

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ATTENDS HEALTHCARE PRODUCTS, INC.

Petitioner

v.

PAUL HARTMANN AG

Patent Owner

***Inter Partes* Review No. IPR2020-01479**
Patent No. 8,771,249

PETITION FOR *INTER PARTES* REVIEW UNDER 35 U.S.C. § 312

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Petitioner's Exhibit List

Ex.	Shorthand	Description
1001	'249 Patent	U.S. Patent No. 8,771,249
1002	Benning	U.S. Patent App. Pub. No. 2005/0256496
1003	Karami '772	U.S. Patent App. Pub. No. 2006/0058772
1004	Karami '626	U.S. Patent App. Pub. No. 2003/0220626
1005	Miyamoto '499	U.S. Patent App. Pub. No. 2004/0016499
1006	Kleinschmidt	U.S. Patent No. 6,547,773
1007	Jacobs	U.S. Patent No. 5,814,178
1008	Anderson	U.S. Patent No. 6,605,172
1009	Stupperich	Certified Translation of German Patent Application DE 10 2004 053 469 A1, Certificate of Translation, and Original German-Language Document
1010	Mandzsu	WO Patent Pub. No. 2006/099000
1011	Cree	U.S. Patent No. 6,255,236
1012	Jezzi	Declaration of Arrigo "Rick" Jezzi
1013	EDANA	Davis Dyer, <i>Seven Decades of Disposable Diapers: A Record of Continuous Innovation and Expanding Benefit</i> (EDANA, Aug. 2005)
1014	Huggies	USA Volume 2 Huggies
1015	Glaug	U.S. Patent No. 6,514,233
1016	Rohrl	U.S. Patent App. Pub. No. 2006/0282053
1017	Karami '341	U.S. Patent App. Pub. No. 2001/0023341
1018	Fries	U.S. Patent No. 5,549,592
1019	McCormack	U.S. Patent No. 5,695,868
1020	Horn	U.S. Patent App. Pub. No. 2004/0158957
1021	INDA Glossary	INDA Nonwovens Glossary (INDA 2002)
1022	Young	U.S. Patent No. 5,626,571
1023	Sun	U.S. Patent No. 6,852,904
1024	Zoia	U.S. Patent No. 5,053,028

Ex.	Shorthand	Description
1025	Braverman	WO Patent Pub. No. 2006/071211
1026	Neugebauer	U.S. Patent App. Pub. No. 2007/0134489
1027	Igaue	U.S. Patent App. Pub. No. 2004/0236303
1028	Damaghi	U.S. Patent App. Pub. No. 2005/0261650
1029	O'Connell	U.S. Patent No. 6,235,011
1030	Karami '584	U.S. Patent App. Pub. No. 2001/0042584
1031	Miller	U.S. Patent No. 5,845,375
1032		Omitted
1033		Omitted
1034	ASTM D5169	ASTM D5169-98 (1998)
1035	ASTM D5170	ASTM D5170-98 (1998)
1036	Miyamoto '930	U.S. Patent 6,840,930
1037	Couillard	U.S. Patent App. Pub. No. 2002/0174931
1038		Omitted
1039	Brady	U.S. Patent No. 6,843,949
1040	Gorman	U.S. Patent No. 5,256,231
1041	Tao	U.S. Patent No. 6,569,136
1042	Roe	U.S. Patent App. Pub. No. 2004/0224132
1043	FileHistory	File History Excerpts - '249 Patent
1044	Gehring	U.S. Patent No. 6,854,297
1045	Fernfors	U.S. Patent App. Pub. No. 2002/0193776
1046	Huang	EP0734243B1
1047	Hari	<i>Types and properties of fibres and yarns used in weaving</i> , P.K. Hari, Chapter 1 of K.L. Gandhi, <i>Woven Textiles Principles, Technologies and Applications</i> (Series in Textiles, 2012, pg. 3-34)
1048	Chhabra	U.S. Patent App. Pub. No. 2004/0137200
1049	Kauschke	U.S. Patent No. 6,537,644

Claim Listing

Claim	Limitation No.	Limitation
1	1[p]	An absorbent incontinence diaper for an adult user, comprising:
	1[a][1]	a chassis having an inner face which, when in use, is directed toward a user body and an outer face which, when in use, is directed away from the user body,
	1[a][2]	said chassis having an absorbent body and a backsheet on a side of said absorbent body which, when in use, is directed away from the user body,
	1[a][3]	said absorbent body having a smaller width than said backsheet,
	1[a][4]	said chassis also having a rear area, a front area, and a crotch area lying between said rear area and said front area,
	1[a][5]	said chassis further defining first and second side edges;
	1[b]	a first ear attached as a separate component to said first side edge in said front area; a second ear attached as a separate component to said second edge in said front area; a third ear attached as a separate component to said first side edge in said rear area; a fourth ear attached as a separate component to said second side edge in said rear area;
	1[c][1]	said third and fourth ears having a closure component including mechanical closure aids
	1[c][2]	which, when in use, hold the diaper on the user body when said closure component is selectively fastened to either said outer face of said chassis or to said outer face of said first and second ears;

Claim	Limitation No.	Limitation
	1[d]	wherein retaining forces between said closure component and said outer face of said chassis are lower than retaining forces between said closure component and said outer face of said first and second ears.
2	2	The absorbent incontinence diaper for an adult user of claim 1, wherein said retaining forces are determined as over-abdomen retaining forces.
3	3	The absorbent incontinence diaper for an adult user of claim 2, wherein said retaining forces, determined as over-abdomen retaining forces between said closure component and said outer face of said chassis, are 57-20 N/25 mm.
4	4	The absorbent incontinence diaper for an adult user of claim 3, wherein said retaining forces, determined as over-abdomen retaining forces between said closure component and said outer face of said first and second ears, are 90-58 N/25 mm.
5	5	The absorbent incontinence diaper for an adult user of claim 3, wherein said mechanical closure aids comprise hooks of a hook-and-loop fastener.
6	6	The absorbent incontinence diaper for an adult user of claim 5, wherein said closure component comprises an adhesive closure aid.
7	7	The absorbent incontinence diaper for an adult user of claim 3, wherein at least a portion of said outer face of said chassis is constituted by a chassis nonwoven material.
8	8	The absorbent incontinence diaper for an adult user of claim 7, wherein said chassis nonwoven material has a mass per unit area of 10-30 g/m ² .
9	9	The absorbent incontinence diaper for an adult user of claim 7, wherein said chassis nonwoven material is subjected to temperature treatment above 60° C. to improve said over-abdomen retaining forces.

Claim	Limitation No.	Limitation
10	10	The absorbent incontinence diaper for an adult user of claim 7, wherein said chassis nonwoven material is subjected to ring-rolling to improve said over-abdomen retaining forces.
11	11	The absorbent incontinence diaper for an adult user of claim 7, wherein said first nonwoven material has a mass per unit area of 18-22 g/m ² .
12	12[a]	The absorbent incontinence diaper for an adult user of claim 3, further comprising: said outer faces of said first and second ears are constituted by an ear nonwoven material;
	12[b]	at least a portion of said outer face of said chassis is constituted by a chassis nonwoven material;
	12[c]	a mass per unit area of said ear nonwoven material is greater than a mass per unit area of said chassis nonwoven material; and
	12[d]	a thickness of said ear nonwoven material is greater than a thickness of said chassis nonwoven, the thickness being determined under a test pressure of 0.5 kPa.
13	13	The absorbent incontinence diaper for an adult user of claim 2, wherein said over-abdomen retaining forces are determined using a pull-off angle tangential to a curved surface and kept constant, said curved surface having a radius of curvature of 400 mm.
14	14	The absorbent incontinence diaper for an adult user of claim 2, wherein said retaining forces, determined as over-abdomen retaining forces between said closure component and said outer face of said chassis, are 50-25 N/25 mm.
15	15	The absorbent incontinence diaper for an adult user of claim 2, wherein said retaining forces, determined as over-abdomen retaining forces between said closure component and said outer face of said first and second ears, are 80-60 N/25 mm.

Claim	Limitation No.	Limitation
16	16	The absorbent incontinence diaper for an adult user of claim 1, wherein said retaining forces, determined as over-abdomen retaining forces between said closure component and said outer face of said chassis, are 57-20 N/25 mm.
17	17[a]	The absorbent incontinence diaper for an adult user of claim 16, wherein said backsheet is constituted by a nonwoven-foil laminate,
	17[b]	wherein outside nonwoven material and inside foils seat facing said absorbent body, wherein said outside nonwoven material constitutes an outer face of said chassis.
18	18	The absorbent incontinence diaper for an adult user of claim 17, wherein said foil is constituted by a breathable foil that is impermeable to liquids, said foil having at least one layer.
19	19	The absorbent incontinence diaper for an adult user of claim 16, wherein said outer faces of said first and second ears are constituted by an ear nonwoven material.
20	20[a]	The absorbent incontinence diaper for an adult user of claim 19, wherein at least portions of said outer face of said chassis are constituted by chassis nonwoven material and
	20[b]	a mass per unit area of said ear nonwoven material is greater than a mass per unit area of said chassis nonwoven material.
21	21	The absorbent incontinence diaper for an adult user of claim 20, wherein a thickness of said ear nonwoven material is greater than a thickness of said chassis nonwoven, the thickness being determined under a test pressure of 0.5 kPa.

Claim	Limitation No.	Limitation
22	22	The absorbent incontinence diaper for an adult user of claim 16, wherein said first and second ears are constituted by an ear nonwoven material that is permeable to air and water vapor.
23	23	The absorbent incontinence diaper for an adult user of claim 16, wherein a mass per unit area of said first and second ears is 18-60 g/m ² .
24	24	The absorbent incontinence diaper for an adult user of claim 16, wherein a breathability of said ears in said front and/or said rear area is greater than a breathability of said backsheet.
25	25	The absorbent incontinence diaper for an adult user of claim 1, wherein said retaining forces, determined as over-abdomen retaining forces between said closure component and said outer face of said first and second ears, are 90-58 N/25 mm.
26	26	The absorbent incontinence diaper for an adult user of claim 1, wherein said ears in said front and/or said rear area are folded upon themselves at least about one folding line extending in a longitudinal direction.
27	27[a]	The absorbent incontinence diaper for an adult user of claim 1, wherein partial sections of said ears are folded upon each other and lie against one another over an area,
	27[b]	said partial sections being detachably fixed to each other in folded configuration at joining regions.
28	28	The absorbent incontinence diaper for an adult user of claim 1, wherein said ears in said front and/or said rear area have a reinforcing material which, when viewed in a transverse direction, is narrower than each side part,
	28[b]	said reinforcing material being provided in at least a region overlapping said side edge of said chassis, thereby overlapping both a lateral side edge region of said chassis and part of said ear in said transverse direction.

Claim	Limitation No.	Limitation
29	29	The absorbent incontinence diaper for an adult user of claim 1, wherein an extent of said ears attached to the chassis beyond the side edge of the chassis in a transverse direction in an unfolded state is between 15 cm and 35 cm.
30	30	The absorbent incontinence diaper for an adult user of claim 1, wherein said ears attached to the chassis have an extent in a longitudinal direction of the incontinence diaper in the area of attaching to the chassis of at least 14 cm.
31	31	The absorbent incontinence diaper for an adult user of claim 1, wherein said retaining forces, determined as over-abdomen retaining forces between said mechanical closure aids and said outer face of said chassis, are 50-25 N/25 mm.
32	32	The absorbent incontinence diaper for an adult user of claim 1, wherein said retaining forces, determined as over-abdomen retaining forces between said closure component and said outer face of said first and second ears, are 80-60 N/25 mm.
33	33	The absorbent incontinence diaper for an adult user of claim 1, wherein a mass per unit area of said first and second ears is 27-40 g/m ² .
34	34[p]	An absorbent incontinence diaper, comprising:
	34[a][1]	a chassis having an inner face which, when in use, is directed toward a user body and an outer face which, when in use, is directed away from the user body,
	34[a][2]	said chassis having an absorbent body and a backsheet on a side of said absorbent body which, when in use, is directed away from the user body,
	34[a][3]	said absorbent body having a smaller width than said backsheet,

Claim	Limitation No.	Limitation
	34[a][4]	said chassis also having a rear area, a front area, and a crotch area lying between said rear area and said front area,
	34[a][5]	said chassis further defining first and second side edges;
	34[b][1]	a first ear attached as a separate component to said first side edge in said front area; a second ear attached as a separate component to said second edge in said front area; a third ear attached as a separate component to said first side edge in said rear area; a fourth ear attached as a separate component to said second side edge in said rear area;
	34[b][2]	said first, second, third, and fourth ears having an inner face and an outer face;
	34[b][3]	wherein said crotch area has no ears; and
	34[c][1]	said third and fourth ears having a closure component including mechanical closure aids
	34[c][2]	which, when in use, hold the diaper on a the user body when said closure component is selectively fastened to either said outer face of said chassis or to said outer face of said first and second ears;
	34[d]	wherein retaining forces between said closure component and said outer face of said chassis are lower than retaining forces between said closure component and said outer face of said first and second ears.
35	35	The absorbent incontinence article of claim 34, wherein said retaining forces are determined as over-abdomen retaining forces.
36	36	The absorbent incontinence diaper of claim 35, wherein said retaining forces, determined as over-abdomen retaining forces between said closure component and said outer face of said chassis, are 57-20 N/25 mm.

Claim	Limitation No.	Limitation
37	37	The absorbent incontinence diaper of claim 36, wherein said retaining forces, determined as over-abdomen retaining forces between said closure component and said outer face of said first and second ears, are 90-58 N/25 mm.
38	38[a]	The absorbent incontinence diaper for an adult user of claim 36, further comprising: said outer faces of said first and second ears are constituted by an ear nonwoven material;
	38[b]	at least a portion of said outer face of said chassis is constituted by a chassis nonwoven material;
	38[c]	a mass per unit area of said ear nonwoven material is greater than a mass per unit area of said chassis nonwoven material; and
	38[d]	a thickness of said ear nonwoven material is greater than a thickness of said chassis nonwoven, the thickness being determined under a test pressure of 0.5 kPa.
39	39	The absorbent incontinence diaper of claim 35, wherein said retaining forces, determined as over-abdomen retaining forces between said closure component and said outer face of said chassis, are 50-25 N/25 mm.
40	40	The absorbent incontinence diaper of claim 35, wherein said retaining forces, determined as over-abdomen retaining forces between said closure component and said outer face of said first and second ears, are 80-60 N/25 mm.
41	41	The absorbent incontinence diaper of claim 35, wherein said over-abdomen retaining forces are determined using a pull-off angle tangential to a curved surface and kept constant, said curved surface having a radius of curvature of 400 mm.
42	42[a]	The absorbent incontinence diaper of claim 35, wherein said mechanical closure aids comprise hooks of a hook-and-loop fastener and

Claim	Limitation No.	Limitation
	42[b]	wherein said closure component further comprises an adhesive closure aid.
43	43	The absorbent incontinence diaper of claim 34, wherein said ears in said front and/or said rear area are folded upon themselves at least about one folding line extending in a longitudinal direction
44	44	The absorbent incontinence diaper of claim 34, wherein said retaining forces, determined as over-abdomen retaining forces between said closure component and said outer face of said chassis, are 57-20 N/25 mm.
45	45	The absorbent incontinence diaper of claim 44, wherein said outer faces of said ears in said front and/or said rear area are constituted by an ear nonwoven material.
46	46[a]	The absorbent incontinence diaper of claim 45, wherein at least a portion of said outer face of said chassis is constituted by a chassis nonwoven material and
	46[b]	a mass per unit area of said ear nonwoven material is greater than a mass per unit area of said chassis nonwoven material.
47	47	The absorbent incontinence diaper of claim 46, wherein a mass per unit area of said ears in said front and/or said rear area is 18-60 g/m ² .
48	48	The absorbent incontinence diaper of claim 46, wherein a thickness of said ear nonwoven material is greater than a thickness of said chassis nonwoven material, the thickness being determined under a test pressure of 0.5 kPa.
49	49	The absorbent incontinence diaper of claim 46, wherein a mass per unit area of said first and second ears is 28-35 g/m ² .

Claim	Limitation No.	Limitation
50	50	The absorbent incontinence diaper of claim 44, wherein said retaining forces, determined as over-abdomen retaining forces between said closure component and said outer face of said first and second ears, are 90-58 N/25 mm.
51	51	The absorbent incontinence diaper of claim 34, wherein an extent of an ear in the front area and the rear area attached to the chassis beyond the side edge of the chassis in a transverse direction in an unfolded state is at least 15 cm and no more than 35 cm.
52	52	The absorbent incontinence diaper of claim 34, wherein the ears in the front area and the rear area attached to the chassis have an extent in a longitudinal direction of the incontinence diaper in an area of attachment to the chassis of at least 14 cm.
53	53	The absorbent incontinence diaper of claim 34, wherein said retaining forces, determined as over-abdomen retaining forces between said mechanical closure aids and said outer face of said chassis, are 50-25 N/25 mm.
54	54	The absorbent incontinence diaper of claim 34, wherein said retaining forces, determined as over-abdomen retaining forces between said-closure component and said outer face of said ears in said front area, are 80-60 N/25 mm.

I. INTRODUCTION

The '249 Patent combines known diaper components—hook fasteners, and a backsheet nonwoven that is heavier than a wing nonwoven—in a known configuration—a diaper with four discrete wings. The challenged claims merely chase the natural consequence of that configuration—higher retaining forces between hook-fastener and wings than between hook-fastener and backsheet. The '249 Patent seeks to shroud that fact in a purportedly-unique test, but the claims seek to protect a wholly-obvious structure rather than a method of testing. Moreover, even that purportedly-unique test had been previously disclosed by Patent Owner.

II. MANDATORY NOTICES

A. Real Party in Interest (37 C.F.R. §42.8(b)(1))

The real parties-in-interest are: Attends Healthcare Products, Inc. and Domtar Corporation (NYSE:UFS).

B. Related Matters (§42.8(b)(2))

Petitioner identifies the following other matters that may affect, or be affected by, a decision in this proceeding:

Pending IPR2020-01477 against U.S. Patent No. 8,152,788.

Dismissed IPR2013-00173 against U.S. Patent No. 8,152,788.

Pending IPR2020-01478 against U.S. Patent No. 8,784,398.

Pending IPR2020-01480 against U.S. Patent No. 8,708,990.

C. Lead and Back-Up Counsel (§42.8(b)(3))

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D. Service Information (§42.8(b)(4))

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Petitioner consents to electronic service.

III. GROUNDS FOR STANDING

Pursuant to § 42.104(a), Petitioner certifies that the '990 Patent is available for *inter partes* review, and that Petitioner is not barred or estopped from requesting an *inter partes* review on the grounds identified in this Petition.

During prosecution, no prior art references were substantively considered. EX1043, 222-224/342. Moreover, specific evidence herein was not substantively considered, including Karami '772's (EX1003's) explicit teaching of claim 1's

variable retaining forces sufficient to hold a diaper on a wearer (§VIII.A.2, Limitation 1[c][2]) and evidence showing the desirability of differential basis weights that would have produced such variable retaining forces (§VIII.B.2, Limitation 1[d]).

An IPR was previously instituted against a related patent—U.S. 8,152,788—but terminated before final written decision due to settlement. *See* IPR2013-00173 (“Medline IPR”).

Like Petitioner’s grounds here, the instituted grounds in the Medline IPR included several based on Benning (EX1002) and Karami ’772. But this weighs in favor of institution because those challenges were found likely to succeed yet were never resolved. Medline IPR, Paper 17 at 22; *see Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, slip op. at 14-15 (PTAB Mar. 20, 2020) (Paper 11) (“institution ... may serve the interest of overall system efficiency and integrity” by addressing otherwise “[un]resolve[d] patentability question[s]”). While Benning, Karami ’772, and the Petition from the Medline IPR were cited during prosecution of this ’990 Patent, the Examiner did not rely on any of these references as the basis for a rejection. Indeed, the only discussion of Benning came in PO’s self-serving comments attempting to distinguish Benning or Karami ’772 individually, but not their combination. EX1043, 75-76/342.

Further, the Medline IPR did not address the below combination of Benning and Karami '626 (EX1004). Nor was Karami '626 cited during prosecution.

IV. STATEMENT OF PRECISE RELIEF REQUESTED

A. Claims for Which Review Is Requested (§42.104(b)(1))

Petitioner requests review and cancellation of claims 1-54.

B. Statutory Grounds of Challenge (§42.104(b)(2))¹

All claims are invalid under § 103(a) over these combinations of prior art:

Ground	Claims	Prior Art Combination
1	1-5, 7, 8, 11-27, 29-41, 43-54	Karami '772 (EX1003), Benning (EX1002).
2	1-5, 7, 8, 11-17, 19-27, 29-41, 43-54	Benning, Karami '626 (EX1004)
3	1-5, 7, 12-18, 19-22, 24-27, 31, 32, 34-41, 43-46, 48, 50-54	Benning, Karami '626, Stupperich
4	6, 42	Karami '772, Benning, Miyamoto '499 (EX1005)
5	6, 42	Benning, Karami '626, Miyamoto '499
6	6	Benning, Karami '626, Stupperich, Miyamoto '499
7	9	Karami '772, Benning, Jacobs (EX1007).
8	9	Benning, Karami '626, Jacobs
9	10, 18	Karami '772, Benning, Anderson (EX1008)
10	10, 18	Benning, Karami '626, Anderson
11	28	Karami '772, Benning, Fernfors (EX1045)
12	28	Benning, Karami '626, Fernfors
13	28	Benning, Karami '626, Stupperich, Fernfors

¹ All Grounds are supported by POSITA's general knowledge. *Koninklijke Philips N.V. v. Google LLC*, 948 F.3d 1330, 1337-38 (Fed. Cir. 2020).

