

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ATTENDS HEALTHCARE PRODUCTS, INC.
Petitioner

v.

PAUL HARTMANN AG
Patent Owner

Case No. IPR2020-01477 for U.S. Patent No. 8,152,788
Case No. IPR2020-01478 for U.S. Patent No. 8,784,398
Case No. IPR2020-01479 for U.S. Patent No. 8,771,249
Case No. IPR2020-01480 for U.S. Patent No. 8,708,990

DECLARATION OF G.A.M (TONY) BUTTERWORTH

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I. Introduction

1. My name is G.A.M (Tony) Butterworth. I have been retained on behalf of PAUL HARTMANN AG for above-identified proceedings. I understand that those proceedings involve U.S. Patent No. 8,152,788 (the '788 patent), U.S. Patent No. 8,784,398 (the '398 patent). U.S. Patent No. 8,771,249 (the '249 patent), and U.S. Patent No. 8,708,990 (the '990 patent), all directed to an absorbent incontinence article with improved closure systems. The first named inventor of all the patents is Susanne Beckert, so I will collectively refer to all of the patents as the "Beckert patents."

2. I have been asked to provide my technical review, analysis, and opinions regarding the diaper and adult incontinence industry, the Beckert patents, the Declaration of Arrigo D. Jezzi (Ex. 1012), the references relied on by Mr. Jezzi, and the validity challenges made in the *inter partes* review proceedings.

3. The materials that I considered in my preparation of this declaration are provided in Appendix A.

II. Professional Background and Qualifications

4. I have worked over 30 years in nonwoven and absorbent technology. My curriculum vitae is attached as Appendix B to this declaration.

5. Currently, I am the principal of Butterworth Consulting, serving as a consultant for fiber-based consumer, medical, and industrial products. My clients include fiber, process equipment, nonwovens, and consumer product companies.

6. Before starting my own consulting company, I worked at Procter & Gamble from 1996–2001 as a Principal Scientist. During my time and Procter & Gamble, I managed fiber development and absorbent strategy and surveyed fiber-based technologies seeking product cost and feature opportunities, among other things.

7. From 1982–1996 I worked for Tambrands Inc., which had previously been known as Tampax Inc. Tambrands Inc. was acquired by Procter & Gamble in 1996, and, as noted above, I continued working at Procter & Gamble until 2001. At Tambrands Inc., I served in many positions, including Vice President of Advanced Technology, Vice President of Material Technology, Vice President of Fibers and Absorbents, Director of International Product Development, and Director of Product Development. I worked in product development for diapers, sanitary napkins, panty shields, and tampons. In addition, I also directed the design, prototyping, manufacturing line selection, start-up, and full implementation of an elasticized, disposable diaper. I also initiated documentation for fiber processing and managed raw materials specification upgrades, among other things.

8. Before that, from 1979–1982, I worked at American Hospital Supply as Director of Product Development. Among other things, I directed development of skin-contacting nonwoven and absorbent materials, including materials used in drape fabrics, burn dressings, surgical facemasks, and clean room apparel and bound antimicrobial drapes.

9. From 1972–1979, I was a Manager of Research & Development at Johnson & Johnson in the areas of nonwoven process and material design, absorbent technology, and product design. My work included product development and product design for disposable diapers and disposable training pants. I also organized fiber and absorbent technology programs across company divisions.

10. Before working at Johnson & Johnson, I worked at Fabric Research Laboratories from 1960–1972 in the areas of fibrous materials and nonwovens. I started there as a scientist and ended my work there as Vice President of Contract Research & Development. In my roles, I directed applied research in materials science for medical, consumer, industrial, nonwovens and upstream technologies. I worked with conventional textile products, including methods of seaming, ultrasonic bonding, and garment assembly.

11. I attended the University of Manchester Institute of Science and Technology and received a Bachelor of Science degree in Fibers, Polymers, and

Textiles. I also attended Massachusetts Institute of Technology and received a Master of Science in Fibers and Polymers.

12. I am a Fellow of the Textile Institute and a Chartered Textile Technologist. I also hold the Distinguished Achievement Award from The Fiber Society. I am a past Chairman of the Executive Committee and a former member of the Board of Trustees for the Textile Research Institute in Princeton, New Jersey. I am also a past President of The Fiber Society, Princeton, New Jersey.

13. I am named as the inventor or co-inventor on many patents and patent applications filed in the United States and abroad.

14. I am being compensated for my work on these matters at a rate of \$150.00 per hour, and I am being reimbursed for reasonable out-of-pocket expenses. My compensation is not contingent upon the outcome of any of these *inter partes* review proceedings.

III. Legal Principles

15. In preparing this declaration, I have been informed by HARTMANN's counsel of legal standards to consider and apply. I understand that, as the Petitioner, Attends bears the burden of proving invalidity of the Beckert patents by a preponderance of the evidence. I also understand that *inter partes* review proceedings patent claims can be held unpatentable or invalid as being (1) anticipated based on a single reference or as (2) obvious based on one or more

references. I further understand that the Beckert patent claims are only being challenged on obviousness grounds. I understand that Attends has not alleged that any of the Beckert patents' claims are anticipated by single reference.

A. Anticipation

16. As I noted, I understand that Attends has not argued that the Beckert patent claims are anticipated. For background and completeness, I have been told that for a claim to be anticipated, each and every limitation must be taught by a single prior art reference.

B. Obviousness

17. For obviousness, I understand that a patent claim is invalid or unpatentable as obvious if the differences between the claimed subject matter and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

18. When considering the issue of obviousness, I understand that I should consider: (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; (3) the level of ordinary skill in the art; and (4) evidence of secondary indicia of non-obviousness. I have been informed that secondary indicia of non-obviousness include: (i) "long felt need" for the claimed invention, (ii) commercial success attributable to the claimed

invention, (iii) unexpected results of the claimed invention, and (iv) “copying” of the claimed invention by others.

19. I have been told that the relevant time for considering whether the Beckert patent claims would have been obvious to a person of ordinary skill in the art is the time of the invention. I have been instructed to assume that the time of the invention for the Beckert patent claims is October 2006.

20. I further understand that when someone is modifying a prior art reference to show obviousness or is combining prior art references or elements in the prior art to show obviousness, that person must show that a person of ordinary skill in the art would have had a reason to make to that change or combine those references. I also understand that this reason cannot come from the Beckert patents themselves. I have been told using the challenged patents as a guide to modify the prior art is called using hindsight analysis, which I understand is not permitted.

21. I also understand that a reference may be said to teach away from a particular modification or change. I understand that happens when a person of ordinary skill in the art reading the reference would be discouraged from following a particular path or would be led in a different direction from the path argued for by Attends.

22. I further understand that any change to the prior art or a prior art reference cannot make the prior art or prior art reference unsuitable for its intended

purpose and cannot change the basic principle under which the prior art was intended to operate.

