrees or less.

13. The absorbent article according to claim 1 wherein said leg elastic members cause the rear portion to become cup shaped.

14. The absorbent article according to claim 4 wherein said leg elastic members abut or overlap with said loop members.

15. A disposable absorbent article, said article defining a front portion, a rear portion, and a crotch portion connecting the front and rear portions and having opposed longitudinal side edges, said article comprising:

- an outer cover;
- a liquid-pervious body-side liner;

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an absorbent material located between said outer cover and said body-side liner;

a pair of opposed ears located on said rear portion, said ears being adapted, in use, to overlap with said front portion of said article to form an overlapped portion;

attachment means for attaching said overlapped portion of said ears to said front portion to form attachment points, said attachment points being located on a side of the article behind a transverse center plane of said article and within about 2.5 inches (6.4 centimeters) of said transverse center plane;

a waist elastic member attached to at least one of said front or rear portion; and

leg elastic members attached to said crotch portion adjacent said opposed longitudinal side edges.

16. The absorbent article according to claim 15 wherein said ears are non-integrally formed with said rear portion.

17. The absorbent article according to claim 15 wherein said attachment means comprise a first mechanical fastener attached to said ears and adapted to releasably engage with a second mechanical fastener attached to said front portion.

18. The absorbent article according to claim 17 wherein said first mechanical fasteners are hook members of a hook-and-loop fastener and said second mechanical fasteners are loop members of a hook-and-loop fastener.

19. The absorbent article according to claim 18 wherein said first mechanical fastener has a length of up to 3.5 inches (8.9 centimeters).

20. The absorbent article according to claim 15 wherein all of said attachment points are located within about 1.5 inches (3.8 centimeters) of said transverse center plane.

21. The absorbent article according to claim 20 wherein all of said attachment points are located within about 1.0 inches (2.54 centimeters) of said transverse center plane.

22. The absorbent article according to claim 15 wherein said waist elastic member is attached to said front portion and said absorbent article further comprises a waist elastic member attached to said rear portion.

23. The absorbent article according to claim 15 wherein said leg elastic members are separate elements which extend beyond said opposed longitudinal side edges.

24. The absorbent article according to claim 15 wherein said leg elastic members are located between said body-side liner and said outer cover.

25. A disposable absorbent article, said article defining a front portion, a rear portion, and a crotch portion connecting the front and rear portions and having opposed longitudinal side edges, said article comprising:

- an outer cover;
- a liquid-pervious body-side liner;
- an absorbent material located between said outer cover and said body-side liner;
- a pair of opposed ears located on said front portion, said ears being adapted, in use, to overlap with said rear portion of said article;
- a first mechanical fastener attached to said opposed ears;
- a second mechanical fastener attached to said outer cover in said rear portion and being configured to releasably engage with said first mechanical fastener to define attachment points; all of said attachment points being located behind a transverse center plane of said article and within about 2.5 inches (6.4 centimeters) of said transverse center plane; and