Filed in 2004 and 2005, respectively, Karami '772 and Benning are prior art under §§ 102(a) and 102(e)(1) as of their March 16, 2006 and November 17, 2005 publication dates.

Published in 2003, Karami '626 is prior art under § 102(b).

Published on May 4, 2006, Stupperich is prior art under § 102(a).

Issued in 1998, Jacobs is prior art under § 102(b).

Issued in 2003, Anderson is prior art under § 102(b).

Published in 2002, Fernfors is prior art under § 102(b).

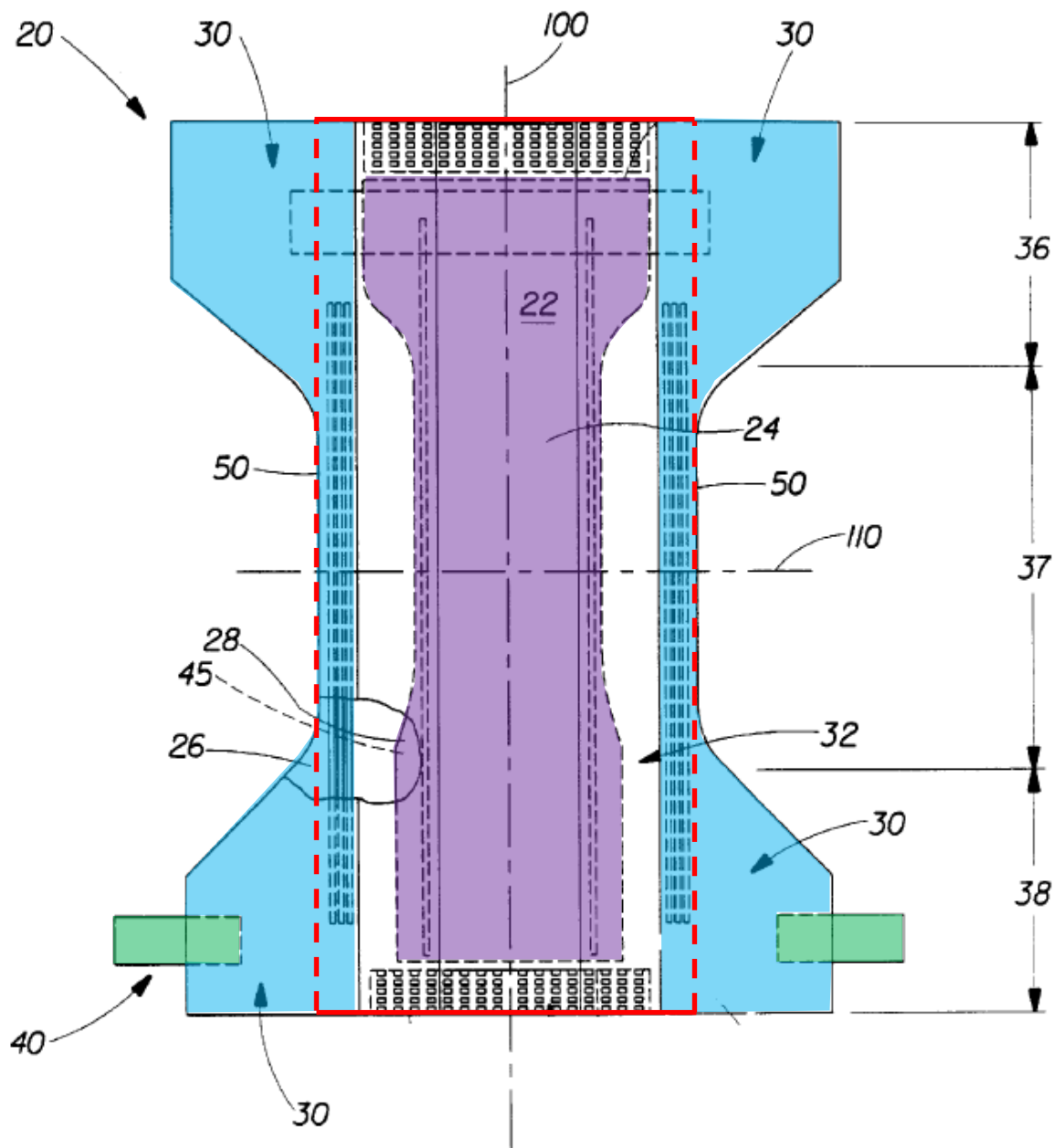
V. FIELD OF TECHNOLOGY

A. Diapers

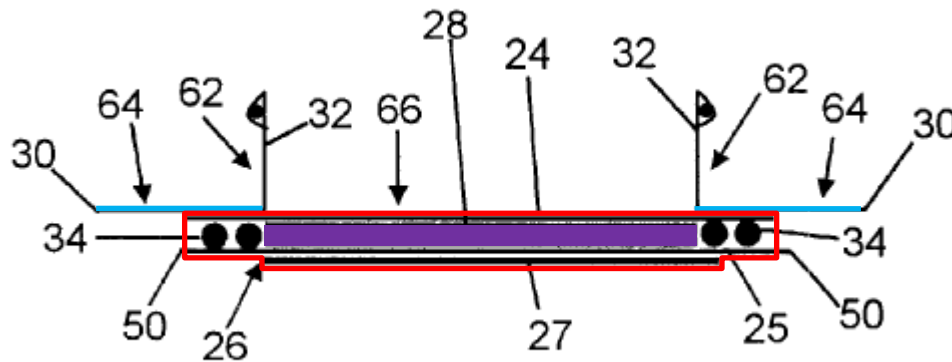
Diapers were designed for babies and incontinent adults “to absorb and contain waste such as urine and feces.” EX1012, ¶21; *see, e.g.*, EX1015, 1:18-26.

Diapers had “four basic components: 1) a topsheet; 2) an absorbent core; 3) a backsheet; and 4) a fastening mechanism.” EX1012, ¶22; *see also* EX1001, 1:14-41 (acknowledging known configuration). Kleinschmidt’s diaper 20 has such a configuration. EX1006, 4:19-24, 6:48-58, FIGs. 1-2 (annotated below); EX1012, ¶23. Diaper 20 has a [red] chassis 22 (or “main part,” per the '249 Patent) including [purple] absorbent core 28 disposed between liquid-pervious topsheet 24 and liquid-impervious backsheet 26. EX1006, 4:19-24, FIG. 2; EX1001, 1:14-36; EX1012, ¶23. [Blue] side panels 30—which were “also referred to as ‘side parts,’ ‘ears,’

‘wings,’ and the like”—extend outwardly from edges 50 to “encircle the waist of the wearer.” EX1006, 4:8-18, 6:48-64, FIG. 1; EX1012, ¶¶23-24; *see also* EX1001, 1:14-36; EX1002, ¶¶[0002]-[0003]. [Green] fasteners 40 were configured to “maintain diaper 20 in this closed configuration.” EX1006, 7:11-25, FIG. 1; EX1012, ¶¶23-24.



Annotated Version of Kleinschmidt's FIG. 1
 ("Annotated1")



Annotated Version of Kleinschmidt's FIG. 2
("Annotated2")

A liquid-permeable topsheet “defined the diaper’s body-facing surface” to receive liquid into the absorbent core. EX1012, ¶22; EX1006, 4:62-66; *see, e.g.*, EX1003, ¶¶[0027]-[0028], [0030]; EX1016, ¶[0001]; EX1019, 1:30-41; EX1002, ¶[0053]; EX1013, 11. A liquid-impermeable backsheet defined the outer surface to prevent liquid egress. EX1012, ¶22; EX1006, 4:62-66; *see, e.g.*, EX1001, 1:14-27, 1:49-52.

Side panels 30 were defined by nonwovens “attached to the chassis” (*see* EX1006, 7:64-8:10, FIG. 2) or were “integrally formed” with a component of the chassis (*see* EX1006, 8:40-50, FIG. 3). EX1012, ¶¶24-25.

As the '249 Patent acknowledges, diapers were also known to include “discrete”/separate wings. EX1001, 1:14-27; EX1012, ¶25; *see, e.g.*, EX1016, ¶[0026], FIG. 1; EX1002, ¶[0054], FIG. 1. For example, Rohrl’s diaper 2 (*see* “Annotated3,” below) includes a [red] chassis with [purple] absorbent core 22

between backsheet 7 and topsheet 9, and four separate wings 10, 12 [blue]—two front (10) and two rear (12)—attached to the chassis. EX1016, ¶¶[0026]-[0029], FIGs. 1-2; EX1012, ¶25. While four-winged diapers were common, some had only two. EX1012, ¶25; *see, e.g.*, EX1006, 6:59-64 (side panels 30 in “first waist region 36 or in both the first waist region 36 and the second waist region 38”); EX1017, ¶¶[0064], [0067], FIGs. 6, 10-11 (“T-shaped”). Separate-wing configurations facilitated manufacturability, cost savings, and the use of elasticized wings to “improve[] fit and reduce leakage.” EX1012, ¶26; EX1011, 1:14-20, 1:39-42, 8:25-40, FIG. 10.

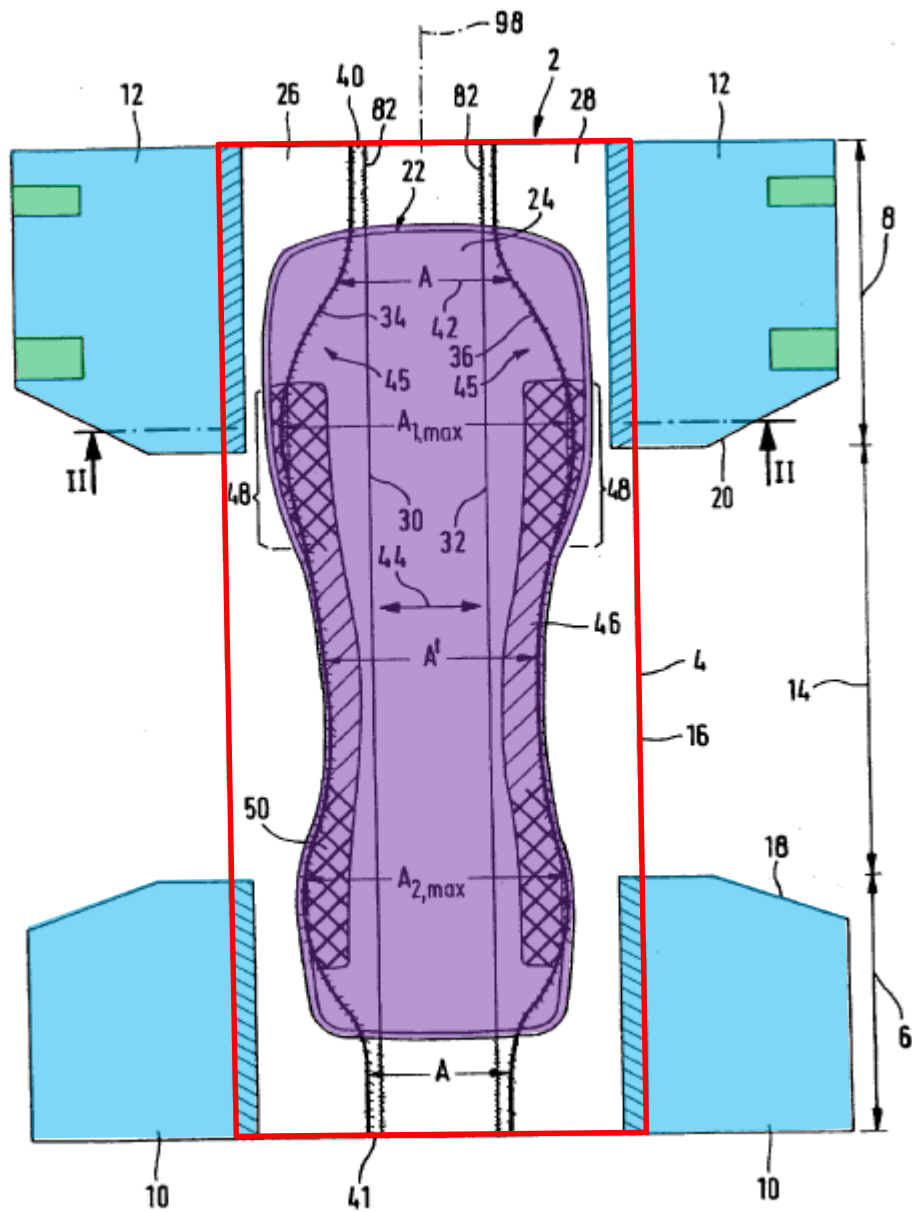


Fig. 1

Annotated Version of Rohrl's FIG. 1
 ("Annotated3")

Because integral-wings and separate-wings “served the same fundamental purpose,” materials and improvements were applied analogously between them. EX1012, ¶26; *see, e.g.*, EX1003, ¶[0025].

B. Nonwovens

Polymeric nonwovens were used for various diaper components. EX1012, ¶27; *see, e.g.*, EX1006, 2:19-38, 5:40-43 (side panels, topsheet, backsheet's outer cover); EX1018, 4:41-45, 6:33-36, 16:41-44; EX1019, 1:31-35, 2:25-29. A nonwoven “was a web of fibers formed without weaving or knitting the fibers,” made by bonding fibers “mechanically, thermally, or with a cementing medium.” EX1012, ¶27; EX1021, 51-52.

Nonwovens were desirable for diapers because they were “inexpensive[,]” had “cloth-like tactile properties,” were breathable, and “(relevant for topsheets) [were] liquid permeable.” EX1012, ¶28; *see, e.g.*, EX1022, 1:21-27 (softness); EX1006, 8:11-16 (softness); EX1002, ¶¶[0032]-[0033] (breathable, “skin-friendly”); EX1023, 8:18-23 (“cloth-like texture”); EX1003, ¶[0028] (liquid permeability, softness); EX1014, 1/2. A nonwoven’s “basis weight”—“weight of a unit area of fabric” that “was often expressed as grams per square meter (gsm or g/m²)”—affected such characteristics. EX1012, ¶29; EX1021, 11; *see, e.g.*, EX1022, 1:21-41 (strength and softness); EX1006, 2:19-32, 8:11-38 (same).

Diapers often incorporated “lower basis weight nonwovens ... for components like topsheets, cuffs, and backsheets to promote the softness thereof and higher basis weight nonwovens ... for components like side panels to promote the strength thereof.” EX1012, ¶29; *see, e.g.*, EX1022, 1:21-41; EX1006, 2:19-32, 8:11-

38; EX1004, ¶[0065]. “[C]ommon basis weights used for various diaper components were around 15-30 gsm,” although other basis weights were used too. EX1012, ¶29; *see, e.g.*, EX1022, 1:34-37 (“15 gsy to about 30 gsy”); EX1023, 8:21-23 (20 gsm); EX1004, ¶[0065] (20-40 gsm (“optimally 34 gsm”) for wings and 15-30 gsm (“optimally 20 gsm”) for backsheet).

C. Cloth-Like Backsheets

While early backsheets were liquid-impermeable plastic films, diapers began in the 1990s to include film-nonwoven laminate backsheets. *See* EX1012, ¶¶30-31; EX1019, 2:25-32; EX1008, 1:51-66; EX1023, 8:3-28. Such laminates included an inner film layer to block liquid leakage, and an outer nonwoven layer to give “the backsheet’s outer surface” a “soft, cloth-like feel.” EX1012, ¶30; EX1019, 2:25-32; EX1019, 1:58-64; EX1023, 8:3-28. Laminated backsheets thereby improved on film-only backsheets that were “not pleasing to the touch” and “cold and clammy.” EX1012, ¶30; EX1019, 1:42-47, 1:65-2:2, 2:25-32; 5:13-17; EX1008, 1:51-66, 12:1-8. Backsheet films were often made breathable (e.g., via micropores) to allow “for the escape of water vapor while acting as a barrier to liquids.” EX1012, ¶31; EX1019, 1:48-65, 3:66-4:24.

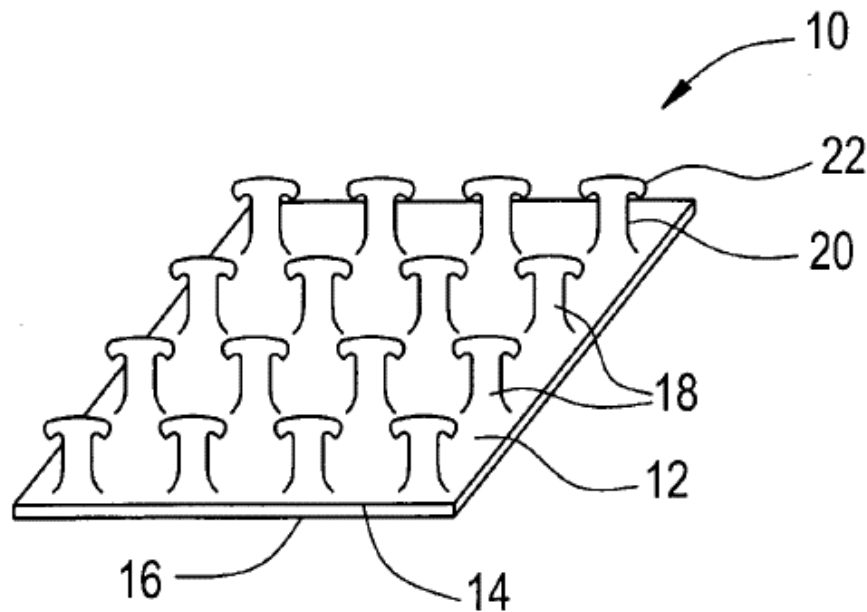
D. Hook-and-Loop Fasteners

With film-only backsheets, diapers used adhesive tapes to ‘stick’ to the film for wearing. EX1012, ¶32; EX1024, 1:16-23. But such required “relatively thick,”

expensive films to prevent tearing and lost tackiness when contaminated. EX1012, ¶32; EX1024, 1:21-34.

Mechanical fasteners (i.e., “hook-and-loop” fasteners) “were not susceptible to contaminant-induced loss of fastener reliability” and replaced adhesive tapes as “the industry standard” fastener. EX1012, ¶¶33-34; *see, e.g.*, EX1024, 1:35-40, 1:58-65; EX1006, 7:16-20; EX1020, ¶¶[0003]-[0004]; EX1002, ¶[0002]; EX1004, ¶[0003]. Illustrative hooks are shown below. *See* EX1025, FIG. 1; EX1004, FIG. 12.

FIG. 1



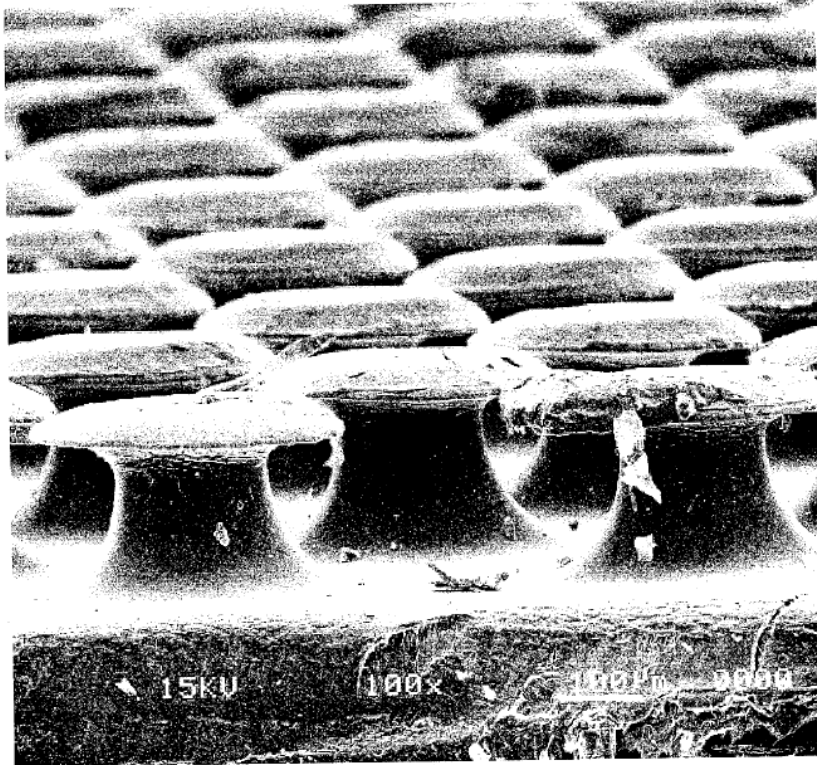


FIG. 12

Traditionally, “a strip of landing zone [loop] material [was] attached to the backsheet.” EX1012, ¶35; *see also, e.g.*, EX1005, ¶¶[0023], [0033], FIG. 3; EX1004, ¶[0003]. But this was expensive, so “hook fasteners that could aggressively engage directly with a[n inexpensive] nonwoven” were developed. EX1012, ¶35; EX1020, ¶[0005]; EX1024, 1:35-46; *see, e.g.*, EX1025, ¶[0009]; EX1010, 3:21-22, 5:23-29; EX1026, ¶¶[0022]-[0023]. Hooks engageable with nonwovens increased diaper size adjustability because they could fasten to any part of the nonwoven backsheet or wings. EX1012, ¶35; *see, e.g.*, EX1025, ¶[0051]; EX1010, 30:25-31:7; EX1026, ¶¶[0022]-[0023]; EX1027, ¶[0026].

VI. LEVEL OF ORDINARY SKILL IN THE ART

As of October 27, 2006²—the '249 Patent's earliest claimed priority date—POSITA would have had a bachelor's degree in chemistry, physics, mechanical, chemical, or process engineering, or a related degree, and 2-3 years of experience designing diapers. EX1012, ¶18. The prior art and '249 Patent also evidence this level of ordinary skill. *See id.*, Sections III.C, V. The prior art in Section V demonstrates that POSITA was familiar with different diaper wing configurations (e.g., integral- and separate-wing), nonwoven materials, cloth-like backsheets, and hook-and-loop fastening systems. *See* EX1012, ¶18.