23. I understand that a party challenging the validity of patent may argue that a prior art reference, while not expressly disclosing a particular claim element, inherently includes that element. In other words, I understand that a patent challenger may argue that a claim element is inherent in the disclosure of a reference. I have been told that for a claim element to be inherent in a single reference, that element must have been necessarily present in that reference. I understand that inherency cannot be established by the possibility or probability that the claim element was present in that reference; it must necessarily have been present in that reference. I further understand that the mere fact that a certain thing may result from a given set of circumstance is not enough to show inherency.

24. I also understand that a party challenging the validity of a patent may argue that a missing claim element is inherently present in a combination of references. I have been told that inherency in obviousness is only present with the claim element is the natural result of the combination of prior art elements. Again, I understand that probabilities and possibilities are not sufficient to show inherency based on a combination of references. The fact that something could or may result from a combination of reference is not sufficient. I understand that the party

challenging validity would have to show that it necessarily would result for inherency.

C. Level of ordinary skill

25. I understand a person of ordinary skill in the art is determined by considering: (1) the type of problems encountered in the art; (2) prior art solutions to those problems; (3) the rapidity with which innovations are made; (4) the sophistication of the technology; and (5) the educational level of active workers in the field.

26. I understand that I must evaluate the Beckert patents from the perspective of a person of ordinary skill in the art. That is, the patents must be evaluated through the eyes of a person with ordinary skill in the relevant art at the time of the invention of these patents. It is my opinion that such a person of ordinary skill in the art as related to the Beckert patents would hold at least a bachelor's degree in fiber and textile science or an equivalent degree, and two to five years of hands-on experience working in the diaper industry as of the earliest priority date of each of the Beckert patents. If a person did not have a bachelor's degree, additional relevant experience could provide an acceptable substitute. Likewise, additional education beyond a bachelor's degree could compensate for a deficiency in practical experience.

27. I understand that Petitioner's expert, Mr. Jezzi, has proposed a somewhat different level of ordinary skill in the art. My opinions in this declaration would remain unchanged under Mr. Jezzi's proposed level of ordinary skill in the art.

28. As of the earliest priority date of each of the Beckert patents, I was at least a person of ordinary skill in the art.

D. Claim construction

29. I have been informed that in an *inter partes* review, claim terms should be construed under the same standard applied in district court cases, and that under that standard claim terms should be interpreted according to their ordinary and customary meaning. I have also been informed that claims should only be construed to the extent necessary to resolve any controversy. I have applied this standard here in my interpretation of the Beckert patents.

IV. The Beckert Patents

30. The Beckert patents relate to absorbent incontinence articles with improved closure systems for securing a diaper to a wearer. To solve the problem of securing an incontinence diaper on a wearer, the Beckert patents disclose a closure system where wearers are encouraged to correctly secure the diaper on the body of a user. '788 patent 1:65–2:37.

31. The Beckert patents disclose a diaper and closure system with closure aids that can “be secured detachably at least in regions both on the outer face of the main part and also on the outer face of the side parts in the front area, the retaining forces between the mechanical closure means and the outer face of the main part being lower than the retaining forces between the mechanical closure means and the outer face of the side parts in the front area.” ’788 patent, 2:1–7.

The Beckert patents teach that this arrangement surprisingly encourages the correct fastening of the diaper. For instance, the patents explain (’788 patent, 2:13–37):

Surprisingly it has also been shown that, when the retaining forces between the closure means and the outer face of the main part are smaller than the retaining forces between the closure means and the outer face of the side parts in the front area of the diaper, the users of the diapers tend to close the diaper in such a way that the closure means are secured on the outer face of the side parts in the front area. This, in turn, increases the wearing comfort of the diaper because it avoids overlapping of the side parts with the backsheet, which enables the advantages of the permeability to air and water vapor of the side parts to take effect without obstruction. Moreover, the risk of damage to the backsheet of the main part and therefore the risk of liquid passing through the mechanical closure aids is reduced.

The essential characteristic is that the retaining forces between the outer face of the main part and the closure means having mechanical closure aids also help to hold the diaper on the body. For this purpose, it has proven advantageous if the over-abdomen retaining forces between the closure means and the outer face of the main part is 57-20 N/25 mm and, in particular, 50-25 N/25 mm.

Furthermore, the over-abdomen retaining forces between the closure means and the outer face of the side parts in the front area are preferably 90-58 N/mm and, in particular, 80-60 N/25 mm.

32. In adult incontinence diapers, it is not only important that the diaper be secured on the wearer, but also that the wearer have confidence that it is secured and will not leak when used. Precluding or preventing leakage is a critical feature for an incontinence diaper. It is also important that diapers be sufficiently secured for both ambulatory and non-ambulatory wearers. The diaper should not fall off or leak when the wearer moves. The Beckert patents teach achieving this with different retaining forces between the front of the diaper and the side parts.

33. The Beckert patents disclose an incontinence diaper that encourages correctly fastening the side parts to the closure to secure the diaper but also instills user confidence by reliably securing the diaper on the wearer if the closures are

attached to the front area instead of the side parts (even though this is not preferred). The Beckert patents also permit the closure to be selectively detached and then reengaged, which permits both adjustment of the fit and inspection of the diaper.

34. For determining whether the retaining forces that provide the surprising results have been achieved, the Beckert patents provide a valid method to establish the difference between the closure attachment and the side parts, and the closure attachment and the outer face of the front part. '788 patent 3:56–4:28. The disclosed testing method is described in detail and is understandable and reproducible. One of ordinary skill in the art would easily understand the test method and be able to reproduce it.

35. In the Beckert patents, a diaper is illustrated in Figure 1, which is reproduced below. The diaper includes a main part, or chassis, and four side parts. '788 patent 12:9–26, The main part/chassis 4 has a front area 6, a rear area 8, and a crotch area 12 with an absorbent body 14 between a topsheet 11 and a backsheet 10. '788 patent 12:11–18. The four side parts are discrete (not directly interconnected) from one another. '788 patent 4:63–67. Two side parts 16 are attached to the chassis at the front, and two side parts 17 are attached to the chassis at the rear. '788 patent 12:23–28. The side parts are non-detachably connected in an overlap area 18 shown hatched below with the chassis-forming material of the

36. The outer face of the main part (the backsheet) is preferably made of a specially engineered nonwoven material. '788 patent 5:21–37. The Beckert patents explain that nonwovens can be manufactured more economically than



traditional textile loop components and can be engineered to serve the same purpose while being gentler on the user's skin. '788 patent 5:21–37. More specifically, to make the main part impermeable to liquids, the nonwoven may be engineered to include a breathable foil laminate on the inner face of the main part. '788 patent 5:21–37. The outer face of the main part is preferably nonwoven and may include embossing to prevent product failure caused by fibers being torn from the engineered nonwoven material when the mechanical closure aids are detached. '788 patent 6:36–43. The Beckert patents likewise provide examples for the nonwoven to be used for the side parts. '788 patent 12:54–13:5, 14:43–51. Further, as the Beckert patents teach, various nonwoven properties may be manipulated to achieve higher retaining forces. For example, nonwovens may be embossed in special patterns to manipulate the number of fibers that the mechanical closures engage with or the nonwovens may receive a special temperature treatment during lamination to preserve plushness. '788 patent 7:19–41, 8:8–28. The Beckert patents teach a method to ensure that hook closures adequately secure a specifically embossed patterned nonwoven.