VII. THE '249 PATENT

Entitled “Absorbent Incontinence Article With Improved Closure System,” the '249 Patent's diaper “correctly secure[s] the diaper on the body of a user” to “increase[] the wearing comfort of the diaper.” EX1001, 2:7-16, 2:21-34.

A. Perceived Shortcomings

Known hook-and-loop fastening systems purportedly could not economically “guarantee the large degree of flexibility required for fitting incontinence diapers” because they required “a corresponding [textile loop] engagement surface” that was

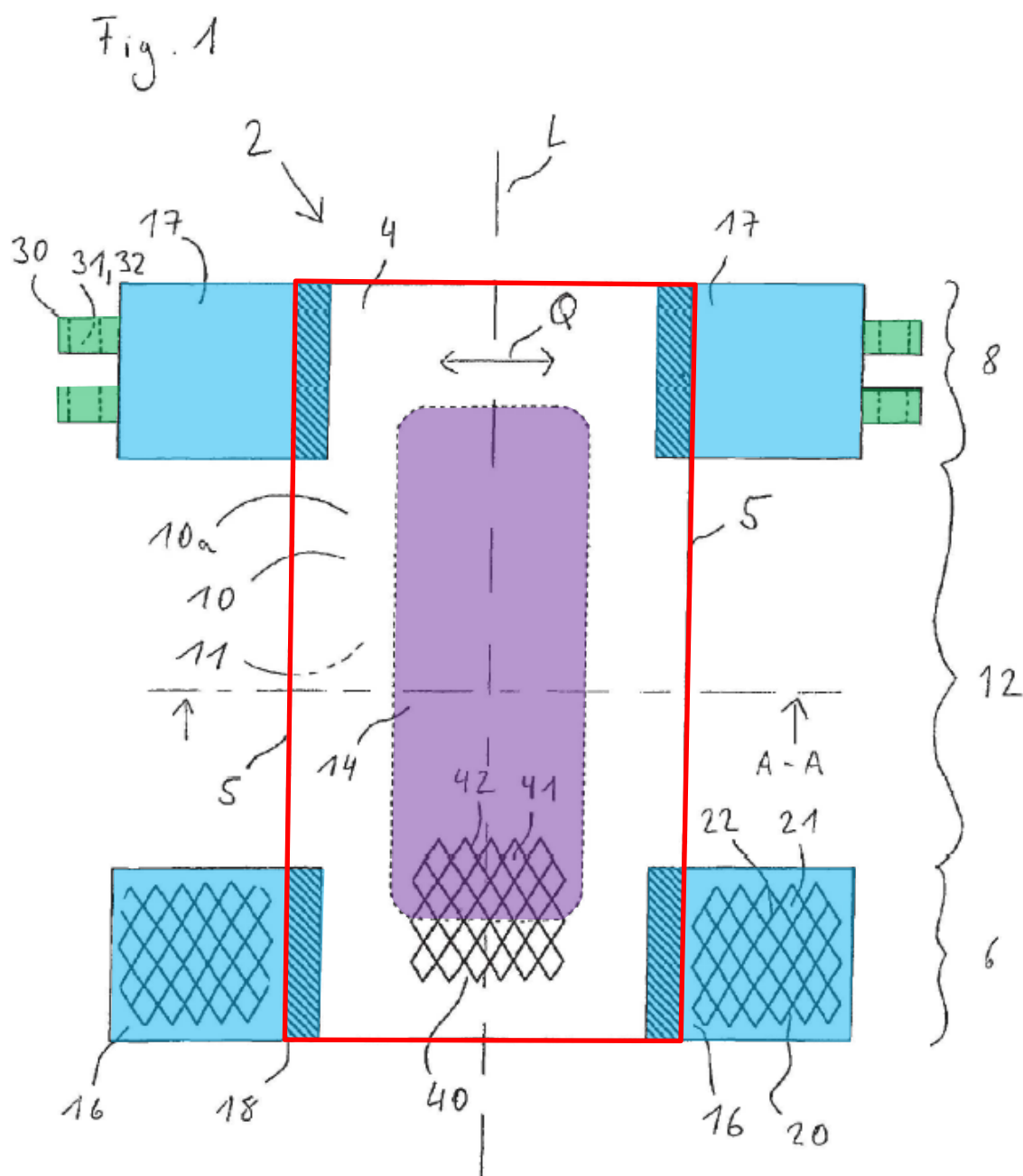
² All statements herein about the knowledge, skills, and perspective of POSITA are as of this date. EX1012, ¶¶12, 20.

“a considerable cost factor” and “would have to extend along a large part” of the diaper’s front to provide fitting-flexibility. EX1001, 1:49-65; EX1012, ¶43.

B. The ’249 Patent’s Asserted Improvement to the Prior Art

To address these perceived shortcomings, the ’249 Patent provides a diaper whose “main part”/chassis and front “side parts”/wings each comprise a material that “serve[s] as the engagement surface for the closure means” such that the closures are securable to the outer faces of both. EX1001, 2:7-21; EX1012, ¶44.

The ’249 Patent’s diaper 10 has a separate-chassis-and-wings configuration (*see* Annotated4, below) with two [blue] front side parts 16 and two [blue] rear side parts 17 attached to edges 5 of [red] main part 4, having [purple] absorbent body 14 disposed between liquid-permeable topsheet 11 and liquid-impermeable backsheet 10. EX1001, 12:17-41, FIG. 1; EX1012, ¶41. The outer face of main part 4 and front side part 16 can comprise “[n]umerous types of nonwovens” to which [green] mechanical closures 32 with hooks 31 are securable. *See* EX1001, 2:7-21, 5:23-33, 6:24-42, 12:62-65, 13:18-20; EX1012, ¶42-44.



Annotated Version of the '249 Patent's FIG. 1
("Annotated4")

C. History

The '249 Patent issued from Application No. 13/798,242. During prosecution, the Examiner issued rejections for indefiniteness and obviousness-type double patenting. EX1043, 222-224/342.

In an Examiner interview, PO argued that the prior art “teaches away from selective attachment with a front side and a side part area” and the “waist hoop stress examiner relies on for a teaching of differential retention forces is not relative to the retention forces obtained by the differences in the side part and outer surface of the nonwoven [material] as taught in the present invention.” EX1043, 94/342.

PO also submitted terminal disclaimers to overcome the rejections for obvious-type double patenting. EX1043, 63/342, 81/342, 83/342.

D. Claim Construction (§42.104(b)(3))

1. Closure Components Including Mechanical Closure Aids (Claims 1, 34)

If PO argues that this is a means-plus-function limitation, its function is to “detachabl[y] fasten[]” to outer faces of a diaper’s main and side parts (EX1001, 16:13-18), and its corresponding structure is a “strip [of] material” including “hooks of a hook-and-loop fastener,” optionally with one or more adhesive regions. EX1001, 4:37-5:3, 12:41-53, and 15:32-37; EX1012, ¶¶50-52.

Nevertheless, construction is unnecessary to resolve Petitioner’s challenges, as the mapped structures all include hook-type fasteners (e.g., §§VIII.A.2 and

VIII.B.2, each at Limitation 1[c][1]) that therefore meet it under a means-plus-function or *Phillips* construction. See *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

2. Foil (Claims 17, 18)

Here, “foil” means “film.” EX1012, ¶49. POSITA knew that earlier disposable diapers had film backsheets (*id.*, ¶30) and would have recognized that the specification referenced film when explaining that, in earlier diapers, “the outer face of the main part ... is usually constituted by a foil material.” EX1001, 1:49-52; EX1012, ¶49. The specification also explains that the “foil” can be polymeric (EX1001, 5:45-6:9) like traditional diaper films and can be manufactured in the same way (*id.*, 6:11-23). EX1012, ¶49.

3. Reinforcing Material (Claim 28)

If PO argues “reinforcing material” is a means-plus-function limitation, its function is to provide a “reinforce[ed]” connection between a diaper’s side part and main part by overlapping both (EX1001, 18:3-10), and its corresponding structures include “additional material added to the side part” such as “a section of a strip-shaped [] or ribbon-shaped material” (e.g., “a nonwoven material, textile material, or foil [(film)]”) (EX1001, 11:18-30). EX1012, ¶54.

Fernfors’s pieces of reinforcement material are such strip- or ribbon-shaped sections of material (§VIII.G), meaning they are “reinforcing material” under either

a means-plus-function or *Phillips* construction. Construction is therefore not required. *See Nidec*, 868 F.3d 1013.

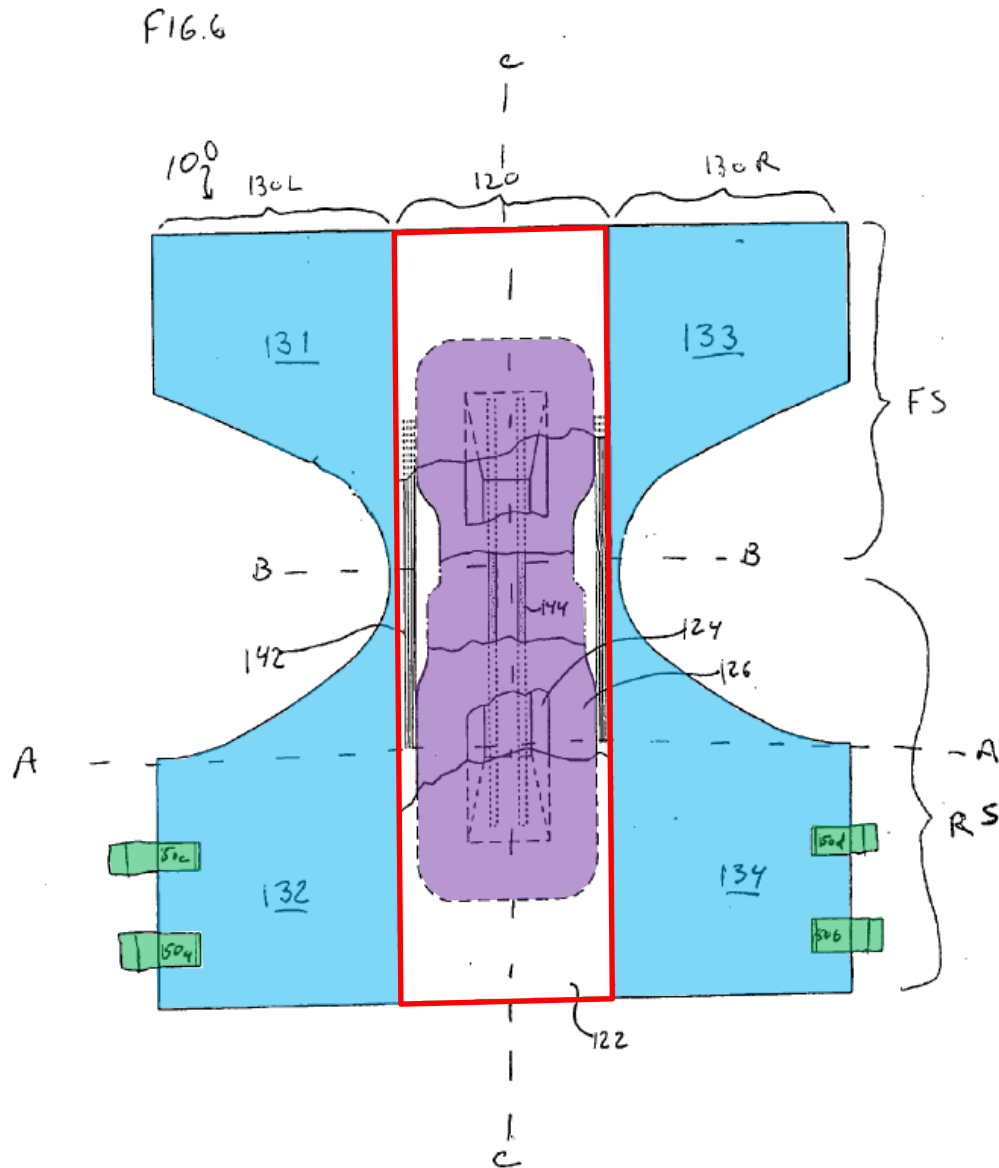
4. Over Abdomen Retaining Forces (e.g., Claims 2, 35)

The '249 Patent describes the “over-abdomen retaining forces” of its fasteners as “closure of forces exerted during lateral strain” (EX1001, 2:7-8, 2:30-39), meaning that they are simply the shear forces required to separate the hook fastener from the nonwoven. EX1012, ¶[0057]. However, formal construction is not required because each of the below grounds explains why their respective, obvious diaper structures would have yielded the claimed retaining forces using the specific test of the '249 Patent. *See Nidec*, 868 F.3d 1013.

VIII. REASONS FOR RELIEF REQUESTED (§§ 42.22(A)(2), 42.104(B)(4))

A. Ground 1 – Karami '772 and Benning Render Obvious Claims 1-5, 7, 8, 11-27, 29-41, 43-54

Karami '772 describes diaper 100 having backsheet 130 defining four [blue] wings 131-134 extending outwardly from [red] containment assembly 120 with [purple] absorbent core 126 between topsheet 122 and the backsheet. EX1003, ¶¶[0045]-[0047], FIG. 6 (annotated below); EX1012, ¶¶71-73.

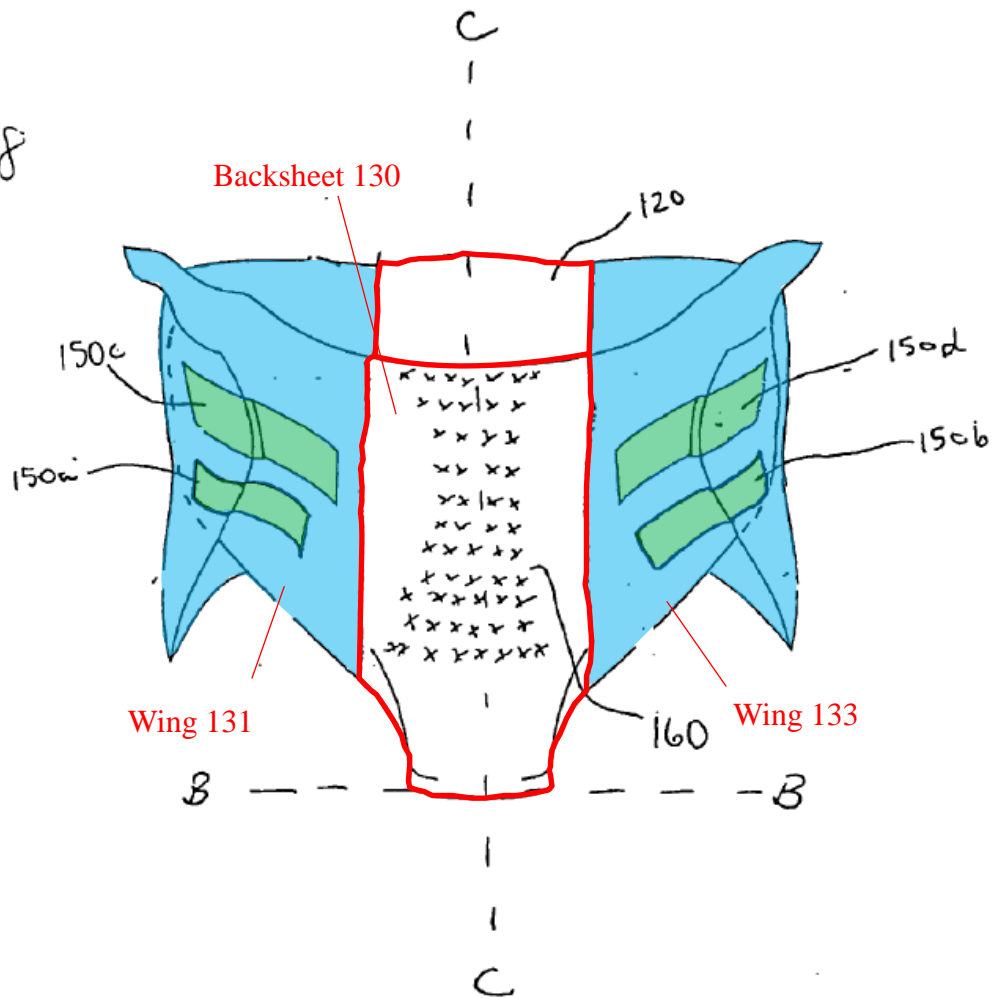


Annotated Version of Karami '772's FIG. 6
("Annotated8")

Wings 132, 134 carry [green] "[h]ook-type fasteners 150a-150d" to secure the diaper around a wearer. EX1003, ¶¶[0047]-[0048], FIG. 6; EX1012, ¶74. Rather than a separate "loop-type 'landing zone'"—which Karami '772 views as disadvantageous (EX1003, ¶¶[0003]-[0005])—backsheet 130 comprises a film-

nonwoven laminate with a nonwoven outer surface to which the fasteners can attach. EX1003, ¶¶[0025], [0031], [0047]-[0048], [0052] (“nonwoven layered with a polypropylene or polyethylene film”); EX1012, ¶¶66, 72, 74. At least part of backsheet 130 defining front wings 131, 133 is “water jet treated and/or apertured” to yield “significantly higher” retaining forces between the wings and fasteners 150a-150d. EX1003, ¶¶[0036]-[0037], [0048], [0053], FIG. 8; EX1012, ¶¶67, 75. As shown in Karami ’772’s FIG. 8 (annotated below), a portion of backsheet 130 underlying containment assembly 120 is untreated “such that it has ‘diminished affinity to hook-type fasteners in relation to the remainder of the front waist portion’ to define a stay-away zone 160.” EX1012, ¶¶68-70, 75-76; EX1003, ¶¶[0047]-[0048], [0053], FIG. 8.

FIG. 8



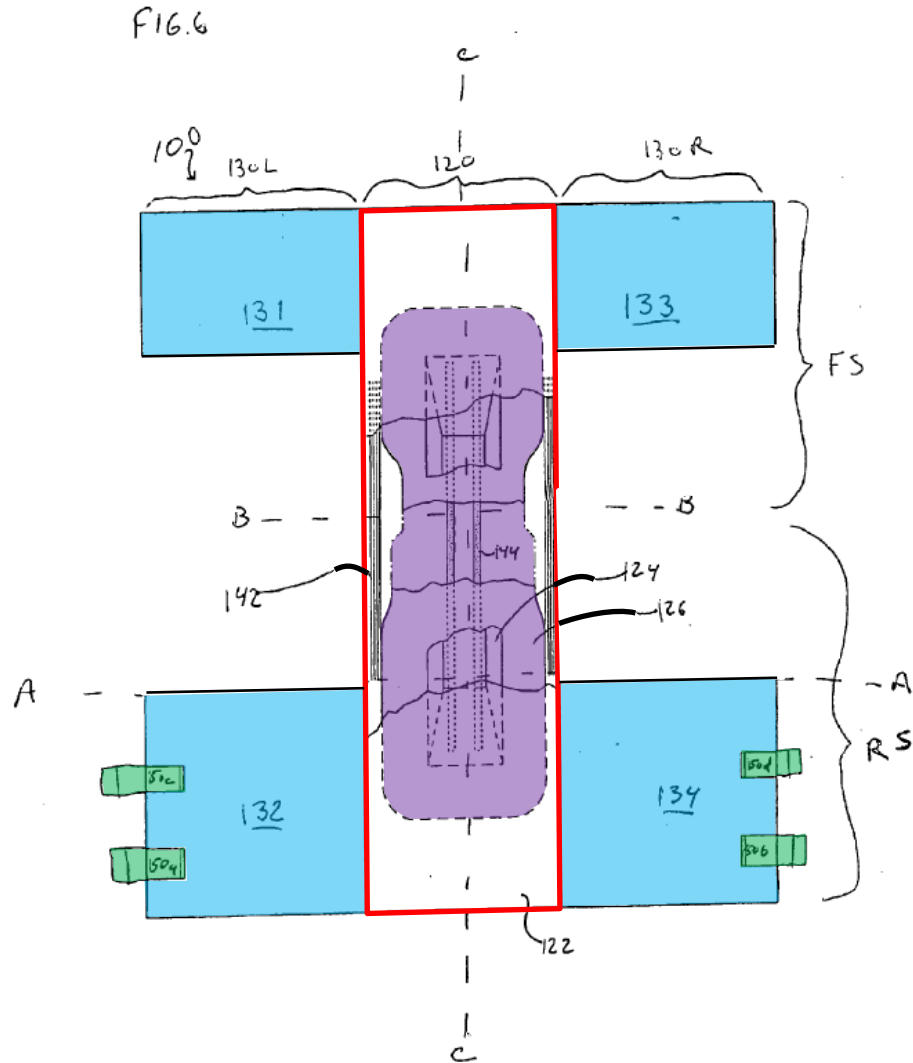
Annotated Version of Karami '772's FIG. 8
("Annotated8")

Because “fasteners 150a-150d can securely engage with any portion of the wings 131 and 133,” diaper 100 has greater size-adjustability. EX1003, ¶[0048]; EX1012, ¶74. POSITA would have understood that the hooks would still attach to the backsheet’s stay-away zone, while the better affinity to wings 131, 133 would encourage fastening thereto for intended sizing. See EX1003, ¶¶[0037], [0053] (“diminished affinity” (emphasis added)), TABLE 1 (shear forces with untreated

nonwovens); EX1028, ¶¶[0021], [0024], [0049]-[0051] (central stay-away zone 100, with no affinity rather than diminished affinity, prevents “improper sizing”); EX1012, ¶¶68-70, 75-77.

1. Obvious to Use Separate-chassis-and-wings Construction

It was obvious to use “separate wings bonded to the edges of a central chassis” that defines containment assembly 120, rather than Karami ’772’s integral-wing configuration. EX1003, ¶¶[0046]-[0047], FIG. 6; EX1012, ¶78. Mr. Jezzi illustrates one such construction in a modified version of Karami ’772’s FIG. 6 (below) (“Annotated10”). EX1012, ¶79. As modified, absorbent core 126 is still disposed between topsheet 122 and film-nonwoven laminate backsheet 130, but with separate nonwoven side panels 131-134 bonded to the assembly’s edges. EX1012, ¶79.



Modified Version of Karami '772's FIG. 6
("Annotated10")

Benning confirms this was an obvious construction. EX1012, ¶¶62-64, 78. As annotated below in Benning's FIG. 4 ("Annotated7"), Benning's diaper has (1) [red] "chassis" 20 with [purple] absorbent core 28 disposed between "fluid-impermeable underlayer 30" (backsheet) and fluid-permeable topsheet 32, and (2) four [blue] nonwoven "material sections" or "side flaps" 34 attached to the

chassis's edges. EX1002, ¶¶[0029], [0032]-[0033], [0053]-[0054], FIGs. 4-5; EX1012, ¶¶62-64.

Karami '772 itself contemplates using separate wings (T-shaped diaper 10 has separate wings 40), and teaches that “[a]s in the wings of the previously-described T-shaped diaper, the wings 131 and 133 of the diaper 100 can be made of any ... bonded nonwoven,” which “would have invited POSITA to use wings that are separate from and not necessarily the same material as the backsheet.” EX1003, ¶¶[0032], [0035], [0048], [0052], [0054], FIG. 1 (Karami '772 applicable to “absorbent articles having any other suitable structure”); EX1012, ¶78. Finally, the '249 Patent acknowledged the separate-chassis-and-wings construction as well-known. EX1001, 1:14-27; EX1012, ¶80.

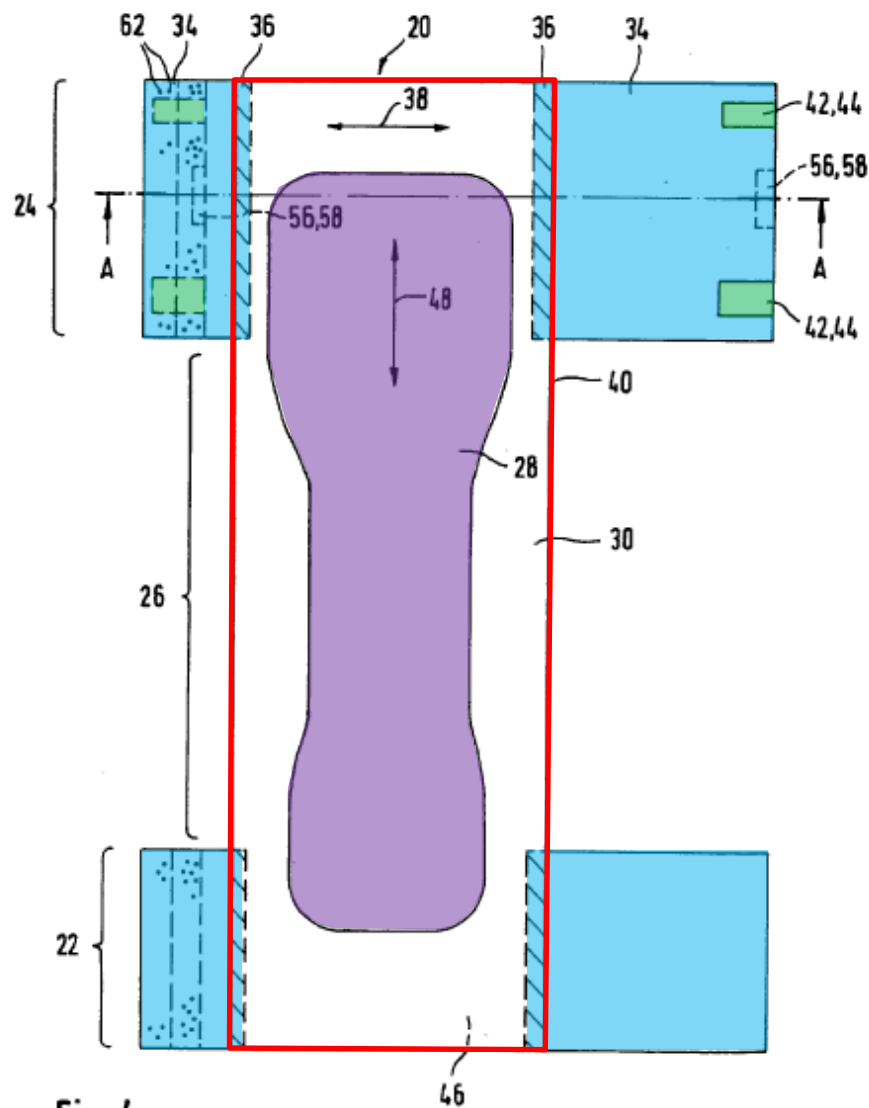


Fig. 4

Annotated Version of Benning's FIG. 4
("Annotated7")

POSITA would have used Benning's separate-chassis-and-wings construction for Karami '772's diaper 100 for multiple reasons.

First, POSITA would have done so to reduce cost and improve manufacturability. EX1012, ¶¶80-81; *see, e.g.*, EX1015, 19:27-33 ("individual sections which are secured together" allows construction in "an efficient and

economical basis”). For example, unlike integral-wing constructions, using separate wings beneficially would not have “required production machines to be at least as wide as the unfolded diaper” and thus allowed the use of smaller equipment that could “be readily adapted to alter individual components, yielding manufacturing flexibility.” EX1012, ¶¶80-81; EX1015, 20:4-39.

Second, POSITA would have done so to permit the use of different materials for wings 131-134 and chassis 120, e.g., higher-basis-weight nonwoven wings for strength and a lower-basis-weight backsheet nonwoven for user comfort (§VIII.A.4) and/or more-breathable wings for user comfort. EX1012, ¶¶82-85.

While backsheets—including Karami ’772’s—had a film “to prevent bodily fluids from passing therethrough,” it was obvious to use a nonwoven alone for wings 131-134, as in Benning (EX1002, ¶[0032]). POSITA would have recognized that wings need not be liquid-impermeable, and not including film would promote wing-breathability and reduce costs associated with laminating nonwoven to film. EX1012, ¶¶84-85. The separate-chassis-and-wings construction, by permitting separate wing material, would have facilitated user comfort by permitting breathable wings. EX1012, ¶¶83-85.

Modifying Karami ’772’s diaper 100 to use Benning’s separate-chassis-and-wings construction was routine and straightforward for POSITA and predictably

would have reduced costs, facilitated manufacturing, and improved user comfort, rendering the modification obvious. EX1012, ¶86.

2. Claims 1, 2, 13, 29-30, 34-35, 41, and 51-52

Every limitation of claims 1, 2, 13, 29-30, 34-35, and 51-52 is present in Karami '772's diaper 100 as modified in view of Benning per Section VIII.A.1.

Limitation 1[p]

Diaper 100 is an absorbent incontinence diaper. EX1003, ¶¶[0030], [0045], [0047] (“‘diaper’ ... worn about the torso of an infant or incontinent person.”); EX1012, ¶71. Karami '772's diaper is intended for adults. EX1003, ¶[0026] (diaper: “absorbent article ... [for] incontinent person”); EX1012, ¶71.

Limitation 1[a][1]

As explained in Section VIII.A.1, diaper 100 would have included Benning's separate-chassis-and-wings, with the chassis/“main part” defined by containment assembly 120 having topsheet 122 defining a user-facing inner face and backsheet 130 defining an opposing outer face. Annotated10; EX1003, ¶¶[0027], [0047]-[0048], FIGs. 6, 8; EX1002, ¶¶[0053]-[0054], FIGs. 4-5; EX1012, ¶¶71-73, 78-79.

Limitation 1[a][2]

Containment assembly 120 has an absorbent core/body 126 between topsheet 122 and backsheet 130, which is on the side directed away from the user. EX1003, ¶¶[0027], [0047]-[0048], FIG. 6; EX1012, ¶¶73, 79.

Limitation 1[a][3]

As shown in Annotated10 (above), core 126 is narrower than backsheet 130. *See* EX1003, ¶[0047], FIG. 6; EX1002, ¶[0053], FIGs. 4-5 (same for core 28 and backsheet 30); EX1012, ¶¶73, 79.

Limitation 1[a][4]

Containment assembly 120 has a rear area to which wings 132, 134 are bonded, a front area to which wings 131, 133 are bonded, and a crotch area therebetween. *See* Annotated10; EX1003, ¶[0046]; EX1012, ¶¶78-79.

Limitation 1[a][5]

Containment assembly 120 has first and second side edges parallel with longitudinal centerline C. *See* Annotated10; EX1003, ¶[0046]; EX1012, ¶79.

Limitation 1[b]

As explained in Section VIII.A.1, diaper 100 would have had four discrete, not directly connected side parts: wings 131-134. *See* Annotated10; EX1003, ¶¶[0047]-[0048], FIGs. 6, 8; EX1002, ¶¶[0029], [0054], FIG.; EX1012, ¶¶62, 78-79. Front wings 131, 133 attached to respective edges of the front area, and rear wings 132, 134 are attached to respective edges of the rear area, of containment assembly 120. *See* Annotated10; EX1003, ¶[0047], FIG. 6; EX1002, ¶[0029], FIG. 4; EX1012, ¶¶78-79.

Limitation 1[c][1]

Diaper 100 includes closure components including mechanical closure aids: “hook-type fasteners 150a-150d” with “hook-type material,” that are connected to back wings 132, 134. Annotated10, EX1003, ¶¶[0032], [0047]-[0048]; EX1012, ¶74.

Limitation 1[c][2]

Fasteners 150a-150d are configured such that they can be releasably attached to the treated nonwoven defining the outer surface of each of wings 131, 133. EX1003, ¶¶[0011], [0048]; EX1012, ¶¶74, 77. The fasteners can also be releasably attached to the outer nonwoven surface of containment assembly 120, in both its treated zones and its untreated stay-away zone 160. EX1003, FIG. 8 (showing treated zones surrounding the stay-away zone), ¶¶[0053] (the stay-away zone “will have diminished”—rather than no—“affinity to hook-type fasteners in relation to the remainder of the [treated] front waist portion” (emphasis added)), [0036]-[0037] (treatments yield “better affinity”), TABLE 1 (showing untreated nonwovens exhibiting fastener peel and shear strengths); EX1012, ¶¶68, 74-77.

Even in stay-away zone 160, retaining forces between fasteners 150a-150d and backsheet 130 were sufficient to hold the diaper on a wearer. EX1012, ¶¶68-70, 75. Karami ’772’s backsheet—like Karami ’626’s—is a film-nonwoven laminate, with a 5-45 gsm nonwoven. EX1003, ¶¶[0031], [0046]; EX1004, ¶¶[0063]-[0065] (film-nonwoven laminate backsheet, with nonwoven “basis weight

of 13-50 [gsm]”); EX1012, ¶¶72, 108; *see also* §VIII.A.4 (10-30 gsm (e.g., 20 gsm) obvious for backsheet nonwoven).

Karami ’772 also uses (or at least shows was an obvious option) the same fastener as Karami ’626: the Binder 25445. EX1003, ¶[0041]; EX1004, ¶¶[0007], [0060] (“Binder ... #42-288-HX-200-PP3,” which is the Binder 25445 (EX1001, 15:32-37), is “preferred” for the same nonwoven-engaging function as Karami ’772’s fasteners). EX1012, ¶¶70, 75. For these materials, Karami ’626 explains that “the fastener elements 41, 42 ... may engage directly with any portion of the nonwoven surface constituting the ... backsheet 32 ... [to] accommodat[e]”—and thus secure the diaper on—“both small and large-waisted persons.” EX1004, ¶[0040]; EX1012, ¶70. Per Karami ’626, this is also true using two fastener elements, let alone Karami ’772’s four. EX1012, ¶75 (citing EX1004, FIGs. 9-10, ¶[0055]).

Limitation 1[d]

Because the outer nonwovens of wings 131, 133 are treated, while stay-away zone 160’s is not, the retaining forces between fasteners 150a-150d and the outer surface of containment assembly 120 are lower than those between the fasteners and the outer faces of the wings. EX1003, ¶¶[0036]-[0037] (“water jet treatment and/or aperturing ... increase[] shear and peel strength”), [0053], FIG. 8; EX1012, ¶¶67-70, 74-77.

It also was obvious to use a higher-basis-weight nonwoven in Karami '772's wings than in its containment assembly (§VIII.A.4), which would have rendered fastener retaining forces lower in the containment assembly, including in its treated and stay-away zones. EX1012, ¶¶76-77, 93-95. The '249 Patent confirms this: a higher-basis-weight wing nonwoven will “essentially ensure[]” the claimed differential retaining forces. EX1001, 13:42-49, 7:25-32; EX1012, ¶¶45, 103, 120.

Limitations 2 & 13

Over-abdomen retaining forces are simply a proxy for shear forces. *See* §VII.D.4; EX1012, ¶57. And the selection of a particular test method to measure characteristics of structures does not alter the structures themselves, nor that such structures would yield differential retaining forces. EX1012, ¶¶186-187. Moreover, because the analysis for Limitations 1[c][2] and [d] (and the forces of claims 3, 4, 8, 13-16, 25, 31, 32, 36, 37, 39, 40, 44, 50, 53, and 54) is based specifically on the same materials (like those for which shear forces were measured in the '249 Patent) exhibiting the same properties under the same test (as used in the '249 Patent to measure those very materials), these limitations are necessarily met. EX1012, ¶¶186-187.

Limitations 29

Benning teaches that its wings 34 extend beyond the chassis in a transverse direction in an unfolded state between 15 cm and 35 cm. EX1002, ¶[0029] (“at least

15 cm and ... 35 cm at the most”); EX1012, ¶177. It was obvious to use wings of such dimensions to achieve desired sizing for at least some users. EX1012, ¶¶178-179.

Limitation 30

Benning teaches that its wings 34 extend longitudinally at least 14 cm. EX1002, ¶[0028] (“at least 14 cm”); EX1012, ¶177. It was obvious to use wings of such dimensions to achieve desired sizing for at least some users. EX1012, ¶¶178-179.

Claim 34

See Claim 1. Claim 34 is substantially identical to claim 1, with the exception of Limitations 34[b][2] and 34[b][3]:

Limitation 34[b][2]

Wings 131-134 each have inner and outer faces. *See* Annotated10; EX1003, ¶¶[0047]-[0048], FIGs. 6, 8; EX1012, ¶¶73-74, 78-79.

Limitation 34[b][3]

In the modified Karami ’772-Benning diaper, there are no ears in the crotch region. *See* Annotated10; EX1012, ¶¶78-79.

Limitation 35 & 41

See Limitations 2 & 13.

Limitation 51

See Limitation 29.

Limitation 52

See Limitation 30.

**3. Claims 2-5, 7, 13-19, 22, 24, 25, 36, 37, 39-41, 44, 53-54:
Obvious To Use the Claimed, Workable Retaining-Force
Ranges In the Modified Karami '772 diaper**

POSITA would have understood that Karami '772's "stay-away zone 160" has "diminished affinity to hook-type fasteners in relation to the remainder of the front waist portion" (EX1003, ¶[0053]) to discourage the attachment of fasteners 150a-150d thereto. EX1012, ¶¶77, 97. POSITA would have also understood that such discouragement, however, did not prevent such attachment because the stay-away zone has affinity for the fasteners, and that affinity is sufficient to hold the diaper on a wearer. §VIII.A.2, Limitation 1[c][2]; EX1012, ¶¶69-70, 75.

With this understanding, POSITA would have recognized that the diminished affinity in Karami '772's stay-away zone struck a balance between permitting diaper-adjustability and encouraging proper diaper-sizing, each of which was known to be advantageous. EX1003, ¶¶[0003], [0005], [0009] (diaper-adjustability); EX1004, ¶¶[0004], [0006], [0010] (diaper-adjustability); EX1028, ¶[0007] (diaper-sizing: e.g., "diapers that are too large may still be nominally fitted to an individual ... [, but t]his practice is wasteful"); EX1012, ¶¶77, 97. Such affinity was sufficient

to permit the fasteners' use on the stay-away zone to secure the diaper on a wearer, thereby maximizing the diaper's adjustability, yet diminished to encourage a user—through perceptibly lower 'gripping'—to attach the fasteners to other, higher-affinity portions of the diaper. *See* EX1004, ¶[0069] (higher affinities “play[] an importan[t] role psychologically in providing reassurance against accidental opening of a fastened assembly”); EX1012, ¶¶77, 97. This known cause-and-effect communicated to a user a preferred attachment configuration, while not rendering the diaper entirely useless for users who were smaller than the ideal range for a particular diaper size. EX1012, ¶¶77, 97.

This is the same result and the same means to achieve it that forms the basis of the '249 Patent's purported invention: fastener retaining forces for a diaper's side parts and its main part that “help hold the diaper on the body,” where the main part's retaining forces “are smaller ... [so that] users of the diaper[] tend to close the diaper ... [using] the side parts,” which results in a more-ideal fit. EX1001, 2:17-45, claim 1; EX1012, ¶98. The '249 Patent's claims merely recite broad, workable ranges for such fastener retaining forces—20-57 N/25 mm (claims 3, 16, 36, 44) or 25-50 N/25 mm (claims 14, 31, 39, 53) for the main part, and 58-90 N/25 mm (claims 4, 25, 37, 50) or 60-80 N/25 mm (claims 15, 32, 40, 54) for the side parts—to which no independent purpose or significance is attributed (*see id.*, 2:35-45) and were therefore obvious, individually and in combination. *In re Aller*, 220 F.2d 454, 827

(C.C.P.A. 1955) (“[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.”); EX1012, ¶¶97-98; EX1009, ¶[0034] (5-80 N/25 mm is suitable for diaper closure).

POSITA were capable of achieving the ’249 Patent’s. To illustrate, for each of the modified Karami ’772 diaper’s backsheet and wings, POSITA would have understood that increasing or decreasing the basis weight of its nonwoven would have increased or decreased, respectively, the retaining forces between it and a fastener. §VIII.B.2, Limitation 1[d].

Such basis-weight-tailoring could have involved selecting from the broad range of materials and basis weights that Karami ’772 and Benning teach are suitable. EX1003, ¶¶[0046] and [0048] (wings and backsheet: “any single layer or multi-layer bonded nonwoven”), [0031] and [0046] (backsheet’s nonwoven and wings’ basis weight: “5-45 [gsm]”); EX1002, ¶[0032] (wings “are preferably of a non-woven material ... hav[ing] a surface weight of ... specifically [] 25-50 [gsm]”); EX1012, ¶¶64, 91-95, 99.

Retaining forces between the modified Karami ’772’s backsheet and fasteners could also have been increased using a temperature treatment (§VIII.E) that caused its nonwoven sections to “gather and bulk up between adjacent bond sites.” EX1007, 6:6-11; EX1012, ¶100; *see also* EX1040, 2:27-47 (describing similar

gathering (*compare* EX1007, FIG. 2 *with* EX1040, FIG. 1), as “increas[ing] basis weight”); EX1001, 8:15-35, 9:24-41.

To increase retaining forces between the modified Karami '772's wings and fasteners, POSITA could have also used Karami '772's water jet treatment and/or aperturing. EX1003, ¶¶[0048], [0051]; *see also* EX1003, ¶[0037] (“provides a softer, bulkier and more flexible nonwoven resulting in increased shear strength and peel strength”); EX1012, ¶¶67, 100.

To the extent either the modified Karami '772 diaper's backsheet or wings required strengthening to support such retaining forces, POSITA knew how to accomplish that too: bonding its nonwoven's fibers to one another at points or areas, *e.g.*, via embossing. EX1004, ¶¶[0062], [0068] (“the extent to which [the fibers] are bonded together in the nonwoven provide ... the strength necessary to provide a high level of shear strength.”); EX1009, ¶[0002]; EX1012, ¶101.

Only through such known materials, and known applications of known techniques to such known materials, does the '249 Patent purportedly achieve its claimed retaining forces, which are therefore presumably sufficient to do so. *See* EX1001, 6:24-42 (“all nonwovens are suitable that contain ... a thermoplastic polymer”), 7:18-24 (backsheet's nonwoven basis weight “is preferably 10-30 [gsm]” and wings' nonwoven basis weight “is preferably 18-60 gsm”), 7:25-32 (a higher retaining force is “[d]ue to” a higher basis weight) and 13:42-49 (higher retaining

forces are “essentially ensured” by higher basis weights), 8:15-35 (“gather[ing]”-inducing temperature treatment increases retaining force), 6:42-46 (fiber-bonding strengthens a nonwoven); EX1012, ¶¶102-103.

Limitations 2, 13

See §VIII.A.2, Limitations 2, 13.

Limitations 3, 14

These claims merely recite workable ranges of retaining forces for implementing Karami ’772’s teachings and were therefore obvious. §VIII.A.3.

Limitations 4, 15

These claims merely recite workable ranges of retaining forces for implementing Karami ’772’s teachings and were therefore obvious. §VIII.A.3.

Limitation 5

Fasteners 150a-150d are “hook-type fasteners” having “hook-type material” of a hook-and-loop fastener. EX1003, ¶¶[0042], [0047]-[0048]; EX1012, ¶74.

Limitation 7

The outer face of containment assembly 120 comprises the nonwoven of backsheet 130. *See* EX1003, ¶¶[0048], [0052]-[0053] (diaper 100’s “backsheet may be formed of the above-identified nonwoven layered with a polypropylene or polyethylene film,” with the outer surface being the nonwoven); EX1012, ¶¶72, 79.