A. Claims of the '788 patent

37. The '788 patent has 21 claims. Claim 1, from which claims 2 through 21 depend, is an independent claim directed to an “incontinence diaper.” The claimed incontinence diaper has a main part, side parts, and mechanical

closures. The main part consists of an inner face directed towards the user's body and an outer face directed away from the user's body, and an absorption body between the inner face and outer face. The side parts in the front or rear are also folded upon themselves during production. The mechanical closures have mechanical closure aids and are detachably fastenable to the outer face of the main part and the outer face of the front side parts. Importantly, the retaining forces between the main part and the mechanical closure is lower than the retaining forces between the side parts and the mechanical closure. One of ordinary skill in the art would understand that the retaining forces between the main part and the mechanical closure and the retaining forces between the side parts and the mechanical closure must be sufficient to secure the diaper on the wearer.

38. The dependent claims of the '788 patent add various limitations, such as ranges for the retaining forces (claims 2 and 3), requiring hook and loop closures with or without adhesive closures (claims 4 and 5), various side part configurations (claims 6–8), leg cutouts (claim 9), various engineered nonwoven specifications (claims 10–19), folding requirements (claim 20), and reinforcing means requirements (claim 21).

B. Claims of the '398 patent

39. The '398 patent has 30 claims. Claim 1, 26, 28, and 30 are independent claims. Claim 1 of the '398 patent recites an incontinence diaper

including a chassis that is constituted by a first nonwoven material and has an inner and outer face and an absorption body and a backsheet on the side away from the user body. The chassis also has a rear area, front area, and crotch area between the front and back areas. The diaper also includes four side parts attached to a side edge on each side of the front and back of the chassis. The diaper further includes closure means having mechanical closure aids, which are connected to the side parts at the rear area for selective detachable fastening to the outer face of the chassis and the outer face of the side parts in the front area. Claim 1 further specifies that the retaining forces between the closure means and the outer face of the chassis secure the diaper on the user body and are less than the retaining forces between the closure means and the outer face of the side parts. Claim 1 also requires that the entire area of the outer face excludes mechanical closures other than the first nonwoven material. Claim 1 thus requires the retaining forces between the main part and the mechanical closure be lower than the retaining forces between the side parts and the mechanical closure and that both retaining forces are sufficient to secure the diaper on the wearer.

40. Independent claim 26 is similar to claim 1 and further recites that the closure means have hook-and-loop fastener and an adhesive closure aid intended for detachable fastening to a first nonwoven material. Claim 26 does not require

that the entire area of the outer face exclude mechanical closures other than the first nonwoven material when the closures are not fastened.

41. Independent claim 28 is similar to claim 1 and further specifies that the first nonwoven material of the outer face chassis has a first mass per unit area and a first thickness, and the side parts have an outer face comprising a second nonwoven material with a second mass per unit area of between 18–60 g/m², which is greater than the first mass per unit area, and a second thickness. Claim 28 also specifies that the second thickness of the side parts is greater than the first thickness of the first nonwoven material and that over-abdomen retaining forces are between 57–20 N/25 mm.

42. Independent claim 30 is similar to the other independent claims and further specifies that the retaining forces between the closure means and first nonwoven material of the chassis are between 57–20 N/25 mm when determined using a pull-off angle tangential to a curved surface and kept constant, the curved surface having a radius of curvature of 400 mm. It further specifies that those retaining forces are lower than retaining forces between said closure means and the second nonwoven when measured the same way.

43. The dependent claims of the '398 patent add various limitations, such as retaining forces requirements (claims 2–4, 16, and 27), additional closure requirements (claims 5, 6, and 29), various engineered nonwoven specifications

(claims 7–15, 17–20, 24, and 25), folding requirements (claims 21 and 22), and diaper construction requirements (claim 23).

C. Claims of the '249 patent

44. The '249 patent has 54 claims. Claims 1 and 34 are independent claims. Claim 1 of the '249 patent recites an incontinence diaper with a chassis having an inner facing topsheet and outer facing backsheet, and an absorbent body. The diaper has four separate “ears,” two attached to the edges of the front area and two attached to the edges of the rear area. The ears that attach to the rear area have mechanical closures that, when in use, hold the diaper onto the wearer when selectively fastened to the outer face of the chassis or the outer face of the ears that attach to the edges in the front area of the diaper. Claim 1 further specifies that the retaining forces between the rear ears and the outer face of the chassis secure the diaper on the user body and are less than the retaining forces between the rear ears and the outer face of the front ears.

45. Independent claim 34 is similar to claim 1 and further recites that the crotch area of the chassis has no ears.

46. The dependent claims of the '249 patent add various limitations, such as retaining forces requirements (claims 2–4, 13–16, 25, 31, 32, 35–37, 39–41, 44, 50, 53, and 54), additional closure requirements (claims 5, 6, and 42), various engineered nonwoven specifications (claims 7–11, 17–24, 38, and 45–49),

folding requirements (claims 27, 27, and 43), and diaper construction requirements (claims 12, 28–30, and 51).

D. Claims of the '990 patent

47. The '990 patent has 21 claims. Claims 1 and 21 are independent claims. Claim 1 of the '990 patent recites an incontinence diaper including a chassis with a liquid-permeable topsheet that faces the wearer during use and a liquid-impermeable backsheet that is directed away from the wearer during use, and an absorbent body disposed between the topsheet and backsheet. The diaper has four discrete side parts: two joined at the edges of the rear side of the chassis and two joined at the front side edges of the chassis. The backsheet has an outer face made of a first nonwoven with a first mass per unit area and thickness. The side parts that attach to the front side of the chassis are made of a second nonwoven that has a greater mass per unit area and thickness than the first nonwoven. The side parts that are attached at the edges of the rear sides of the chassis have mechanical closures configured for selective detachable fastening to the outer face of the backsheet or to the side parts attached at the edges of the front sides. Claim 1 further specifies that the retaining forces between the closures and the outer face of the backsheet will retain the diaper on the wearer and are less than the retaining forces between the closures and the outer face of the side parts.

48. Claim 21 is similar to claim 1 and further recites that the nonwoven material that forms the outer face of the side parts has a mass per unit area of 18-60 g/m², that the closures are hook-and-loop and adhesive, and that the retaining force between the closures and backsheet is between 20–57 N/25 mm.

49. The dependent claims of the '990 patent add various limitations, such as retaining forces requirements (claims 3–6), additional closure requirements (claims 7 and 8), various engineered nonwoven specifications (claims 2, 9, and 12–20), and diaper construction requirements (claims 10 and 11).

V. Discussion of Certain References

50. Mr. Jezzi identifies many references. None of those references disclose or teach the claimed differing retaining forces. None of those references disclose or teach a diaper with retaining forces between the closures and the outer face of the front part of the diaper that are sufficient to secure the diaper on the wearer and are lower than the retaining forces between a closure and the outer face of the side parts of the diaper. None of these references recognize that this surprisingly encourages correct diaper securement while still permitting the diaper to be retained on the wearer if it is incorrectly secured or if the wrong size is worn.