Limitation 16

§VIII.A.2, Claim 1.

See Limitation 3.

Limitation 17[a]

POSITA would have used a film-nonwoven laminate for backsheet 130 in the modified diaper 100 as Karami '772 teaches such that the backsheet is “liquid and/or vapor” impermeable and has a cloth-like outer surface. EX1003, ¶¶[0031], [0052]; EX1012, ¶¶72, 78, 83.

Limitation 17[b]

Backsheet 130's nonwoven defines the backsheet's outer surface. EX1003, ¶¶[0048], [0052]-[0053]; EX1012, ¶¶72-73, 83. The backsheet's film therefore faces absorbent core 126. *See* EX1003, ¶¶[0048], [0052]-[0053], FIG. 6; EX1012, ¶¶72-73, 83.

Limitation 18

POSITA would have made backsheet 130's film “vapor and air permeable” (i.e., breathable) to promote user comfort. EX1003, ¶¶[0031] (describing T-shaped diaper's breathable film-nonwoven laminate backsheet), [0052]; EX1012, ¶83; *see also* EX1008, 1:28-34, 2:64-3:17 (benefits of breathable films).

Limitation 19

As explained in Section VIII.A.1, diaper 100 would have included breathable nonwoven wings 131-134 to promote wearer comfort as in Benning. *See* EX1002, ¶[0032] (“Preferably the [wings] ... are configured to breathe.”); EX1012, ¶¶84-85.

Limitation 22

The nonwovens of Karami ’772’s wings 131-134 are breathable because nonwovens have an “open, fibrous structure [that] allowed vapor and air to pass through.” EX1012, ¶¶67, 72, 83. Further, as explained in Section VIII.A.1, diaper 100 would have included breathable nonwoven wings 131-134 to promote wearer comfort as in Benning. *See* EX1002, ¶[0032]; EX1012, ¶¶84-85.

Limitation 24

Wings 131-134 would not have included the liquid-impermeable film of backsheet 130 as in Benning, rendering the wings more breathable than the backsheet, to save costs and promote wearer comfort. §VIII.A.1; *see* EX1002, ¶[0032]; EX1012, ¶¶83-85.

Limitation 25

§VIII.A.2, Claim 1.

See Limitation 4.

Limitations 35 & 41

See Limitations 2 & 13.

Limitations 36, 39

See Limitations 3, 14.

Limitation 37

See Limitation 4.

Limitation 40

See Limitation 15.

Limitations 44, 53

§VIII.A.2, Claim 34.

See Limitations 36, 39.

Limitation 50

See Limitation 4.

Limitation 54

§VIII.A.2, Claim 34.

See Limitation 32.

4. *Claims 8, 11, 12, 20-21, 23, 33, 38, 46, 47, 49: Obvious to Use Various Nonwoven Basis Weights for Karami '772's Wings*

Karami '772 indicates the nonwovens of its backsheet 130 and wings 131-134 can have a basis weight of 5-45 gsm, and offers 20 gsm and 33.9 gsm, respectively, as examples. *See* EX1003, ¶¶[0031], [0041], [0046]-[0047], [0052], TABLE 1 (diaper 100's wing-defining backsheet can be that of T-shaped diaper, whose basis weight is 5-45 gsm); EX1012, ¶¶70, 90-91. In the separate-chassis-and-wings

construction (§VIII.A.1), it was obvious to use a 10-30 gsm (e.g., 20 gsm) nonwoven for backsheet 130's film-nonwoven laminate, and an 18-60 gsm (e.g., 30 gsm) nonwoven for wings 131-134. EX1012, ¶¶90-91, 93-95.

POSITA would have arrived at these basis weights “when balancing nonwoven performance with its cost.” EX1012, ¶¶90, 92-93. Higher basis weights “tend[ed] to be stronger” but “more expensive because they included more material,” while lower basis weights “tend[ed] to have a more ‘cloth-like’ feel” and be more cost-effective. EX1012, ¶92; *see, e.g.*, EX1006, 2:19-32, 8:11-38 (higher-basis-weight “side panel deliver[s] the material strength needed for securing a fastening device to the diaper,” and lower-basis-weight region “deliver[s] a softness that is comfortable to the wearer’s skin”); EX1022, 1:21-41, 6:40-44 (“[W]hile strength and coverage may be increased by an increase in basis weight, the softness tends to decrease” and factoring the “higher cost of higher basis weight materials” into its design choice); EX1020, ¶[0006] (“low basis weight nonwoven webs” are more susceptible to having fibers “pulled loose” upon “disengaging of a hook member”).

With these considerations, POSITA would have understood that lower basis weights (e.g., 10-30 gsm, such as 20 gsm) were desirable for backsheet 130's outer cover to cost-effectively yield the desired “cloth-like feel.” EX1012, ¶¶92-93; *see, e.g.*, EX1023, 8:3-28 (“20 gsm ... desirably ... provides a generally cloth-like texture”); EX1037, ¶[0060] (same); EX1004, ¶[0065] (“relatively lower basis

weights of 15-30 gsm (optimally 20 gsm) are preferred for the backsheet”); EX1010, 39:8-24, FIG. 8 (backsheet “polypropylene spunbond nonwoven ... 20 grams/m²”).

POSITA also would have understood that higher basis weights (e.g., 18-60 gsm, such as 30 gsm) were desirable for wings 131-134 for strength—as the wings “have to withstand larger forces than backsheet 130”—and to “resist[] tearing when the fasteners are disengaged therefrom.” EX1012, ¶¶92-95; *see, e.g.*, EX1002, ¶[0032] (wings 34 “advantageously have a surface weight” that is “in particular 20-100 g/m², and specifically [] 25-50 g/m²”); EX1004, ¶¶[0065], [0067]-[0068] (“slightly higher basis weights of 20-40 gsm (optimally 34 gsm) or preferred for ... wings” for “strength necessary to provide a high level of shear strength”); EX1006, 2:19-32, 8:26-39; EX1009, ¶¶[0021]-[0023] (nonwoven basis weight of “20 to 35 g/m² ... guarantee[s] a good closing function in combination with a hook-forming component” and “good mechanical properties” for use “as belts in absorbent hygiene articles”); EX1020, ¶[0006].

These basis weight selections were routine for POSITA and predictably yielded these benefits, rendering them obvious. EX1012, ¶96.

Limitations 8, 11

§VIII.A.3, Limitation 7.

As described in Sections VIII.A.3 and VIII.A.4, it was obvious to use nonwoven basis weights throughout the full range of either 10-30 gsm or 18-22 gsm—e.g., 20 gsm—for wings 131-134.

Limitation 12[a]

§VIII.A.3, Claim 3.

The outer surfaces of front and rear wings 131-134 each are constituted by a nonwoven. *See* EX1003, ¶¶[0046]-[0048], [0053]; EX1012, ¶¶67, 74, 77, 85.

Limitation 12[b]

See §VIII.A.3, Limitation 7.

The wings are separate from, and therefore their ear nonwovens are distinct from the outer chassis nonwoven of containment assembly 120's film-nonwoven backsheet 130 (EX1003, ¶¶[0046]-[0047], [0052]). EX1012, ¶¶72, 78-79, 83.

To the extent PO argues that the wing nonwovens need be more distinct than separate from the backsheet/chassis nonwoven, it was obvious to use a lower-basis-weight backsheet nonwoven and higher-basis-weight wing nonwovens. *See* §§VIII.A.1-4; EX1012, ¶¶82, 92-95.

Limitation 12[c]

See Limitation 12[b].

Limitation 12[d]

It was obvious to use the same nonwoven, including type (e.g., spunbond), fiber-material, and fiber-thickness, for the modified Karami '772 diaper's wing and backsheet nonwovens, with the wing nonwoven having a higher basis weight. *See* EX1003, ¶¶[0045]-[0046], [0048], [0052]-[0053] (wing, backsheet can be same); EX1012, ¶172. This would have been a straightforward way of achieving the benefits of higher-basis-weight wings (§VIII.A.4) and simplicity of design. EX1012, ¶172.

Between such same-material nonwovens, the higher-basis-weight would have had more material per unit area and therefore a larger thickness than the lower-basis-weight. EX1012, ¶173 (including “under a pressure of 0.5 kPa”); *see* EX1048, ¶¶[0005]-[0006] (“Adding basis weight, or more material ..., increases the [] thickness of the nonwoven substrate”); EX1001, 7:32-40 (“higher mass per unit area of the [side part] nonwoven ... therefore has a greater thickness”).

Nevertheless, increasing a nonwoven's thickness was a known way to increase its basis weight and would have been obvious to achieve the benefits of higher-basis-weight wings. §VIII.A.4; EX1012, ¶174-175.

Limitation 20[a]

§VIII.A.3, Limitation 19.

See Limitation 12[b].

Limitation 20[b]

See Limitation 12[c].

Limitation 21

See Limitation 12[d].

Limitations 23

§VIII.A.3, Limitation 16.

As described in Sections VIII.A.1, VIII.A.3, and VIII.A.4, it was obvious to use nonwoven basis weights throughout the full range of 18-60 gsm—e.g., 30 gsm—for wings 131-134.

Limitations 33

§VIII.A.3, Limitation 16.

See Limitation 23

Limitations 38[a]-[d]

§VIII.A.3, Limitation 36.

See Limitations 12[a]-[d]

Limitations 46[a]-[b]

§VIII.A.3, Limitation 44.

See Limitations 12[a]-[b]

Limitations 49

See Limitation 23.

5. *Claims 26, 27, 43: Obvious to Fold & Releasably Bond Wings*

It would have also been obvious to fold wings 131-134 in Karami '772's modified diaper 100 (§VIII.A.1) "about multiple longitudinal fold lines" (parallel with "longitudinal centerline C") "such that partial sections thereof are folded upon each other and lie against one another." *See* EX1012, ¶¶87-89; EX1003, ¶[0045], FIG. 6. Benning's side flaps 34 "are folded over themselves at least along one fold line running in the longitudinal direction," such as "along three fold lines 50, 52, 54 extending in the lengthwise direction" such that partial sections 60 rest against one another. EX1002, ¶¶[0006]-[0007], [0020], [0055]-[0060], FIGs. 5-6, 8; EX1012, ¶¶65, 87. Karami '772 itself contemplates folding of its wings. EX1003, ¶[0037] ("[A]perturing step may take place ... before a folding station at which the wings are folded."); EX1012, ¶87. As in Benning, it was obvious to releasably fix the partial sections of folded wings 131-134 at affixation points or areas to maintain their folded configuration. EX1012, ¶¶87-88; EX1002, ¶¶[0006]-[0008], [0020], [0058], FIGs. 4, 7.

POSITA would have folded and temporarily affixed Karami '772's wings 131-134 as Benning teaches for multiple, independent reasons.

First, POSITA would have done so to “prevent[] the side flaps from fluttering during production” (facilitating manufacturing), decrease diaper 100's footprint to “facilitate[] stacking, packaging and storage ... prior to shipment,” and maintain “a neat appearance.” EX1012, ¶88; EX1002, ¶¶[0007], [0025]; EX1030, ¶¶[0006]-[0009], [0021], FIGs. 1, 3-6.

Second, POSITA would have done so to promote user-friendliness, with the releasable folding “mak[ing] handling even simpler”—especially when applying the diaper to “persons who require intensive care”—and allowing wing-deployment with “a single pull.” EX1002, ¶¶[0007] (eases the feeding of wings under a side-lying patient), [0020], [0025]; EX1012, ¶88.

This modification was straightforward and routine for POSITA and predictably would have facilitated manufacturing, packaging, and use of Karami '772's diaper, rendering it obvious. EX1012, ¶89.

Limitation 26

§VIII.A.2, Claim 1.

As explained in Section VIII.A.5, wings 131-134 each would have been folded upon itself about at least one longitudinal folding line, as in Benning. *See*

EX1002, ¶¶[0006]-[0007], [0020], [0055]-[0060], FIGs. 5-6, 8; EX1012, ¶¶65, 87-88.

Limitations 27[a]-[b]

Wings 131-134 each would have been “folded [into] partial sections 60 ... releasably attached to”—and therefore lying against—“each other in the folded configuration by ... affixation points 62,” as in Benning, to facilitate manufacturability, packaging, and use, while permitting easy wing-deployment. EX1002, ¶¶[0058], [0006], [0056]-[0060], FIGs. 4-8 (folded partial sections 60 “lie on top of each other”); EX1012, ¶¶65, 87-88.

Limitation 43

§VIII.A.2, Claim 1.

See Limitation 26.

B. Ground 2 – Benning and Karami ’626 Render Obvious Claims 1-5, 7, 8, 11-17, 19-27, 29-41, 43-54

Benning’s diaper includes [red] “main body portion ... 20, ... [or] chassis” with [blue] “material section[s] 34” or “wings” attached to its edges. EX1002, ¶¶[0003], [0053]-[0055], FIGs. 4-6; EX1012, ¶62.

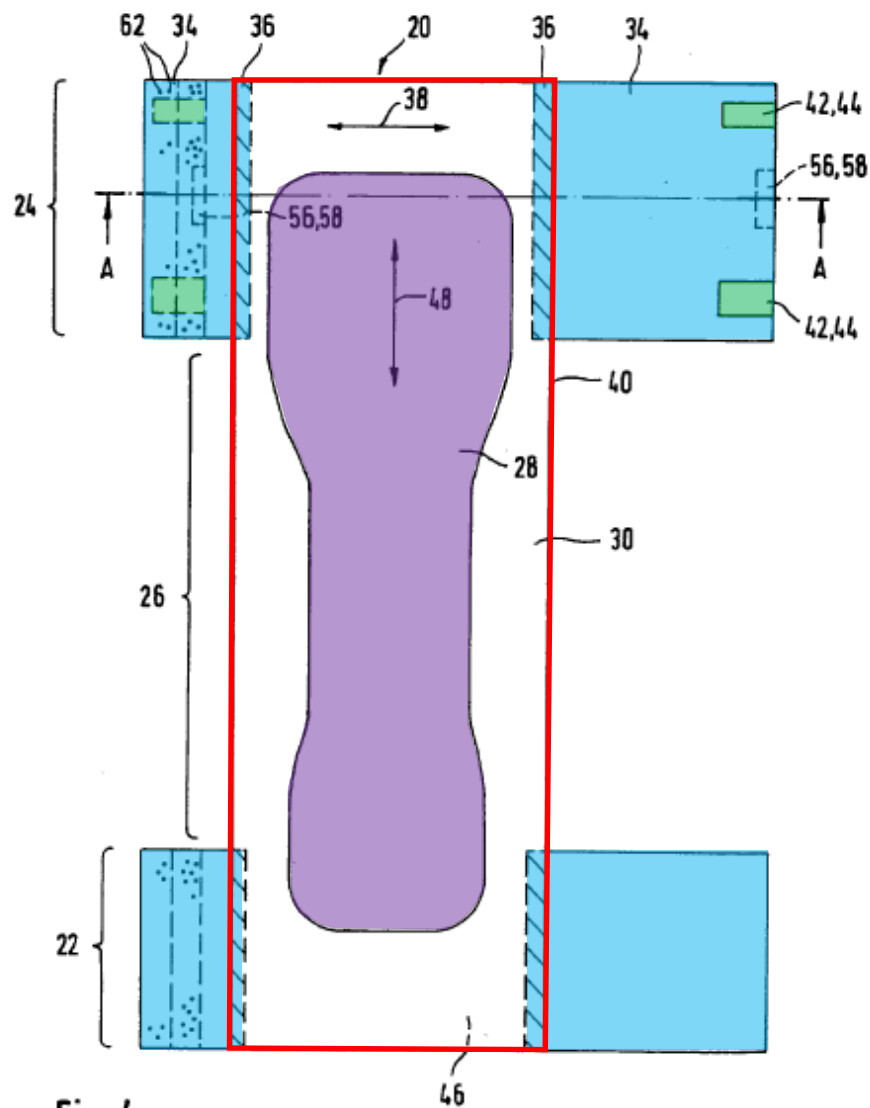


Fig. 4

Annotated Version of Benning's FIG. 4
("Annotated7")

A [purple] absorbent core 28 for “receive[ing] and permanently stor[ing] bodily fluids” is between a user-facing “fluid-permeable topsheet 32” and an outer “fluid-impermeable underlayer 30.” EX1002, ¶¶[0003], [0053], FIGs. 4-5; EX1012, ¶63.

Wings 34 are “preferably of a non-woven material.” EX1002, ¶[0032]; EX1012, ¶64. Prior to use, the wings “are folded over themselves along at least one fold line running in the longitudinal direction ... [and] are releasably attached at affixation points or areas.” EX1002, ¶¶[0006]-[0007], [0055]-[0060], FIGs. 4-6, 8; EX1012, ¶65. Such wing-folding desirably prevents wing-flutter “in the high-speed manufacturing machine” and facilitates the diaper’s placement onto a wearer. EX1002, ¶¶[0005], [0007]; EX1012, ¶¶62, 65.

Alternatively, closures 42 can “be designed to grip mechanically” (EX1002, ¶¶[0030], [0003]), which POSITA would have understood to refer to hook-type fasteners. *See, e.g.*, EX1020, ¶[0002] (“mechanical fasteners [are] often referred to as ‘hook and loop’ fasteners”); EX1024, 5:48-58 (hook-type fasteners “mechanically engage”); EX1004, ¶[0068] (same); EX1012, ¶62. Petitioner relies on the variant of Benning’s diaper that uses these hook-type fasteners. If PO argues it would require modification, it was obvious to use Benning’s hook-type fasteners over his adhesive ones, as the latter were known to be more susceptible to reliability-reducing contamination. EX1024, 1:29-40, 1:58-65; EX1012, ¶¶62, 32-33.

Benning’s hook fasteners “act in concert in a releasably gripping ... fashion with a landing zone on the main part.” EX1002, ¶[0030].

1. Obvious to Use Film-Nonwoven Backsheet & Hook Fasteners

(a) Obvious to use a film-nonwoven backsheet for wearer comfort and visual appeal

Karami '626's diaper has a film-nonwoven backsheet. EX1004, ¶¶[0062]-[0064]; EX1012, ¶108. Such backsheets were known to: (1) via their films, prevent leakage; and (2) via their nonwovens, promote wearer comfort and visual appeal with a cloth-like outer surface. *See, e.g.*, EX1023, 8:3-28 ("liquid permeable outer layer ... [that] desirably ... provides a generally cloth-like texture" such as "a 20 gsm ... spunbond polypropylene web"); EX1037, ¶[0060] (same); EX1019, 1:55-2:32 (achieving (2) with outer "polypropylene or polypropylene copolymer spunbond [(nonwoven)] web"); EX1008, 1:51-67 ("outer nonwoven also preferably includes a cloth-like outer surface [that] provides a softer feel[] and ... a more appealing visual appearance"); EX1012, ¶¶30-31, 112-113. Further, POSITA would have seen Karami '626's film-nonwoven laminate as particularly suited to these benefits given its nonwoven's lower (e.g., "optimally 20 gsm") basis weight, which was known to promote "a generally cloth-like texture." *See* EX1023, 8:18-24; EX1037, ¶[0060]; EX1012, ¶113.

Therefore, POSITA would have been motivated to use a film-nonwoven laminate like Karami '626's for Benning's underlayer 30 to:

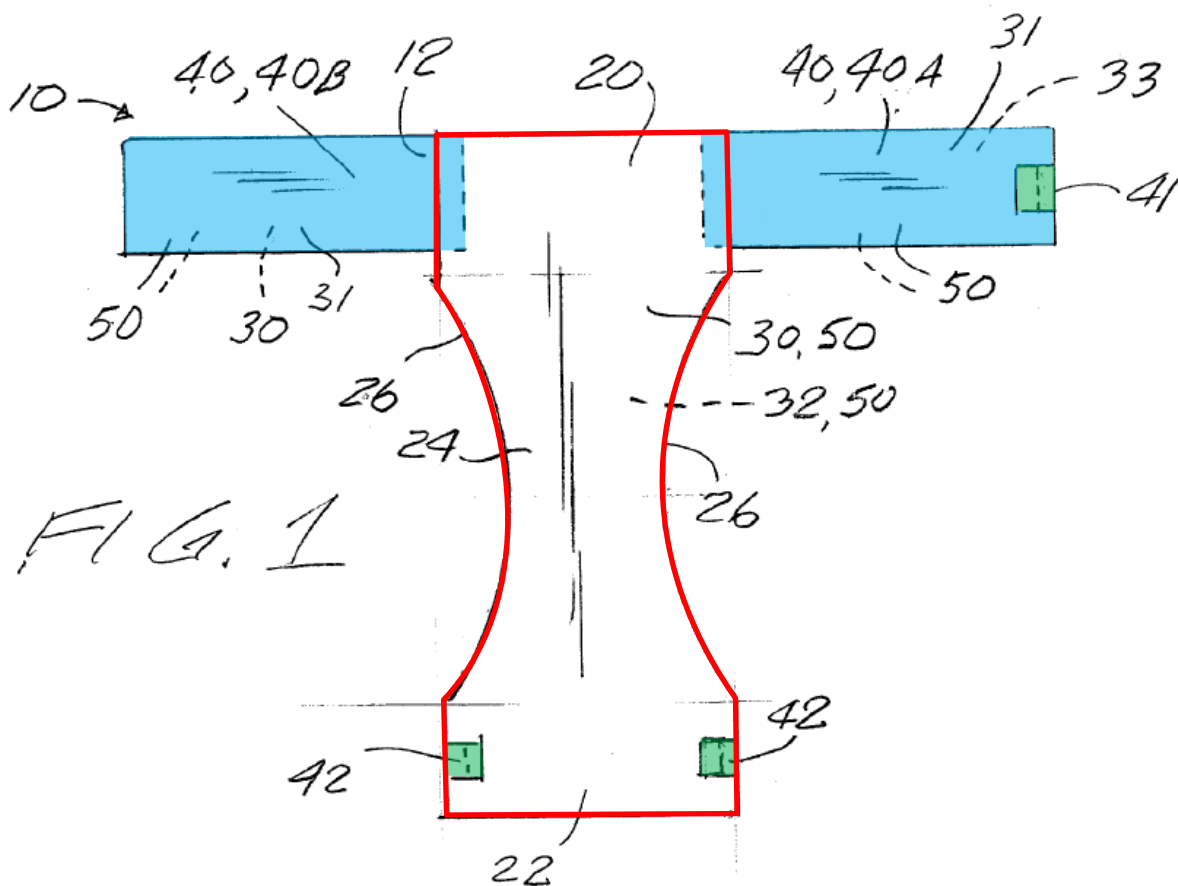
- a) provide a more comfortable and visually appealing cloth-like outer surface for Benning's diaper; and

b) improve adjustability by enabling fasteners like Karami '626's to "[e]ngage directly with any portion of [a diaper's] nonwoven surface[s]" to secure the diaper on a wearer. EX1004, ¶[0040]; EX1012, ¶¶112-113; *see also* §VIII.B.1(b).

(b) *Obvious to Use Fasteners Like Karami '626's for Benning's Closures to Enhance Size-Adjustability*

As Karami '626 explains, landing zones like Benning's (EX1002, ¶[0030]) were disadvantageous because they limited where fasteners could be secured and therefore the diaper's size-adjustability. EX1004, ¶¶[0003]-[0004], [0006]; EX1012, ¶114. Karami '626 solved this problem by using hook-type fasteners that could directly engage (i.e., without a separate landing zone) any portion of the nonwovens that defined his diapers' surfaces, up to and including backsheets and wings. EX1004, ¶¶[0006]-[0011], [0039]-[0041]; EX1012, ¶¶104, 107, 114-115. Karami '626's diapers thus could accommodate wearers ranging from small- to extra-large-waisted. EX1004, ¶¶[0006], [0039]-[0041], [0055]; EX1012, ¶¶104, 107.

Karami '626 illustrates this for a T-shaped diaper, explaining that wing 40A's fastener 41 can engage wing 40B's nonwoven to form a belt. EX1004, ¶¶[0037]-[0038], FIGs. 1, 7; EX1012, ¶¶105-106 (Annotated11, reproduced below).



Annotated Version of Karami '626's FIG. 1
("Annotated11")

Due to fastener 41's ability to engage any part of wing's 40B's nonwoven, the wings may vary in overlap to fit "both small and large-waisted persons." EX1004, ¶¶[0039]-[0040]; EX1012, ¶107. "For the extra-large waisted wearer," the first and second wings are "[i]nstead ... secured ... by fastener elements 42" engaging the nonwovens of wings 40A and 40B. EX1004, ¶¶[0038], [0041]; EX1012, ¶116.

Karami '626 also discloses an integral-chassis diaper 14 that achieves "the same or analogous improvement[] in the fit." EX1004, ¶[0055], FIGs. 9-10;

EX1012, ¶¶106-107. That diaper has front wings and rear wings with hook-type fasteners that POSITA would have understood to engage either the front wings (for a larger-waisted wearer) or central portion (for a smaller-waisted wearer) to achieve such fit-improvement. EX1012, ¶¶107, 116 (citing EX1004, ¶¶[0037]-[0040], [0055], FIGs. 9-10).

POSITA would have been motivated to use fasteners like Karami '626's for Benning's closures 42, at least to improve size-adjustability by directly engaging with a backsheet nonwoven (§VIII.B.1(a)) or its nonwoven wings 34 (EX1002, ¶[0032]). EX1012, ¶¶114-116.

POSITA would have recognized Benning as being well-suited to this approach, at least because its wings 34 already are "preferably spunbond materials ... hav[ing] a surface weight of ... specifically [] 25-50 [gsm]" (EX1002, ¶[0032]) (EX1004, ¶¶[0062], [0063], [0065]), which is engageable with Karami '626's fasteners to secure a diaper on a wearer (EX1004, ¶¶[0039]-[0040]). *See* EX1012, ¶115.

With Benning's configuration, implementing Karami '626's teachings would have involved attaching hook-type fasteners in place of Benning's closures 42 such that the hooks would engage either of the front wings 34 for larger-waisted users, or backsheet for smaller-waisted users (like Karami '626's T-shaped and integral diapers, *supra*). EX1012, ¶¶115-116.

(c) *The Modified Diaper Has a Lower-Basis-Weight Nonwoven in Its Backsheet Than in Its Wings, or it Was Obvious to Further Modify it as Such*

The modified Benning diaper includes a film-nonwoven backsheet like Karami '626's (§VIII.B.1(a)), with its nonwoven basis weight being “optimally 20 gsm” (EX1004, ¶[0065]; EX1012, ¶¶112-113, 117-118), and Benning's wings 34, which have higher basis weights of “specifically [] 25-50 [gsm]” (EX1002, ¶[0032]; EX1012, ¶117).

Karami '626's broader teachings also render these differential basis weights, and others, obvious. EX1012, ¶118. For its T-shaped diaper, “slightly higher basis weights of 20-40 gsm (optimally 34 gsm) are preferred for use on the wings ..., while relatively lower basis weights of 15-30 gsm (optimally 20 gsm) are preferred for the backsheet.” EX1004, ¶[0065]. POSITA would have understood the higher-basis-weight wings would have also been preferred for the modified Benning diaper given that, like Karami '626's T-shaped diaper, its wings were separate from the backsheet, would encircle a wearer's waist when worn, and would be engaged by fasteners. §VIII.B.1(b); EX1012, ¶118.

Independently, POSITA recognized that higher-basis-weight (e.g., 18-60 gsm, such as 30 gsm) wings would have desirably promoted diaper-strength while lower-basis-weight nonwovens (e.g., 10-30 gsm, such as 20 gsm) for backsheets would have desirably promoted wearer-comfort (§VIII.A.4). EX1012, ¶118.

2. Claims 1, 2, 13, 26, 27, 29, 30, 33-35, 43, 51, 52

Every limitation of these claims is present in Benning's diaper as modified in view of Karami '626 per Section VIII.B.1.

Limitation 1[p]

Benning's is an absorbent incontinence diaper for adults. EX1002, FIG. 4, ¶[0002] (“an absorbent incontinence article, specifically for incontinent adults”); EX1012, ¶¶62-63.

Limitation 1[a][1]

Chassis 20 has an in-use-body-facing inner face defined by topsheet 32 (EX1002, ¶[0053], FIGs. 5, 6) and an in-use-away-facing outer face defined by underlayer/backsheet 30 (*id.*). EX1012, ¶¶62-63.

Limitation 1[a][2]

“[Chassis] 20 comprises an absorbent core 28 [that] is dimensioned to receive and permanently store bodily fluids.” EX1002, ¶[0053], FIGs. 4-6; EX1012, ¶63. Benning's underlayer 30 is a backsheet disposed on the side of core 28 opposite the wearer when in use. EX1002, ¶[0053] (“underlayer 30 [] can also form the outer visible side of the incontinence article”), FIGs. 5, 6; EX1012, ¶63.

Limitation 1[a][3]

As shown in Benning's FIGs. 4-6, the width of absorbent core 28 is smaller than the width of underlayer 30. EX1012, ¶63.

Limitation 1[a][4]

“[Chassis] 20 comprises a front region 22, a back region 24[,] and a crotch region 26 between them.” EX1002, ¶[0053], FIG. 4; EX1012, ¶62.

Limitation 1[a][5]

Benning’s chassis 20 defines “lengthwise edge[s] 40” along its sides. EX1002, ¶[0055], FIG. 4; EX1012, ¶62.

Limitation 1[b]

Benning’s diaper includes four wings 34 (i.e., ears). EX1002, FIG. 4, ¶[0029]; EX1012, ¶62. The wings are not directly connected to one another. EX1002, ¶¶[0054]-[0056], [0029], FIGs. 4-6; EX1012, ¶62.

At the Benning diaper’s back region 24, a wing 34 is attached to each of chassis 20’s lengthwise edges 40. EX1002, ¶¶[0054]-[0056], FIGs. 4-6; EX1012, ¶62. The same is true at the Benning diaper’s front region 22. EX1002, ¶[0029], FIG. 4; EX1012, ¶62.

Limitation 1[c][1]

As explained in Section VIII.B.1(b), Benning’s diaper includes closures 42, attached to back wings 34, “[t]o close the incontinence article when it is worn” that are—or would obviously have been—“designed to grip mechanically” (EX1002, ¶¶[0030], [0054]-[0055]), *i.e.*, hook-type fasteners (*see* §VII.D.1). EX1012, ¶62

Limitation 1[c][2]

As explained in Sections VIII.B.1(a)-(b), it was obvious to use a film-nonwoven backsheet like Karami '626's for Benning's underlayer 30, and fasteners like Karami '626's for Benning's closures 42. Such fasteners are designed to detachably fasten to conventional nonwovens (EX1004, ¶¶[0007], [0070], [0078]), including those of the modified underlayer (*id.*, ¶¶[0062]-[0064]) and wings 34 (EX1002, ¶[0032]). *See* EX1012, ¶¶113, 115.

Closures 42 “interact ... with an outside 46 of the front region 22” (EX1002, ¶[0055]), meaning post-modification they would have interacted with the outer faces of underlayer 30 and front wings 34. §VIII.B.1(b).

The forces between closures 42 and either wing nonwoven or backsheet nonwoven would have been sufficient to hold the diaper on the user's body. EX1012, ¶115; *see also* §VIII.A.3 (obvious to achieve specific forces recited in claims of '249 Patent).

Limitation 1[d]

As explained in Section VIII.B.1(c), the modified Benning diaper had or it was obvious to use a higher-basis-weight nonwoven for wings 34 than for the modified underlayer, *e.g.*:

- for wings: from “25-50 [gsm]” (EX1002, ¶[0032]), from “20-40 gsm (optimally 34 gsm)” (EX1004, ¶[0065]), or from 18-60 gsm (e.g., 30 gsm) (§VIII.B.1(c)); and
- for backsheet/underlayer: “from 15-30 gsm (optimally 20 gsm)” (EX1004, ¶[0065]), or from 10-30 (e.g., 20 gsm) (§VIII.B.1(c)).

For higher-basis-weight wings 34, “more loops [would have been] available for engagement by the hook portion of the fastener” (EX1040, 2:35-39), resulting in higher fastener retaining forces (EX1044, 5:3-7 (“more hooks and loops [] engaged” provides “high[er] peel and shear strength[s]”)) than in the lower-basis-weight nonwoven of underlayer 30. EX1012, ¶120. Such known, positive correlation between basis weight and fastener retaining forces is confirmed by the ’249 Patent, which explains that a higher fastener retaining force in its side parts than in its main part “is essentially ensured by the higher mass per unit area ... of the side parts.” EX1001, 13:42-49, 7:25-32; EX1012, ¶¶120-121.

Limitations 2 & 13

Over-abdomen retaining forces are simply a proxy for shear forces. *See* §VII.D.4; EX1012, ¶57. And the selection of a particular test method to measure characteristics of structures does not alter the structures themselves, nor that such structures would yield differential retaining forces. EX1012, ¶¶186-187. Moreover, because the analysis for Limitation 1[d] (and the forces of claims 3, 4, 8, 13-16, 25,

31, 32, 36, 37, 39, 40, 44, 50, 53, and 54) is based specifically on the same materials (like those for which shear forces were measured in the '249 Patent) exhibiting the same properties under the same test (as used in the '249 Patent to measure those very materials), these limitations are necessarily met. EX1012, ¶¶186-187.

Limitation 26

All of Benning's wings 34 "are folded over themselves at least along one fold line running in the longitudinal direction[, with] partial sections of the material sections folded over each other and contacting each other." EX1002, ¶[0006]; *see also, e.g.*, EX1002, Abstract, ¶¶[0007]-[0008], [0022], [0024], [0025], [0029] ("all such [wings] ... are folded"), [0056]-[0061], FIGs. 4-8; EX1012, ¶65.

Limitations 27[a]-[b]

Wings 34 are "folded [into] partial sections 60 ... releasably attached to"—and therefore lying against—"each other in the folded configuration by ... affixation points 62." EX1002, ¶¶[0058], [0006], [0056]-[0060], FIGs. 4-8; EX1012, ¶65.

Limitation 29

Wings 34 extend beyond the chassis in a transverse direction in an unfolded state between 15 cm and 35 cm. EX1002, ¶[0029] ("at least 15 cm and ... 35 cm at the most"); EX1012, ¶177.

Limitation 30

Wings 34 extend longitudinally at least 14 cm. EX1002, ¶[0028] (“at least 14 cm”); EX1012, ¶177.

Limitation 33

As explained in Section VIII.B.1(c), wings 34 of the modified Benning diaper would have had—or obviously been modified to have—a basis weight of from “25-50 [gsm]” (EX1002, ¶[0032]), from “20-40 gsm (optimally 34 gsm)” (EX1004, ¶[0065]), or from 18-60 gsm (e.g., 30 gsm) (§VIII.A.3).

Claim 34

See Claim 1. Claim 34 is substantially identical to claim 1, with the exception of Limitations 34[b][2] and 34[b][3]:

Limitation 34[b][2]

Wings 34 have inner and outer faces. EX1002, FIGs. 4-6.

Limitation 34[b][3]

In the modified Benning-Karami '626 diaper, there are no ears in the crotch region. *See* EX1002, FIG. 4.

Limitations 35 & 41

See Limitations 2 & 13.

Limitation 43

See Limitation 26.

Limitation 51

See Limitation 29.

Limitation 52

See Limitation 30.

3. Claims 2-5, 7, 8, 11, 12, 15-17, 19-25, 31-33, 35-41, 46, 49, 53, and 54: Obvious to Use Hooks/Nonwovens in Modified Benning Diaper That Yielded the Claimed Retaining Forces

As evidenced by the '249 Patent's example (EX1001, 14:47-15:57), the claimed retaining forces arise directly from an obvious combination of materials: a commercially-available fastener known for use in diaper closures, engaging commercially-available nonwovens known for use in diaper backsheets and wings.

(a) The claimed fastener-backsheet forces result from obvious fastener and backsheet nonwoven

The '249 Patent recorded a retaining force of 48.6 N/25 mm (EX1001, 15:51-52) between:

- a commercially-available hook-type fastener, a “20x25 mm[] [t]ype Microplast® 42-288-HX200-PP3, item number 25445, available from G. Binder GmbH & Co KG Textil-und Kunststofftechnik” (*id.*, 15:32-37) (“**Fastener Z**”); and
- a commercially-available nonwoven of a film-nonwoven, “[a] a 20 [gsm] polypropylene spunbond nonwoven, [b] fiber thickness 2 dtex, with [c] a hot calander embossing pattern ... [having] an embossing

area of 21.13%., ... available from Corovin GmbH” (*id.*, 14:62-15:3)

(“**Nonwoven Y**”).

EX1012, ¶¶123, 125.

Fastener: In the modified Benning diaper, it would have at least been obvious to use Karami '626's “preferred” fastener, the Binder #42-288-HX-200-PP3 (EX1004, ¶[0060]), with Karami '626's preferred dimensions, “at least one inch in width by a half inch in length.” EX1004, ¶[0058]; EX1012, ¶¶123-124. For example, Karami '626 makes clear that this fastener with these dimensions is suitable for fastening to nonwovens to secure a diaper on a wearer. EX1004, ¶[0038]. This is the '249 Patent's Fastener Z, including its dimensions: 25 mm (1 in) x 20 mm (0.79 in). EX1012, ¶124; EX1009, ¶¶[0038], [0046] (using 25 by 20 mm Fastener Z); §VIII.B.1(b).

Backsheet Nonwoven: It also would have at least been obvious to use Karami '626's “optimal” 20-gsm spunbond nonwoven in the modified backsheet. EX1004, ¶¶[0063]-[0065]; EX1012, ¶125. This is the same type and basis weight of nonwoven as the '249 Patent's backsheet uses, Nonwoven Y. EX1012, ¶125; §VIII.B.1(a); *see also* §VIII.B.1(c) (20-gsm backsheet nonwoven).

The '249 Patent confirms that its claimed retaining forces are “essentially ensured” by the nonwoven's basis weight. EX1001, 13:42-49, 7:25-32. Therefore, the use of a 20-gsm spunbond backsheet nonwoven—combined with the identical

Fastener Z—would have yielded the retaining forces of claims 3, 14, 16, 31, 36, 39, 44, and 53. EX1012, ¶127.

To the extent PO argues that these obvious choices might have yielded different retaining forces without the unclaimed material, dtex, or embossing patterns in the '249 Patent's example, other basis weights within Karami '626's disclosed 15-30 gsm backsheet range (e.g., 25 gsm) or 20-40 gsm wing range (e.g., 35 gsm) (EX1004, ¶[0065]) would have yielded other retaining forces within the claimed ranges (EX1001, 13:42-49; §VIII.B.2, Limitation 1[d]) and were just as obvious (§VIII.B.1(c)). EX1012, ¶¶128, 130.

Nevertheless, even with a 20 gsm backsheet nonwoven, the additional features described for Nonwoven Y were obvious:³

Material: Polypropylene was an obvious material choice because it was known to work for a spunbond backsheet nonwoven having the same basis weight and intended to engage the same fastener as Karami '626's. EX1003, ¶¶[0028]

³ Should PO argue the features of temperature treatment or ring-rolling are somehow necessary (EX1001, 15:20-31), which do not the specific retaining-force claims, those also were obvious. *See* Sections VIII.E (temperature treatment) and VIII.F (ring-rolling).

(polypropylene), [0031] (5-45 gsm), [0041] (fastener); §VIII.A.2, Limitation 1[j] (fastener); EX1012, ¶125.

Dtex: Karami '626's "preferred" fiber size range for its backsheet nonwoven is "1.3-3.0 denier" (EX1004, ¶¶[0062]-[0064]) or 1.4-3.3 dtex, rendering at least obvious any dtex value (e.g., 2) therein. EX1012, ¶126.

Embossing Area: Karami '626 "prefer[ed] ... a percentage bonding area of about 15-30%" for its backsheet nonwoven (EX1004, ¶¶[0062]-[0064]), and a 21.13% embossing area would therefore also have at least been obvious. EX1012, ¶¶126.

Therefore, it was obvious—indeed, preferred—to use a polypropylene spunbond nonwoven with 20 gsm basis weight like Nonwoven Y in the modified Benning diaper's film-nonwoven backsheet. EX1012, ¶¶123, 125-126.

Using such a nonwoven and Fastener Z would have necessarily yielded the claimed retaining forces: around 48.6 N/25 mm and, in any event, within the claimed ranges of 20-57 N/25 mm (claims 3, 16, 36, 44) or 25-50 N/25 mm (claims 14, 31, 39, 53). EX1012, ¶127.

(b) *The claimed fastener-wing/side-part forces result from obvious fastener and wing nonwoven*

The '249 Patent also recorded a retaining force of 65.3 N/25 mm (EX1001, 15:49-50) between Fastener Z and another commercially-available non-woven, a

“30 [gsm⁴] polypropylene spunbond nonwoven ... obtain[able] from Corovin GmbH” (“**Nonwoven X**”) having the same fiber-thickness and embossing area as Nonwoven Y. EX1001, 14:50-58. EX1012, ¶¶123, 125.

Wing Nonwoven: In the modified Benning diaper, it also would have at least been obvious to use a 30 gsm spunbond nonwoven for wings 34. EX1012, ¶125. Both Benning and Karami ’626 disclose a 30 gsm basis weight for wing nonwovens (EX1002, ¶[0032] (25-50 gsm); EX1004, ¶[0065] (20-40 gsm, e.g., 34 gsm)), and 30 gsm therefore was an obvious choice. §VIII.B.1(c). This is the same type and basis weight of nonwoven (Nonwoven X) used by the ’249 Patent. EX1001, 14:50-58.

Karami ’626 also explains that wings can comprise the same type of nonwoven—just with a higher basis weight—as its backsheet (EX1004, ¶¶[0062]-[0065]), rendering Nonwoven X’s material, dtex, and embossing area, which are identical to Nonwoven Y’s addressed above, at least obvious choices when implementing Karami ’626’s teachings in Benning’s diaper (§§VIII.B.1(a)-(b)). EX1012, ¶¶125-126.

Using such a nonwoven and Fastener Z would have necessarily yielded the claimed retaining forces: around 65.3 N/25 mm and, in any event, within the claimed

⁴ EX1012 ¶123, n.3.

ranges of 58-90 N/25 mm (claims 4, 25, 37, 50) or 60-80 N/25 mm (claims 15, 32, 40, 54). EX1012, ¶129; *see also* EX1001, 13:42-49, 7:25-32.

Limitations 2, 13

§VIII.B.2, Limitations 2 & 13.

Limitations 3, 14

Obvious selections for closures 42 and modified backsheet nonwoven would have necessarily yielded the claimed retaining forces. *See* this §VIII.B.3.

Limitations 4, 15

Obvious selections for the closures and wing 34 nonwoven would have necessarily yielded the claimed retaining forces. *See* this §VIII.B.3.

Limitation 5

As explained in Section VIII.B.1(b), the modified Benning would include hooks for fastening to the “loops” of the nonwovens in the modified Benning diaper’s underlayer 30 (§VIII.B.1(a)) and wings 34. EX1004, ¶¶[0037], [0057], [0007]-[0008], [0078] (“minihook fastener,” nonwoven is “a miniloop fastener”).

Limitation 7

Underlayer 30 covers all of chassis 20 (EX1002, FIGs. 4-6) and “form[s] the outer visible side of the incontinence article” and therefore of the chassis (*id.*, ¶[0053]). As explained in Section VIII.B.1(a), the modified underlayer 30 would

have a nonwoven outer surface defining the outer face of the chassis. EX1012, ¶¶112-113.