51. While Mr. Jezzi identifies a number of references, he discusses three in particular, namely Karami '772 (Ex. 1003), Benning (Ex. 1002), and Karami '626 (1004). I discuss these references in more detail below.

A. Karami '772 (Ex. 1003)

52. Karami '772 refers to U.S. Publication No. 2006/0058772 and relates “to an absorbent article having a fastening system that does not require a conventional loop-type fastening element.” Ex. 1003 (Karami '772) [0001]. Karami '772 seeks to avoid using costly miniloop fastener elements placed on a landing zone area of a diaper. Ex. 1003 (Karami '772) [0002], [0003]. To achieve this, Karami '772 discloses treating nonwoven materials with water jetting and/or aperturing to create a surface to which hook-type fasteners can releasably attach. Ex. 1003 (Karami '772) [0011], [0025], [0042], [0043]. Karami '772 explains that “[w]ater jet treating and/or aperturing the nonwoven wings 40 obviates the need for corresponding loop-type landing zones to mate with the hook-type fasteners 41, 46, and 48.” Ex. 1003 (Karami '772) [0042].

53. Karami '772 identifies the “inventive concept” as treating a nonwoven with water jetting and/or aperturing a nonwoven to enhance the peel and shear strength of a nonwoven so that a fastener can be securely engaged. Ex. 1003 (Karami '772) [0040], [0044], [0052].

54. Karami '772 explains ([0025]):

In various exemplary embodiments of the present invention, an absorbent article is provided with a fastening system that does not include a loop fastening element. Instead, hook-type fasteners are able to securely

attach to a bonded nonwoven surface that has been subjected to a water jet treatment and/or aperturing. The nonwoven can also be provided with a pattern of three-dimensional relief structures during the water jet treatment, resulting in even greater shear and peel strength. The absorbent article can be a T-shaped or conventional shaped diaper, a pull-up undergarment, a breathable diaper or any other garment that incorporates a fastening system.

55. Karami '772 discloses that a hook-type fastener is releasably attached to the treated portion. Ex. 1003 (Karami '772) [0010], [0025]. Throughout Karami '772, it describes having fasteners engage water jet treated and/or apertured non-woven so that the fastener can engage the nonwoven. It never teaches or suggests attaching a fastener to an untreated nonwoven surface. For instance, Karami '772 teaches treating the “wings” to engage with the hook-type fastener. Ex. 1003 (Karami '772) [0033], [0035]–[0038], [0042], [0048], [0051]. Karami '772 even refers to the treated nonwoven as forming landing zones, further indicating the fasteners are intended to be attached to the treated nonwoven. Ex. 1003 (Karami '772) [0043]. Karami '772 does not teach or suggest securing the fastener to any untreated portion of the diaper. In fact, one of skill in the art would understand Karami '772 as teaching away from securing the fastener to any

portion of the diaper other than a treated portion because it describes the untreated front of the diaper as a “stay-away zone.” Ex. 1003 (Karami ’772) [0053].

56. Karami ’772 describes Figures 1–3 and 5 as embodiments of a T-shaped diaper, Figures 6 and 8 as embodiments of a disposable diaper, and Figure 7 as an embodiment of a pull-up absorbent article. Ex. 1003 (Karami ’772) [0017]–[0024]. In general, these different types of diapers operate differently when donning the article on the wearer and attaching fasteners to secure the diaper on the wearer. Karami ’772 uses wings on each type of diaper, but they operate differently for each type of diaper. At the same time, these different types of diapers all have one thing in common in Karami ’772—the wings have been water-treated and/or apertured so that fasteners can engage the outer surface of the wings. This type of treatment results in a specific type of nonwoven. Karami ’772 only describes one instance, which I explain below, where fasteners can be attached to front of the diaper, but in that case, Karami ’772 also says that the front of the diaper must be water-treated and/or apertured so that the fasteners could attach to the front portion. Ex. 1003 (Karami ’772) [0039].

57. For the T-shaped diaper, Karami ’772 explains that “[w]hen the T-shaped diaper 10 is first placed on the wearer, the free ends of the two wings 40 are brought around the sides and [to the] front of the waist of the wearer” to form “a belt 50 encircling the waist of the wearer,” with fastener 41 engaging the outer

surface of the belt. Ex. 1003 (Karami '772) [0033], [0032]. After securing the belt, the wearer would reach between their legs to pull the front portion 22 forward and raising the hook-type fasteners 46 and 48 to secure the front portion 22 to the outer surface of the belt. Ex. 1003 (Karami '772) [0033]. Karami '772 teaches treating the outer surface of the wings by water jetting and/or aperturing so that the fasteners can attach to the treated surface. Ex. 1003 (Karami '772) [0037], [0038], [0039]. The T-shaped diaper embodiment uses only two wings, which forms a belt, and the diaper is secured by attaching fasteners to the belt.

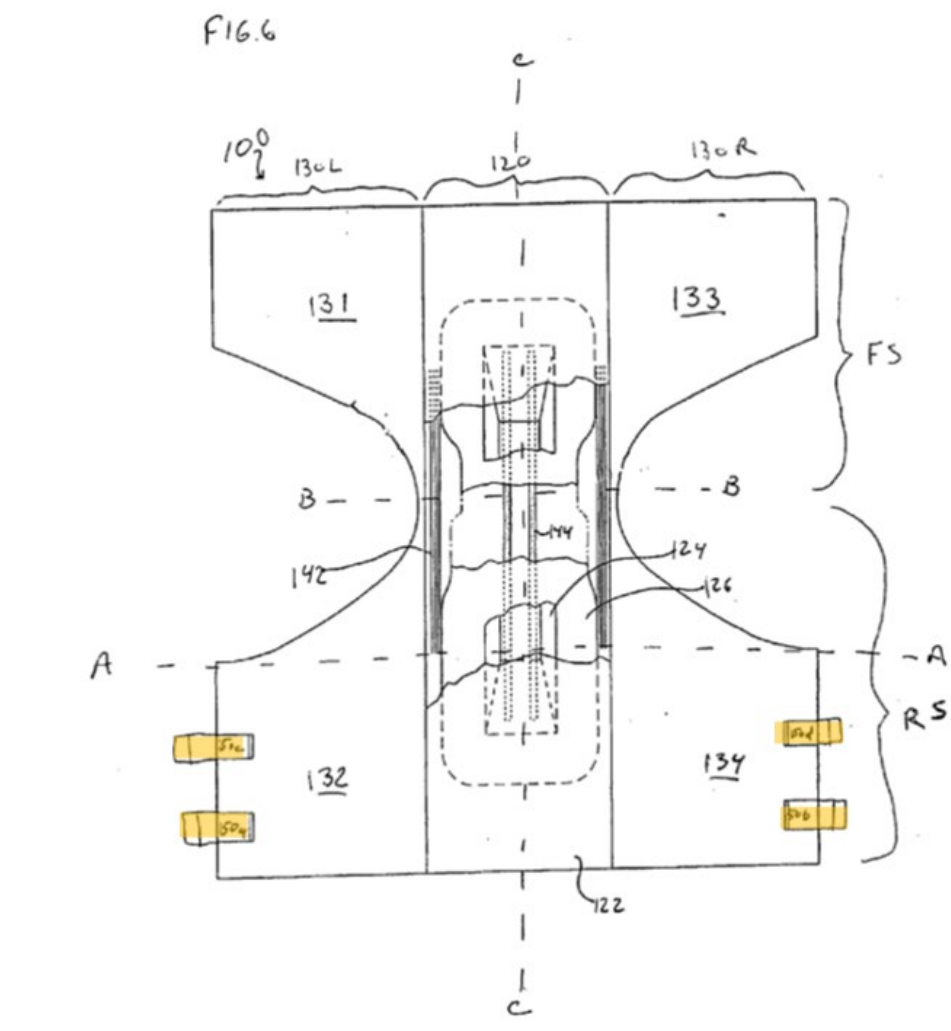
58. Karami '772 also describes a modified T-shaped diaper where the fasteners 46 and 48 at the lateral ends of the front portion are eliminated and another fastener 41 is disposed at the free end of the other wing. Ex. 1003 (Karami '772) [0039]. “With this construction, at least a portion of the outer surface of the front portion 22 of the T-shaped diaper may be made of water jet treated and/or apertured bonded nonwoven, so that the hook-type fasteners at the free ends of the wings 40 can attach to the front portion 22.” Ex. 1003 (Karami '772) [0039]. Karami '772 thus makes clear that the front portion must be “water jet treated and/or apertured” in order for the fasteners to attach to the front portion.