Limitations 8 & 11

As explained in Section VIII.B.1(c), the nonwoven of the modified backsheet/underlayer would have had—or obviously been modified to have—a basis weight of “from 15-30 gsm (optimally 20 gsm).” EX1004, ¶[0065].

Limitation 12[a]

“The [wings] attached to [chassis] are preferably of a non-woven material,” which defines their outer faces. EX1002, ¶[0032]; §VIII.B.1(b).

Limitation 12[b]

See Limitation 7.

Limitation 12[c]

As explained in Sections VIII.B.1(c) and VIII.B.3 it was obvious to use a lower-basis-weight backsheet nonwoven and higher-basis-weight wing nonwovens. EX1012, ¶¶92-94, 118.

Limitation 12[d]

It was obvious to use the same material, including type (e.g., spunbond), fiber-material, and fiber-thickness, for the modified Benning diaper’s wing and backsheet nonwovens, with the wing nonwoven having a higher basis weight. EX1012, ¶172. This is Karami ’626’s preferred configuration: “while the nonwoven [for his wings

and backsheet] is preferably a spunbond” having a preferred fiber-thickness “slightly higher basis weights ... are preferred for use on the wings” than in the backsheet. *See* EX1004, ¶¶[0062]-[0065]; EX1002, ¶172. It also would have been a straightforward way of achieving the benefits of higher-basis-weight wings (§VIII.B.1(c)) and simplicity of design. EX1012, ¶172. The higher-basis-weight would have had more material per unit area and therefore a larger thickness than the lower-basis-weight. *See* §A.4, Limitation 12[d].

Nevertheless, increasing a nonwoven’s thickness was a known way to increase its basis weight and would have been obvious to achieve the benefits of higher-basis-weight wings (§VIII.B.1(c)). *See* §VIII.A.4, Limitation 12[d].

Limitations 16

§VIII.B.2, Claim 1.

Obvious selections for closures 42 and modified backsheet nonwoven would have necessarily yielded the claimed retaining forces. *See* this §VIII.B.3.

Limitation 17[a]

The modified underlayer 30 (backsheet) is a film-nonwoven laminate like Karami ’626’s. §§VIII.B.1(a), VII.D.2.

Limitation 17[b]

See Limitation 7. The nonwoven of the modified backsheet/underlayer forms the outer, visible side of chassis 20, and its film therefore faces absorbent core 28. *See* EX1002, FIGs. 5-6.

Limitation 19

Benning's nonwoven wings 34 “are configured to breathe” to promote wearer comfort. EX1002, ¶[0032]; EX1012, ¶¶64, 119.

Limitation 20[a]

See Limitation 12[b].

Limitation 20[b]

See Limitation 12[c].

Limitation 21

See Limitation 12[d].

Limitation 22

Nonwoven wings 34 “are configured to breathe ..., which allows an exchange of air as well [as] ... vapor.” EX1002, ¶[0032]; EX1012, ¶¶64, 119.

Limitation 23

As explained in Sections VIII.B.1(c) & VIII.B.3, it was obvious to use a nonwoven with a basis weight in the range of 18-60 g/m²—e.g., 30 g/m²—for the

wings. EX1004, ¶[0065] (30 gsm wing nonwoven); EX1002, ¶[0032] (same); *see also* (§VIII.B.1(c)).

Limitation 24

The modified backsheet includes a film (§VIII.B.1(a)); its wings 34 do not (*see* EX1002, ¶[0032]) and are therefore more breathable. EX1012, ¶119.

Limitation 25

§VIII.B.2, Claim 1.

See Limitation 4.

Limitations 31

§VIII.B.2, Claim 1.

See Limitation 14.

Limitation 32

§VIII.B.2, Claim 1.

See Limitation 15.

Limitation 33

§VIII.B.2, Claim 1.

See Limitation 23.

Limitations 35 & 41

See Limitations 2 & 13.

Limitations 36, 39

See Limitations 3, 14.

Limitation 37

See Limitation 4.

Limitations 38[a]-[d]

See Limitations 12[a]-[d]

Limitation 40

See Limitations 15.

Limitations 44, 53

§VIII.B.2, Claim 34.

See Limitations 36, 39.

Limitation 45

See Limitation 12[a].

Limitations 46[a]-[b]

See Limitations 12[b]-[c]

Limitation 47

See Limitation 23.

Limitation 48

See Limitation 12[d].

Limitation 49

See Limitation 23.

Limitation 50

See Limitation 4.

Limitation 54

§VIII.B.2, Claim 34.

See Limitation 15.

**C. Ground 3 – Benning, Karami '626, and Stupperich Render
Obvious Claims 1-5, 7, 12-18, 19-22, 24-27, 31, 32, 34-41, 43-46,
48, 50-54**

Stupperich discloses nonwovens designed to be engaged by hook-type fasteners to secure a diaper on a wearer. EX1009, Abstract, ¶¶[0010], [0016], [0020], [0023], [0035]; EX1012, ¶132. Such a nonwoven should “achieve a good closure effect [with the fasteners that] ... do not unintentionally loosen” yet is releasable when desired “without materials of the closure elements being detached or torn out.” EX1009, ¶[0002]; EX1012, ¶133. These goals compete: bonding promotes damage-free releasability but can reduce retention forces. EX1009, ¶¶[0002]-[0010]; EX1012, ¶133.

Stupperich’s nonwovens strike a balance with their bonding pattern. EX1009, ¶¶[0007]-[0011], [0060]-[0061], FIG. 3A (reproduced below); EX1012, ¶133.

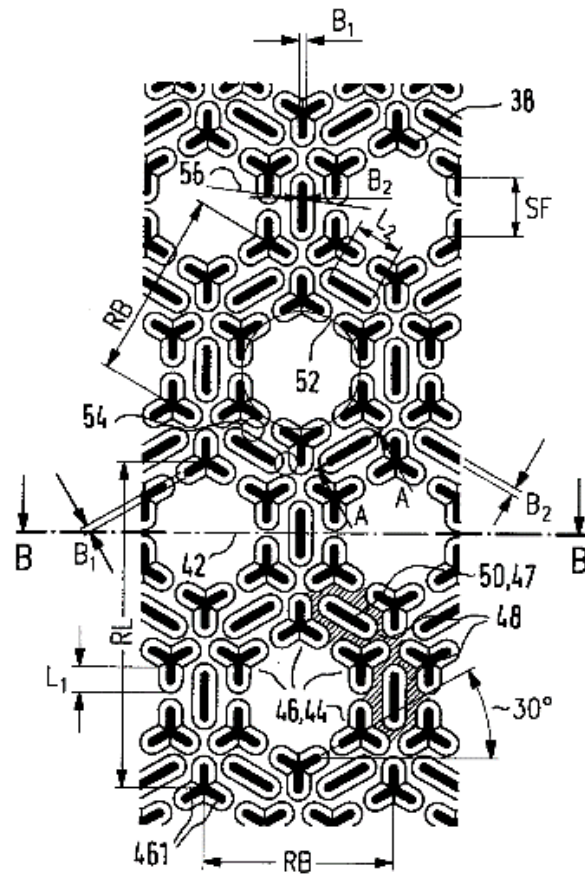


Fig. 3a

Bonded areas provide “sufficient [nonwoven] solidification,” while non-bonded areas 42, 48 provide a “sufficiently large anchoring area for the [fasteners]” and “contribute to a mechanical connection that is [] continuous.” EX1009, ¶¶[0008]-[0010], [0061]; EX1012, ¶135.

It was obvious to use Stupperich’s nonwovens in the modified Benning diaper (§§VIII.B.1(a)-(c)) for wings 34 and as the nonwoven of underlayer 30. EX1012, ¶136.

First, Stupperich's nonwovens are what Karami '626 calls for: nonwovens engagable with hook-type fasteners to secure a diaper on a wearer. EX1004, ¶¶[0007]-[0008], [0040]; EX1009, Abstract, ¶¶[0010], [0016], [0019], [0024], [0035]; EX1012, ¶¶132, 136-137. Stupperich even uses Karami '626's preferred "Microplast' 42-288-HX200-PP3" fasteners (EX1009, ¶¶[0046], [0065], [0068]; EX1004, ¶[0060]) having Karami '626's preferred dimensions: 25 mm x 20 mm (EX1009, ¶[0038], FIG. 5A; EX1004, ¶[0058]). EX1012, ¶¶132, 136; *see also* §VIII.B.3.

Second, POSITA would have sought the advantageous balance between durability and forces of Stupperich's nonwovens. EX1009, ¶¶[0002], [0007]-[0010]; EX1012, ¶137.

Stupperich details two such nonwovens, each having "[an outer] card web layer 36 [] added to [an inner] spunbonded material layer 32" using variations of his bonding pattern and spunbonded layer basis weights: 30 gsm ("**Lower-Basis-Weight-Nonwoven**") and 45 gsm ("**Higher-Basis-Weight-Nonwoven**"). EX1009, ¶¶[0060]-[0064], [0067]; EX1012, ¶¶135, 139.

As explained in Section VIII.B.1(c), it was obvious to use the Higher-Basis-Weight-Nonwoven for the wings 34 and the Lower-Basis-Weight-Nonwoven for its underlayer 30's nonwoven. EX1012, ¶¶138-139. Such would have provided increased strength and fastener retaining forces in the wings where desirable for the

modified Benning diaper's larger-waisted wearers. EX1006, 2:19-32 (strength increases with basis weight); EX1022, 1:31-39 (same); *see* EX1020, ¶[0006] (retaining forces increase with loop-anchoring, which would have been enhanced by the Higher-Basis-Weight-Nonwoven's spunbonded layer); EX1012, ¶139 (same); *compare* EX1009, ¶¶[0065] and [0068] (Higher-Basis-Weight-Nonwoven had higher retaining forces). It would have also achieved the benefits of Stupperich's nonwovens for the backsheet at lower cost than the wings. EX1022, 6:40-41 (cost increases with basis weight); EX1012, ¶139.

Further, this modification would have maintained Karami '626's simplicity of using otherwise similar nonwovens for the wings and backsheet. Karami '626, ¶¶[0062]-[0065]; EX1012, ¶139.

Claims 1, 26-27, 29-30, 34, and 51-53

With the exception of Limitation 1[d] and 34[d], Claims 1, 26-27, 29-30, 34, and 51-53 are met by Benning-Karami '626-Stupperich in the same way as in Benning-Karami '626. *See* §VIII.B.

Limitations 1[d] & 34[d]

As explained in Section VIII.C, it was obvious to use Stupperich's Lower-Basis-Weight-Nonwoven in the underlayer 30, and Higher-Basis-Weight-Nonwoven in the wings. Between the Lower-Basis-Weight-Nonwoven and Karami '626's preferred, obvious fastener, Stupperich measured retaining forces of 51.00

N/25 mm (EX1009, ¶[0065]), which is lower than the 58.89 N/25 mm (EX1009, ¶[0068]) measured between that fastener and the Higher-Basis-Weight-Nonwoven.

Limitations 2 & 13

Stupperich measures the retaining forces between its nonwovens and Karami '626's preferred, obvious fastener using the '249 Patent's test (*compare* EX1009, ¶¶[0036]-[0045], FIGs. 4-6 *with* EX1001, 2:46-4:36, FIGs. 8-10).

Limitation 3

See Limitation 1[d] (51.00 N/25 mm) & Limitation 2.

Limitation 4

See Limitation 1[d] (58.89 N/25 mm) & Limitation 2.

Limitation 5

See §VIII.B.3, Limitation 5. Karami '626's preferred “‘Microplast’ 42-288-HX200-PP3” fasteners are hooks of a hook-and-loop fastener. EX1009, ¶¶[0046], [0065], [0068]; EX1004, ¶[0060].

Limitation 7

See §VIII.B.3, Limitation 7.

As explained in Section VIII.C, the modified backsheet would use Stupperich's Lower-Basis-Weight-Nonwoven, the upper/outer card web nonwoven layer of which would defines the face of the modified backsheet. EX1009, ¶[0019].

Limitation 12[a]

“The [wings] attached to [chassis] are preferably of a non-woven material,” which defines their outer faces. EX1002, ¶[0032]; §VIII.B.1(a). As explained in Section VIII.C, the modified wings would use for their outer nonwoven layer Stupperich’s Higher-Basis-Weight-Nonwoven, which includes two nonwoven layers—a lower/inner 45 gsm carrier nonwoven, and an upper/outer card web nonwoven layer. EX1009, ¶[0059]. It is the upper/outer card web nonwoven layer that defines the face of the modified wings. EX1009, ¶[0019].

Limitation 12[b]

See Limitation 7.

Limitation 12[c]

As explained in Section VIII.C, Stupperich’s Higher-Basis-Weight-Nonwoven (wings) has a greater mass per unit area than Stupperich’s Lower-Basis-Weight-Nonwoven (backsheet).

Limitation 12[d]

See §VIII.B.3, Limitation 12[d].

Limitation 14

See Limitation 3 (51.00 N/25 mm). Stupperich discloses variations on that nonwovens with lower basis weight carrier layers (*e.g.*, “15 to 60 g/m²”) that yielded lower retaining forces—*e.g.*, “at least 40 N/25 mm”—that are within the range of

25-50 N/25 mm, when measured using the identical test espoused by the '990 Patent. EX1009, 10-11/37 (Claims 22 & 30). It was equally obvious to use such slightly lower basis weight Stupperich nonwovens, which would have yielded the disclosed slightly lower retaining forces within the claimed range. EX1012, ¶140.

Limitation 15

See Limitation 4 (58.89.00 N/25 mm). Stupperich discloses variations on that nonwoven with higher basis weight carrier layers (*e.g.*, “15 to 60 g/m²”) that yielded higher retaining forces—*e.g.*, “at most 70 N/25 mm”—that are within the range of 60-80 N/25 mm, when measured using the identical test espoused by the '990 Patent. EX1009, 10-11/37 (Claims 22 & 30). It was equally obvious to use such slightly higher basis weight Stupperich nonwovens, which would have yielded the disclosed slightly higher retaining forces within the claimed range. EX1012, ¶140

Limitations 16

See Limitation 14.

Limitation 17[a]

The modified underlayer 30 (backsheet) is a film-nonwoven laminate like Karami '626's. §§VIII.B.1(a), VII.D.2. With the use Stupperich's Lower-Basis-Weight-Nonwoven, such nonwoven defines the outer nonwoven layer of the modified backsheet.

Limitation 17[b]

The nonwoven of the modified backsheet/underlayer forms the outer, visible side of chassis 20. §VIII.C, Limitation 7. Its film therefore faces absorbent core 28. *See* EX1002, FIGs. 5-6.

Limitation 18

See §VIII.A.3, Limitation 18.

Limitation 19

See Limitation 12[a].

Limitation 20[a]

See Limitation 7.

Limitation 20[b]

See Limitation 12[c].

Limitation 21

See Limitation 12[d].

Limitation 22

Stupperich's nonwovens are "advantageously" breathable for "wearing comfort. EX1009, ¶[0026]. Such nonwovens typically have an "open, fibrous structured [that] allowed vapor and air to pass through" (EX1012, ¶¶64, 84, 135), and POSITA would have wanted them so to promote wearer comfort as in Benning. *See* EX1002, ¶[0032]; EX1012, ¶¶83-85.

Limitation 24

The modified backsheet includes a film (§VIII.B.1(a)); its wings 34 do not (see EX1002, ¶[0032]) and are therefore more breathable. EX1012, ¶119.

Limitation 25

See Limitation 4.

Limitations 31

See Limitation 14.

Limitation 32

See Claim 15.

Limitations 35 & 41

See Limitations 2, 13.

Limitations 36, 39, 53

See Limitations 3, 14.

Limitation 37

See Limitation 4.

Limitations 38[a]-[d]

See Limitations 12[a]-[d]

Limitation 40

See Limitation 15.

Limitation 43

See Limitation 26.

Limitation 44

See Limitation 16.

Limitation 45

See Limitation 12[a].

Limitations 46[a]-[b]

See Limitations 12[b]-[c]

Limitation 48

See Limitation 12[d].

Limitation 50

See Limitation 4.

Limitation 54

See Limitation 15.

D. Grounds 4-6 – Claims 6, 42 Obvious Further in View of Miyamoto '499

As shown in FIG. 4 (annotated below), Miyamoto '499 describes a fastening material 100 attached to a [blue] nonwoven ear panel 49 and comprises [green] first and [yellow] second fastening materials 106, 108. EX1005, ¶¶[0031], [0033]-[0034], FIGs. 1, 4, 5; EX1012, ¶142. First fastening material 106 comprises hooks 102 that “engage into the landing zone member 94” in diaper 20’s “front waist region

36” to close the diaper. EX1005, ¶¶[0023], [0033], FIG. 3; EX1012, ¶142. Second fastening material 108 comprises an adhesive that “serve[s] as a means to temporarily attach the shaped tab 51 to the ear panel 49 as shown in FIG. 1 before use.” EX1005, ¶[0034], FIG. 1; EX1012, ¶142.

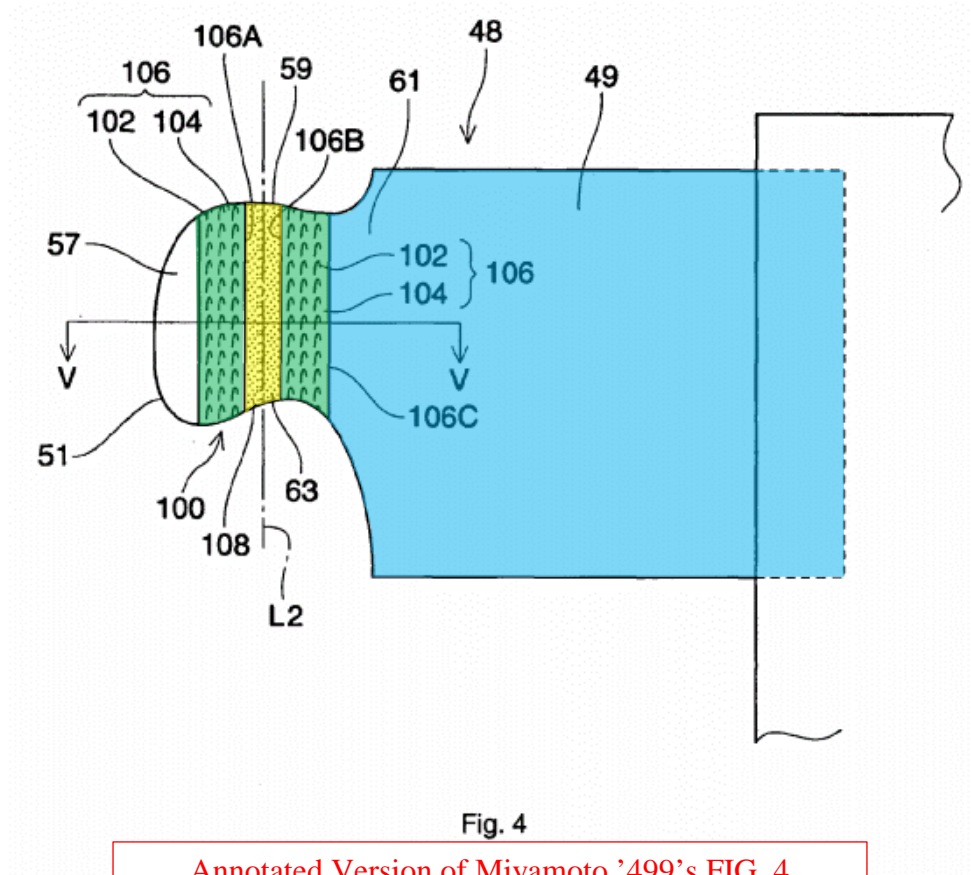


Fig. 4
Annotated Version of Miyamoto '499's FIG. 4
("Annotated11")

It was obvious to include an adhesive material on fasteners 150a-150d of Karami '772's modified diaper (§VIII.A.1) or closures 42 of Benning's modified diaper (§§VIII.B.1(a)-(c)) in addition to the hooks, as in Miyamoto '499. EX1005, ¶¶[0033]-[0034], FIG. 4; EX1012, ¶143.

POSITA would have been motivated to do so to maintain the fasteners folded onto the wings before use, as Miyamoto '499 teaches. EX1005, ¶[0034]; EX1012, ¶144. It was obvious to so fold Karami '772's fasteners 150a-150d (i.e., as Benning's closures 42 are already) "to facilitate folding of the wings" and "mitigate the risk of the fasteners sustaining damage and/or unintentionally engaging with objects." EX1012, ¶144; EX1002, ¶[0055], FIG. 4.

This modification was straightforward and routine for POSITA, rendering it obvious. EX1012, ¶147.

Limitation 6

Claim 5 was obvious:

Ground	<i>See:</i>
4	§VIII.A.3
5	§VIII.B.2
6	§VIII.C

Grounds 4-6: As explained in Section VIII.D, it was obvious to include an adhesive closure aid in addition to the hooks. POSITA would have understood that adding adhesive closure aids would not have materially increased the retaining forces on the backsheet or wings, at least because adhesive has little impact on shear forces when engaged with a nonwoven, and each adhesive aid (a) need only hold the fastener against a wing surface during manufacturing/folding

and (b) its adherence would be reduced after peeling away from that surface to secure the diaper on a wearer. EX1012, ¶140; EX1024, 1:21-34.