59. Karami '772 describes the diaper in the Figure 6 embodiment as incorporating “bonded nonwoven material that is water jet treated (with or without a pattern of three dimensional relief structures).” Ex. 1003 (Karami '772) [0045].

Karami '772 states that Figure 6 shows a diaper 100 that “can be divided into three regions: a containment assembly 120 which extends symmetrically along longitudinal centerline C, and two longitudinally disposed portions 130L and 130R which extend variably in the transverse direction along their length and which define the left and right sides of the diaper respectively.” Ex. 1003 (Karami '772) [0046]. It further says that there are “two wings in each of longitudinal portions 130L and 130R where containment assembly 120 is not present.” Ex. 1003 (Karami '772) [0047]. This results in wings 131 and 133 at the front part of the diaper and wings 132 and 134 at the rear part of the diaper. Ex. 1003 (Karami '772) [0047]. “Rear wings 132 and 134 are provided with hook-type fasteners 150a-150d.” Ex. 1003 (Karami '772) [0047].

60. Karami '772 teaches that in this diaper embodiment at “least a portion of the each of the wings 131 and 133 is made of water jet treated and/or apertured nonwoven,” and in one embodiment “the entire outer surface of the wings 131 and 133 is made of water jet treated and/or apertured nonwoven so that the hook-type fasteners 150a-150d can securely engage with any portion of the wings 131 and 133 when the diaper 100 is placed on the wearer.” Ex. 1003 (Karami '772) [0048]. Karami '772 thus makes clear that the diaper is secured to the wearer by attaching fasteners on the rear wings to the front wings 131 and 133,

which have been treated. This is illustrated in Figure 6 with fasteners 150a-150d annotated in yellow:



61. I understand that for the embodiment shown in Figure 6 of Karami '772, that Mr. Jezzi has asserted that “mechanical fasteners 150a-150d are capable of releasably engaging the outer nonwoven of backsheet 130 either in front wings 131 and 133 or in the central, main portion thereof underlying containment assembly 120” and has cited paragraph [0048] of Karami '772 as support. Ex. 1012 (Jezzi) ¶ 74. I disagree that Karami '772 teaches engaging fasteners to the “central,

main portion” of the diaper. In my opinion, Karami ’772 makes clear in the Figure 6 embodiment that the wings are treated so that fasteners 150a-150d can securely engage with the wings. Ex. 1003 (Karami ’772) [0048]. One of ordinary skill in the art would understand that this could include the wings at the front portion of the diaper, but would not understand it to mean the central, main part of the diaper. Mr. Jezzi himself appears to have recognized that the fasteners engage the wing in paragraphs 72 and 73 of his declaration. There, referring to paragraph [0048] of Karami ’772, Mr. Jezzi says “fasteners engage with the ‘outer surface of the wings 131 and 133.’” Ex. 1012 (Jezzi) ¶¶ 72, 73. In any event, even assuming paragraph [0048] could somehow be read as suggesting that fasteners 150a-150d could engage the “central, main portion” of the diaper, one of ordinary skill in the art would have understood that the central, main portion of the diaper would have to be treated to engage the fasteners since that is what Karami ’772 teaches is required to make the front of the diaper able to engage fasteners when discussing a modified T-shape diaper. Ex. 1003 (Karami ’772) [0039].

62. And if the outer surface of both the wings and the front of the diaper were made from nonwoven that had been subject to water jet treatment and/or aperturing, then the retaining forces would be the same across all locations, not different as taught by the Beckert patents.

63. For the pull-up diaper, Karami '772 says that Figure 7 “is a plan view of a pull-up absorbent article.” Ex. 1003 (Karami '772) [0049]. Karami '772 says that the pull-up diaper “is similar in construction to the previously described diaper of FIG. 6 except for side seals disposed at the lateral edges of the wings.” Ex. 1003 (Karami '772) [0049]. Again, the outer surface of the wings “is made of water jet treated and/or apertured bonded nonwoven so that the hook-type fasteners 250a-250d can securely engage with any portion of the wings 231 and 233 when the pull-up absorbent article 200 is placed on the wearer.” Ex. 1003 (Karami '772) [0051]. It is designed “so that the pull-up type absorbent article 200 can be put on similar to conventional underwear.” Ex. 1003 (Karami '772) [0050].

64. Karami '772 states that it shows another diaper embodiment in Figure 8 where the diaper “can be provided with at least one stay-away-zone 160 at the front waist portion.” Ex. 1003 (Karami '772) [0053]. It states [0053]:

The stay-away zone 160 can be formed by, for example, an inner backing film or inner backing film laminated to a spunbond/melt blown/spunbond nonwoven exposed through an opening in the backsheet 130. Alternatively, the entire front waist portion can be water jet treated (with or without three-dimensional relief structures) and/or apertured except for a portion of the front waist portion that forms the stay-away zone 160. Thus, the stay away zone without water jet treatment and/or aperturing