Limitation 42

Claim 35 was obvious:

Ground	<i>See:</i>
4	§VIII.A.2-3
5	§VIII.B.2
6	§VIII.C

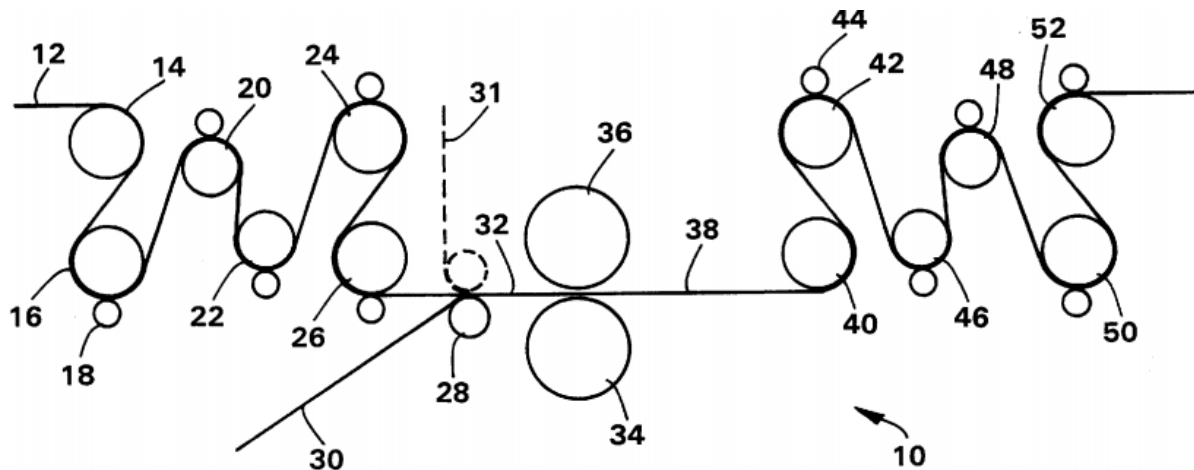
Grounds 4-6: *See* Limitation 6.

E. Grounds 7-8 – Claim 9 Obvious Further in View of Jacobs

Jacobs describes a process for producing a film-nonwoven laminate for a backsheet having “improv[ed cloth-like] tactile properties and thermal stability.” EX1007, Abstract, 1:10-46, 3:7-15, 9:32-43; EX1012, ¶153; *see also* EX1041, 4:62-5:9 (thermal instability causes unpredictable film shrinkage during storage and transport).

In Jacobs’s process, film 12 is heated with rollers 14, 16 to a “stretching temperature” that is “between about 60° C. and about 120° C.” for polyethylene or polypropylene films like in the backsheets of Karami ’772’s diaper (EX1003, ¶[0052]) and the modified Benning diaper (*see* §VIII.B.1(a); EX1004, ¶[0064]). EX1007, 4:9-22, FIG. 1 (below); EX1012, ¶154. The film is then stretched with

rollers 20, 22 “to improve strength properties” of and “down gauge” the film, rendering it more breathable and economical. EX1007, 3:46-56, 4:22-39; EX1012, ¶154.



The film is cooled, and then bonded to nonwoven 30 at bond sites between pattern roll 34 and anvil roll 36. EX1007, 3:16-20, 4:46-5:23; EX1012, ¶155.

Heated rollers 40, 42 next heat the laminate 38 to an “annealing temperature” 5-30° C higher than the stretching temperature: 65-150° C for polyethylene or polypropylene films. EX1007, 1:54-66, 5:24-43; EX1012, ¶155. The laminate is then slowed through rollers 46 and 48 such that the film layer “shrink[s] and anneal[s].” EX1007, 5:48-63; EX1012, ¶155. Laminate 38 is thereby rendered thermally-stable up to the annealing temperature, and its nonwoven 30 “gather[s] and bulk[s] up between adjacent bond sites,” giving the laminate cloth-like, “soft,

drapable, lofty characteristics.” EX1007, 2:66-3:15, 5:38-43, 6:6-11, 6:23-26, 6:30-38, 9:32-40, FIG. 2 (below); EX1012, ¶156.

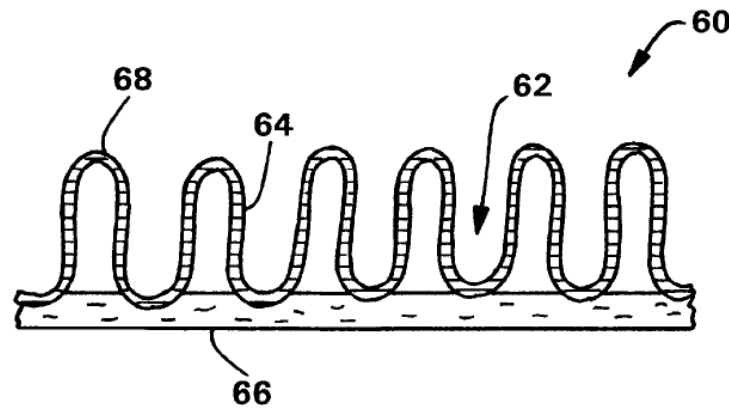


FIG. 2

In the Karami '772-Benning diaper (§§VIII.A.1) and the Benning-Karami '626 diaper (§§VIII.B.1(a)-(c)), it was obvious to make backsheet 130's or underlayer 30's film-nonwoven laminate using Jacobs's process, including subjecting the laminate to an annealing/temperature treatment in which it was heated to at least 60° C in view of its polyethylene or polypropylene film. EX1007, 4:18-22, 5:25-38; EX1003, ¶[0052]; EX1004, ¶[0064]; EX1012, ¶157. POSITA would have done so to achieve the benefits Jacobs teaches, including an “improved cloth-like texture” and “thermal stability.” EX1007, 2:66-3:15, 5:38-40, 6:23-26, 9:32-40; EX1012, ¶157.

Using Jacobs's process was straightforward and routine for POSITA, rendering the modification obvious. *See* EX1012, ¶159.

Limitation 9

Claim 7 was obvious:

Ground	<i>See:</i>
7	§VIII.A.3
8	§VIII.B.2

Grounds 7-8: As explained in Section VIII.E, it was obvious to subject backsheet 130's or underlayer 30's film-nonwoven laminate to an annealing/temperature treatment above 60° C as Jacobs teaches. EX1007, 4:18-22, 5:25-38; EX1012, ¶¶157-159.

The phrase “to improve said over-abdomen retaining forces” “simply expresses the intended result” of the temperature treatment and therefore should “not [be] given weight.” *Hoffer v. Microsoft Corp.*, 405 F.3d 1326, 1329 (Fed. Cir. 2005). Nevertheless, the nonwoven gathering caused by Jacobs's annealing increases retaining forces. *See* EX1007, 6:6-11; EX1012, ¶158; EX1001, 8:15-35, 9:24-41.

F. Grounds 9-10 – Claims 10, 18 Obvious Further in View of Anderson

Anderson's process modifies a film-nonwoven laminate backsheet to render it “breathable to air or vapor” and impart “a soft, clothlike surface and extensibility for improved fit and wearer comfort.” EX1008, Abstract, 2:51-3:23, 17:49-53; EX1012, ¶¶160-161. Nonwoven 5 and film 11 are bonded at joining station 13 and the resulting composite web 12 “passe[s] between a pair of opposed, interengaging

forming rolls 16, 17.” EX1008, 17:46-58, 17:65-18:2, 18:14-56, FIG. 9 (below); EX1012, ¶¶160-162.

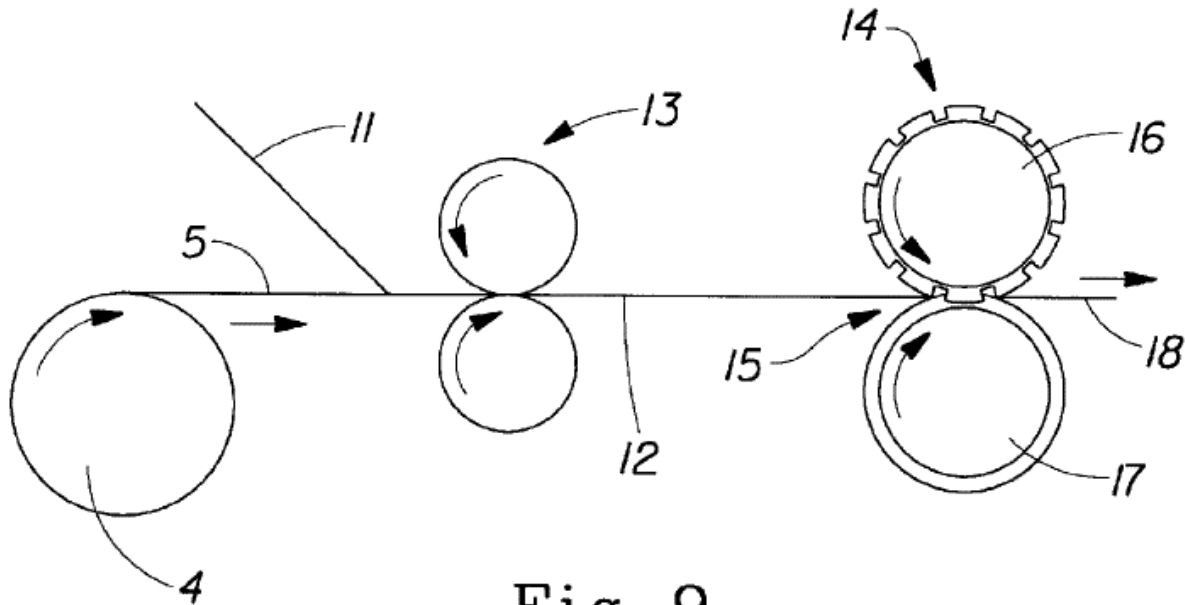


Fig. 9

Forming rolls 16, 17 can be those of FIG. 2 (below) that include interengaged teeth 22 and grooves 24 such that each roll’s teeth “extend partially into ... grooves 24 of the opposed roll.” EX1008, 5:49-6:17, 18:52-56, FIGs. 2-3; EX1012, ¶162. Film-nonwoven laminate 12 is thereby “pressed by teeth 22 into opposed grooves 24” to stretch “intermediate web sections 26” between adjacent teeth such that the treated laminate includes “alternating peaks 30 and valleys 32, which define alternating heavy and light basis weight regions.” EX1008, 5:49-6:17, 6:65-7:25, FIGs. 2-3, 5; EX1012, ¶163. This process is ring-rolling (EX1008, 2:1-31), which

the '249 Patent acknowledges was well-known. EX1001, 8:10-14; *see also* EX1012, ¶¶160-162, 165; EX1039, 1:49-56.

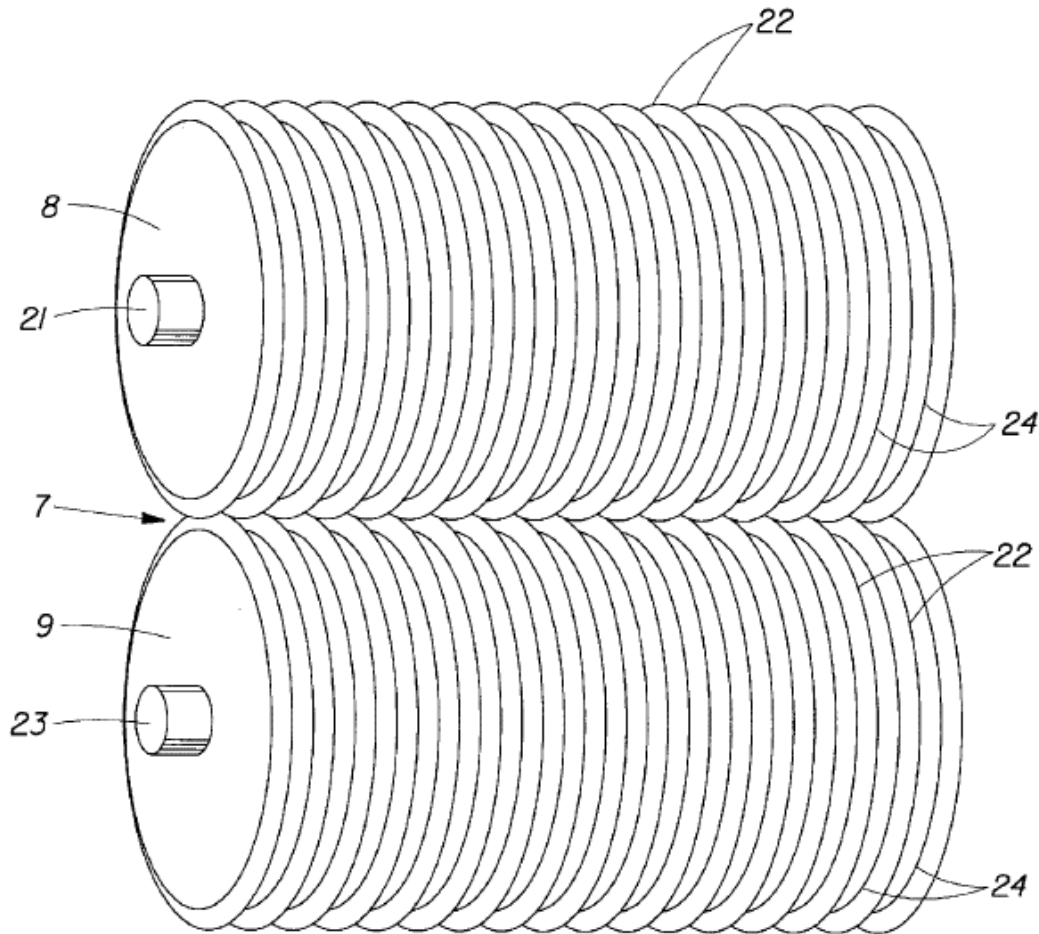


Fig. 2

Anderson's ring-rolling improves "the performance characteristics" of film-nonwoven laminate 12, including its "cross-web extensibility" such that the laminate "more easily [] conforms with and adapts to the contours of the body" and—as a result of micropore formation as rolls 16, 17 stretch the laminate when film 11

“contain[s] pore-forming agents or incompatible fillers”—its breathability. EX1008, 10:64-11:11, 11:23-48, 12:12-22, 15:56-16:5, 18:56-65; EX1012, ¶163.

It was obvious to subject the modified film-nonwoven laminate backsheet of the Karami ’772-Benning diaper (§§VIII.A.1) and the Benning-Karami ’626 diaper (§§VIII.B.1(a)-(c)), including as modified further in view of Stupperich (§VIII.C), to ring-rolling. EX1012, ¶164. POSITA would have been motivated to achieve the benefits Anderson describes, including the comfort-promoting increase in “cross-web extensibility” and breathability. *See* EX1008, 1:28-34, 2:41-44, 11:23-48, 12:12-22, 15:56-16:5, 17:46-58, 18:56-65 (laminate “can be utilized as a backsheet for a ... disposable diaper”); EX1012, ¶¶164-166.

Ring-rolling was straightforward and routine for POSITA, rendering the modification obvious. *See* EX1012, ¶166.

Limitation 10

Claim 7 was obvious:

Ground	<i>See:</i>
9	§VIII.A.3
10	§VIII.B.2

Grounds 9-10: As explained in Section VIII.F, it was obvious to subject the film-nonwoven backsheet of the modified Karami ’772 diaper or the modified Benning diaper to Anderson’s ring-rolling.

The phrase “to improve said over-abdomen retaining forces” should not be given patentable weight because it expresses the intended result of the ring-rolling. *Hoffer*, 405 F.3d at 1329. Further, the ’249 Patent does not identify any particular characteristics of ring-rolling that would be required to “improve” retaining forces, suggesting that any ring-rolling would do so.

Limitation 18

Claim 17 was obvious:

Ground	<i>See:</i>
9	§VIII.A.3
10	§VIII.B.2

Grounds 9-10: As explained in Section VIII.F, it was obvious to ring-roll the film-nonwoven of the modified Karami ’772 or Benning diapers, rendering its film breathable yet liquid-impermeable. EX1008, Abstract (“liquid impermeability”).

G. Grounds 11-13 – Claim 28 Obvious Further in View of Fernfors

Fernfors discloses a diaper 1 having a chassis with a front portion 5 and a back portion 6. EX1045, ¶[0025], FIG. 1 (below); EX1012, ¶167. Belt halves 9, 9’ are attached to the back portion and are fastened together via hook-type fastener 15 to form a belt around a wearer’s waist, with the front portion fastening to the belt via hook-type fasteners 8. EX1045, ¶¶[0027], [0032]-[0033]; EX1012, ¶167.

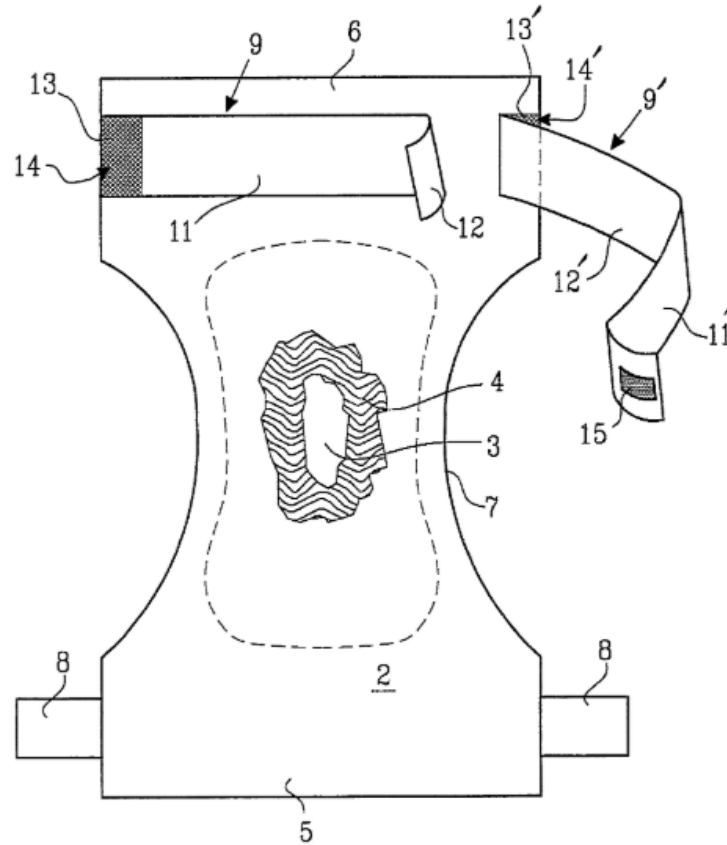
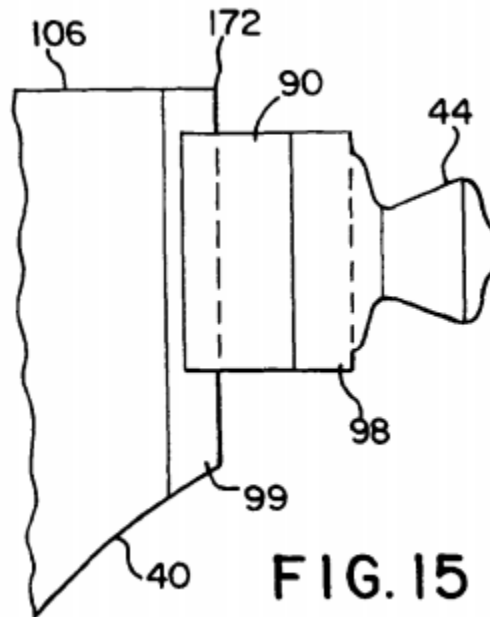


Fig. 1

Fernfors's belt portions can be attached to the back portion via "pieces of reinforcement material ... [that] are permanently attached to," and extend beyond, "opposite edge portions of the topsheet." EX1045, ¶¶[0030], [0045]-[0046], FIG. 6 (below, reinforcing pieces 323, 323'); EX1012, ¶168.

area of the chassis,” similarly to Fernfors’s pieces of reinforcement material. EX1046, ¶¶[0116]-[0119], FIG. 15 (reproduced below); EX1012, ¶169.



Huang also confirms that POSITA knew of suitable materials for Fernfors’s reinforcement material, *e.g.*, “polymer film, a nonwoven fabric, [or] a woven fabric.” EX1046, ¶¶[0065], [0117]; EX1012, ¶168. If PO argues that these materials—identical to those of ’249 Patent’s reinforcing material (*see* §VII.D.3)—are required for claim 21, Huang can be considered part of Grounds 13 and 14.

To achieve stronger chassis-wings connections, it was obvious to add reinforcement material like Fernfors’s at the chassis-wing interfaces in each of the Karami ’772-Benning (§VIII.A.1) and Benning-Karami ’626 (§VIII.B.1) diapers. EX1012, ¶¶170-171.

Limitation 28[a]

Claim 1 was obvious:

Ground	<i>See:</i>
13	§VIII.A.2
14	§VIII.B.2
15	§VIII.C

Grounds 13-15: As explained in Section VIII.G, it was obvious to include reinforcement material like Fernfors's at the wing-chassis interfaces of each of the Karami '772-Benning and Benning-Karami '626 diapers, and such pieces of reinforcement material would have been transversely-narrower than the wings. EX1045, FIG. 6; EX1012, ¶¶170-171.

Limitation 28[b]

At each chassis-wing interface, the pieces of reinforcing material would have overlapped side edges of both. EX1045, FIG. 6; EX1012, ¶170.

IX. CONCLUSION

For the above reasons, claims 1-54 are invalid under Section 103(a).

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Respectfully submitted,

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s
Counsel for Petitioner

CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(a)(i), the undersigned certifies that this Paper—
exclusive of the table of contents, table of authorities, mandatory notices under
§ 42.8, certificate of service, claim listing, and this certificate of word count—
includes 13,987 words.

/Eagle H. Robinson/
Eagle H. Robinson (Reg. No. 61,361)

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e) and 37 C.F.R. § 42.105(a), the undersigned certifies that on August 17, 2020, a complete copy of this Petition for *Inter Partes* Review, Petitioner's power of attorney, and all exhibits were served on Patent Owner at the correspondence addresses of record listed below by FedEx®:

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