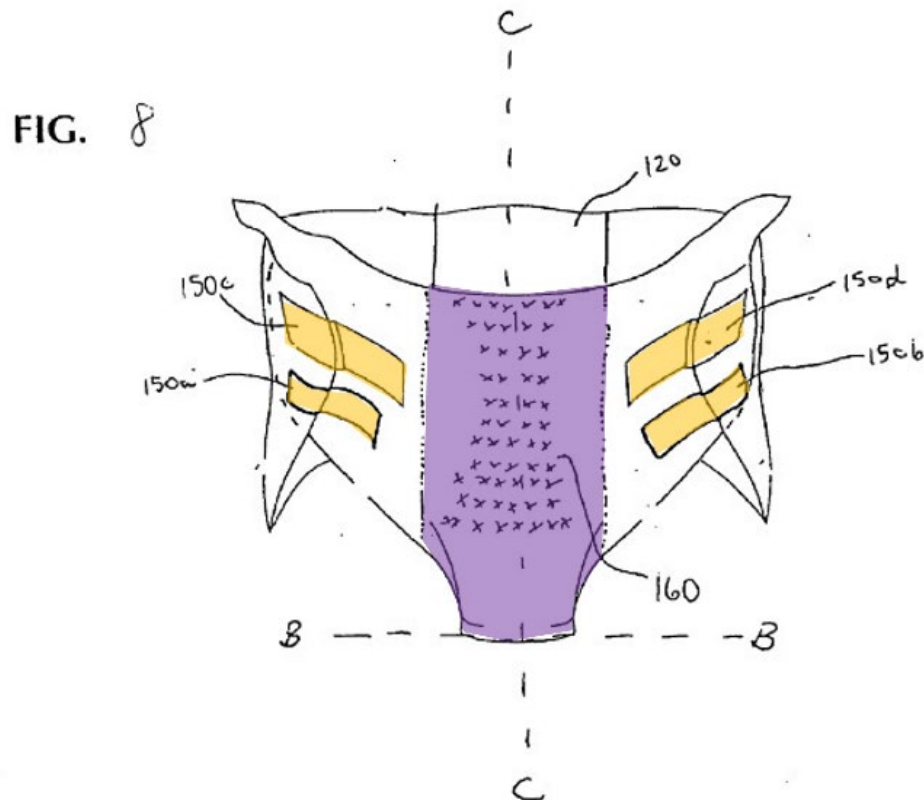
will have diminished affinity to hook-type fasteners in relation to the remainder of the front waist portion.

65. One of ordinary skill in the art would understand a stay-away-zone to refer to an area of a diaper to be avoided—an area of the diaper that should not and cannot be used to secure a diaper on the wearer. The term stay-away itself indicates that. Also, Damaghi (Ex. 1028), which includes Karami as an inventor, describes a stay-away zone as a portion of the diaper “to which the fastener could not attach.” Ex. 1028 (Damaghi) [0051]. Damaghi explains that the stay-away zone could be created “by spraying a solution or attaching a film over a portion of nonwoven backsheet 30 to which the fastener could not attach.” Ex. 1028 (Damaghi) [0051]. It also says that it could be created “by selectively modifying areas of nonwoven backsheet 30, such as by heat or compression, to destroy its ability to adhere to the hooks of a loopless fastener.” Ex. 1028 (Damaghi) [0051]. Damaghi is quite clear that fasteners do not attach to a stay-away zone.

66. Karami '772 likewise discloses that the stay-away zone could be formed by “an inner backing film or backing film laminated to a spunbond/melt blown/spunbond nonwoven exposed through an opening in the backsheet.” Ex. 1003 (Karami '772) [0053]. One of ordinary skill in the art would understand that a fastener would not be able to attach to such a film.

67. Karami '772 alternatively provides that the stay-away zone can be created by using an untreated nonwoven. One of ordinary skill in the art would understand that this would also be an area where fasteners would not attach. The reference to that area having “diminished” affinity (Ex. 1003 (Karami '772) [0053]) further shows that fasteners would not engage. One of ordinary skill the art also would not consider the area a stay-away zone if you could actually stay there and attach fasteners. In fact, Karami '772 makes clear that the untreated nonwoven at the front of the diaper would not have sufficient forces to engage fasteners to the front of the diaper. In the only instance that Karami '772 suggests attaching fasteners to the front of the diaper, it specifies that the front of the diaper must be treated in order for the fasteners to attach to the diaper. Ex. 1003 (Karami '772) [0039]. As I explain above, in an alternate T-shaped diaper embodiment, Karami '772 says that the front portion 22 of the diaper “may be made of water jet treated and/or apertured bonded nonwoven, so that the hook-type fasteners at the free ends of the wings 40 can attach to the front portion 22.” Ex. 1003 (Karami '772) [0039]. One of ordinary skill in the art would understand Karami '772 to be teaching that it is necessary to treat the front portion of the diaper in order to attach fasteners to it. One of ordinary skill in the art would conversely understand Karami '772 to be teaching that fasteners would not be expected to engage with an untreated front portion of the diaper, which forms a stay-away zone, to secure the diaper on the

wearer. In other words, one of ordinary skill in the art would understand that the stay-away-zone (annotated in purple below) would not be able to engage a fastener (yellow below) in order to secure the diaper on the wearer.



68. As I noted, Karami '772 describes treating a nonwoven with water jet treatment and/or aperturing as the “inventive concept.” Ex. 1003 (Karami '772) [0040], [0044], [0052]. To show the advantages of treating a nonwoven, Karami '772 states that it performed tests and reported the results of those tests in Table 1. Ex. 1003 (Karami '772) [0040], [0041], Table 1. The tests, however, were so poorly conducted and so poorly described that one of ordinary skill in the art

cannot draw conclusions from or make generalizations based on the values in Table 1.

69. Karami '772 states that it measured the “shear and peel strengths of various hook-type fastener samples” using a “modified version of the ASTM standardized testing procedures.” Ex. 1003 (Karami '772) [0041]. But Karami '772 never explains what testing procedure was used or how the testing procedure was modified. ASTM D 5169 measures shear strength, not peel strength. Ex. 1034. ASTM D 5170 measures peel strength, not shear strength. Ex. 1035. Karami '772 does not say whether different tests were conducted for shear strength and peel strength or how the tests were modified. Karami '772 states at the bottom of Table 1 that “[a]ll above testing was done peeling and shearing from the 2 inch length side of the hook sample.” Ex. 1003 (Karami '772) Table 1 (annotated in yellow below). I do not understand that description. It does not make sense to refer to the two-inch side of the hook sample. It certainly does not help clarify what testing procedure Karami '772 used. Karami '772 nowhere describes a test that could be reproduced. One of ordinary skill in the art cannot evaluate a testing procedure or the results of the testing procedure without knowing how the test was conducted.

70. Karami '772 states that fastener samples were measured “in relation to 33.9 gsm spunbond nonwoven, the same nonwoven subjected to aperturing with

16 pins/sq. in., and the same nonwoven subjected to aperturing with 32 pins/sq. in.” and in relation to “20 gsm nonwoven subjected to water jet treatment, and the same nonwoven subjected to both water jet treatment and aperturing with 16 pins/sq. in.” Ex. 1003 (Karami ’772) [0041]. Karami ’772 never tested an untreated 20 gsm nonwoven, so the test procedure lacked a control. Karami ’772 also never described how many specimens were tested. Similarly, Karami ’772 never explains what the Velcro sample identity was. All of these deficiencies further show that Karami ’772 has not described tests that can be reproduced and has not presented results that can be properly evaluated.

71. The test results reported in Table 1 (reproduced below) are not fully described and do not make sense. For each sample, the first number presented is reportedly the load at max load. Ex. 1003 (Karami ’772) Table 1. Karami ’772 then presents a second number for each sample but never explains what the value represents. The second number does not appear to have any relationship to the value provided for max load and makes no sense in relation to the reported max load. In some instances, the second value goes down as load at max load increases. In other instances, the second value increases as load at max load increases. For example, for the Binder 25445 hook sample and the 33.9 gsm samples, shear strength is reported as 1094.645/569.7, 2924.343/289.9, and 3325.295/420.2. It is

not clear why the second number would sometimes increase and sometimes decrease with a purported increase in load at max load.

TABLE 1

Hook Peel and Shear Strength Comparison 2" long x 1" wide Hook Samples (In a tape tab + finger lift)							
Binder 25445 (TAPE52) Hook Samples					Binder 65445 Hook Samples		
FQN 33.9 gsm Spunbond Nonwoven	FQN 33.9 gsm Spunbond about 16 pins/sq in	FQN 33.9 gsm Spunbond about 32 pins/sq in	FQN 20 gsm Water Jet Treated Nonwoven	FQN 20 gsm Spunbond/ Water Jet Treated Nonwoven-about 16 pins/sq in	FQN 33.9 gsm Spunbond Nonwoven	FQN 33.9 gsm Spunbond about 16 pins/sq in	
<u>1st Peel Strength</u>							
Load at Max Load (g/2 in)	142.628/ 25.7	298.389/ 25.2	443.046/ 85.3	532.557/ 96.8	613.135/ 83.8	78.026/ 56.1	292.842/ 52.1
<u>Shear Strength</u>							
Load at Max Load (g/2 in)	1094.645/ 569.7	2924.343/ 298.9	3325.295/ 420.2	993.601/ 115.5	1686.611/ 303.2	1616.699/ 586.9	2709.794/ 462.9
Binder 65445 Hook Samples				Velcro USA Hook Samples			
FQN 20 gsm Spunbond/ Water Jet Treated Nonwoven	FQN 20 gsm Spunbond/ Wet Jet Treated Nonwoven-about 16 pins/sq in	FQN 33.9 gsm Spunbond Nonwoven	FQN 33.9 gsm Spunbond about 16 pins/sq in	FQN 33.9 gsm Spunbond Nonwoven- about 16 pins/sq in	FQN 20 gsm Spunbond Water Jet Treated Nonwoven	FQN 20 gsm Spunbond/ Water Jet Treated-about 16 pins/sq in	
<u>1st Peel Strength</u>							
Load at Max Load (g/2 in)	231.120/ 114.4	530.477/ 77.2	104.840/ 60.1	262.006/ 52.2	446.605/ 55.9	673.645/ 131.3	
<u>Shear Strength</u>							
Load at Max Load (g/2 in)	1516.114/ 256.1	1677.780/ 640.3	203.931/ 132.5	1942.152/ 613.1	1032.605/ 132.6	2311.901/ 72.1	

NOTES: All above testing was done peeling and shearing from the 2 inch length side of the hook samples.

72. Karami '772 also does not appear to have normalized the results. The typical testing procedure for shear forces uses a one-inch-wide sample and requires two inches of overlap. Ex. 1034 (ASTM D 5169), page 2. The measurement would then be converted into force per square inch. Ex. 1034 (ASTM D 5169), page 2. It

is not clear whether Karami '772 has normalized the values. Further, complicating the matter is that Karami '772 does not use the correct units for peel and shear strength. Throughout the patent, Karami '772 refers to peel strength in grams per square inch when the unit should be force per a unit of width, i.e., per inch or per two inches. Peel strength is not measured per unit area. In Table 1, Karami '772 does refer to peel strength in "g/2 in" but also refers to shear strength in units of "g/2 in." Shear strength, however, is measured by force per unit of area. Because of all of these issues, it is my opinion that one of ordinary skill in the art would not be able to understand if the numbers are statistically different, or be able to draw any conclusions from the data presented in Karami '772 and would not rely on the data. Data obtained from an unknown test on unknown materials would not be used by one of ordinary skill in the art to support modifying diapers.

73. To summarize, Karami '772 does not recognize or teach the differing retaining forces of the Beckert patents. It does not disclose or teach a diaper where the closure is configured for detachably fastening to the outer face of the main part of the diaper and to the outer face of the side parts of a diaper. It also does not disclose or teach higher retaining forces between the closure and the side parts and lower retention forces between the closure and the outer face of the main part and where those lower retention forces are sufficient to secure the diaper on the wearer. One of ordinary skill in the art would understand that the untreated portions of the

diapers would not be able to engage the fasteners to secure the diaper on the wearer. Karami '772 makes this clear. It says throughout that the nonwoven is treated so that the fasteners can securely engage only with those treated portions of the nonwoven. Ex. 1003 (Karami '772) [0025], [0039], [0042], [0048], [0051].

B. Benning (Ex. 1002)

74. Benning refers to U.S. Patent Publication No. 2005/0256496 and is directed to an incontinence article that “has the material sections which are folded over themselves at least along one fold line running in the longitudinal direction and partial sections of the material sections, folded over each other and contacting each other over large areas in this folded configuration, and are releasably attached at affixation point or areas.” Ex. 1002 (Benning) [0006].

75. Benning seeks to create a diaper “in which the material sections folded over each other are releasably attached to each other so that they are kept in their folded configuration.” Ex. 1002 (Benning) [0007]. This prevents the material sections from fluttering during high-speed manufacture and keeps material sections intact during packaging and prior to use. Benning also seeks folding of the material sections on the side to be “user friendly” because the “process of feeding the section under the patient is considerably simplified with releasably attached material sections in accordance with the invention.” Ex. 1002 (Benning) [0007].

76. Benning illustrates a diaper with 14-22 cm wide material sections extending from the main body portion of the diaper in both the front and back regions. Ex. 1002 (Benning) [0028], [0029], Figure 4. In Figure 4, Benning shows a diaper with “a material section 34 forming side flaps or lateral sections” attached to the main body portion 20. Ex. 1002 (Benning) [0054]. Benning states that the “main body portion 20 comprises an absorbent core 28” and that the absorbent core “has a fluid-impermeable underlayer 30 which can also form the outer visible side of the incontinence article.” Ex. 1002 (Benning) [0053]. Benning further states that “the right material section 34 has two closures 42 in the form of closing tapes 44 folded over themselves which are unfolded when the article is to be used in the intended manner.” Ex. 1002 (Benning) [0055]. According to Benning, the “tapes 44 interact in a releasably adherent manner with an outside 46 of the front region 22 of the main body portion.” Ex. 1002 (Benning) [0055]. Benning also states that the closures “can be designed to grip mechanically or adhesively.” Ex. 1002 (Benning) [0030]. I have annotated Figure 4 of Benning below to show the main body in red, the front flaps in blue, the back flaps in green and the closures in yellow:

section of the hygienic article can be achieved, which preferably suggests a woven or a non-woven material and is experienced as pleasant by the wearer.” Ex. 1002 (Benning) [0033]. Further, Benning teaches that the material sections should not “have any closures which [would] stiffen the sections of material.” Ex. 1002 (Benning) [0060].

78. Benning states that the “material sections attached to the main body portion are preferably of a non-woven material, specifically and preferably spunbond materials (S), or spunbond-meltblown materials (SM), or meltblown layers (SMS) coated on both sides with spunbond material layers, or carded non-woven materials can be used. Non-woven laminates, in particular, double-layer, triple-layer or multi-layer combinations of the aforementioned non-woven materials can be used.” Ex. 1002 (Benning) [0032]. Benning further states that “[p]referably the material sections attached laterally to the main body portion are configured to breathe at least in sections, with microporosity, which allows an exchange of air as well permeability for moisture in the form of vapor, being regarded as advantageous.” Ex. 1002 [0032]. Benning also states that the “material sections advantageously have a surface weight of 10 to 150 g/m², in particular 20-100 g/m², and specifically 25-50 g/m².” Ex. 1002 [0032].

79. Benning does not recognize or teach the differing retaining forces of the Beckert patents. It does not disclose or teach a diaper where the closure is

configured for detachable fastening to the outer face of the side parts of a diaper. Benning teaches fastening the diaper to the outside of the front region with tape, not at the sides. Ex. 1002 [0055]. Benning also does not disclose or teach a fastening system where the retaining forces between the closure and the outer face of the main part are lower than the retaining forces between the closure and the outer face of the side parts and are sufficient to retain the diaper on the wearer.

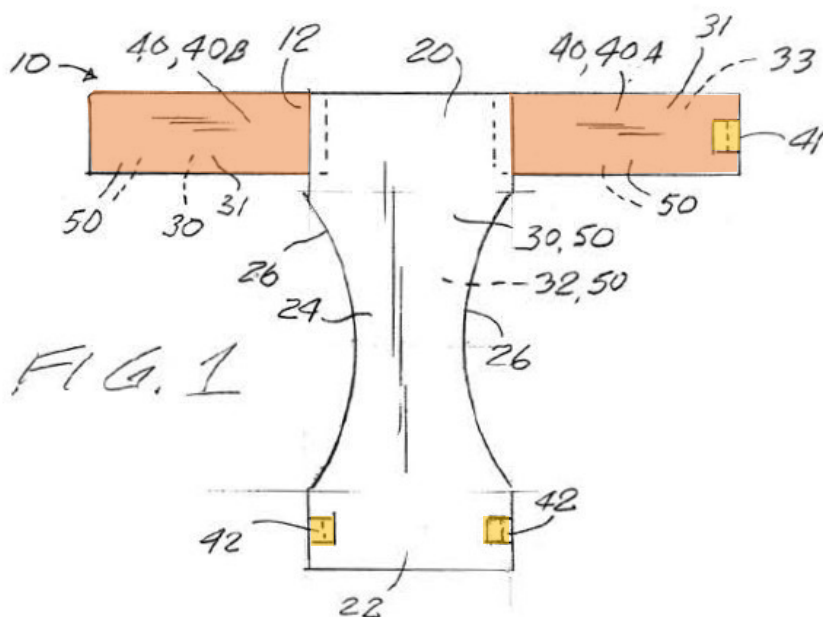
C. Karami '626 (Ex. 1004)

80. Karami '626 refers to U.S. Publication No. 2003/0220626 and “relates to an absorbent article, and more particularly to an absorbent article having a fastening system that does not require a conventional loop-type fastening element.” Ex. 1004 (Karami '626) [0001].

81. Karami '626 describes Figures 1-7 as depicting a T-shaped brief. Ex. 1004 (Karami '626) [0024]–[0027]. As shown in Figure 1, the T-shaped brief includes back portion 20, a front portion 22, and a crotch portion. Ex. 1004 (Karami '626) [0035]. With the T-shaped brief, “a pair of wings 40 extend laterally from respective lateral edges of the back portion 20.” Ex. 1004 (Karami '626) [0037]. Karami '626 explains that the wings have a “frontsheet,” which is the surface that faces the wearer, and a backsheet, which is the surface that faces the garment. Ex. 1004 (Karami '626) [0074], [0047] (referring to back sheet 32 of belt 44), [0049] (referring to frontsheet 30 of the belt 44). “[O]ne of the wings 40 has at

least one hook-type fastener element 4[1] body-facing surface 31 thereof, and the front portion 22 adjacent the top thereof (when the brief 12 is being worn) has at least a first laterally spaced pair of the hook-type fastener elements 42 on the frontsheet 30 thereof (the frontsheet 30 of the front portion 22 facing towards the wearer when the brief 12 is being worn).” Ex. 1004 (Karami ’626) [0037]. Figures 2-5 show additional fasteners on the front portion. Ex. 1004 (Karami ’626) [0043]–[0048]. And Figure 6 shows a pair of patch fastener elements 62 secured to the backsheet 32 of the front portion. Ex. 1004 (Karami ’626) [0049].

82. Karami ’626 explains how the T-shaped brief is placed on a wearer and how the fasteners engage. “When the brief 12 is first placed on the wearer, the free ends of the two wings 40 are brought around the sides and front of the waist of the wearer and make a partially overlapping connection about the front of the waist of the wearer.” Ex. 1004 (Karami ’626) [0037]. As Karami ’626 explains, “once the two wings 40 are placed in partially overlapping connection, they, in effect, form (with the back portion 20) a belt 44 encircling the waist of the wearer. The front portion 22 is then passed through the legs of the wearer and raised in front of the wearer until the first laterally spaced pair of fastener elements 42 secured thereto engage the exposed outer surface of the belt 44.” Ex. 1004 (Karami ’626) [0038]. In this way, all of the fasteners (annotated in yellow below) engage the belt (orange), and the belt secures the T-shaped brief on the wearer.



83. Karami '626 further explains that for a large-waisted wearer, “the wings 40 need not be secured together at the front of the wearer” and are instead “secured by the wearer to opposite lateral edges of the front portion 22 by fastener elements 42 so that the wings 40 form a belt 44 including both the front and back portions 22, 20.” Ex. 1004 (Karami '626) [0041]. In other words, fasteners 42 on the front portion are secured to the outside of the wings to form the belt. For a small-waisted person, Karami '626 states that auxiliary fasteners 70 and 72 can be provided on backsheet or outer garment facing surface the second wing 40B as shown in Figure 2 to fasten the end of that wing to the frontsheet or inner body facing surface of the first wing 40A so that the free of wing 40B does not hang down and form a pocket at the front of T-shaped brief. Ex. 1004 (Karami '626) [0050], [0051]. For all of these accommodations for small- and large-waisted

wearers wearing a T-shaped diaper, Karami '626 discloses securing fasteners to the frontsheet or backsheet of wings 40.

84. Karami '626 also describes another variant in Figure 6 where fastener elements 62 are placed on the backsheet 32 rather than frontsheet of the front portion, and the front portion is then inserted or tucked under the belt “so that the fastener elements 62 on the backsheet 32 of the front portion 22 will engage the frontsheet 30 of the belt 44 (the body-facing surface of a wing 40). Ex. 1004 (Karami '626) [0049]. Again, in these variants, the fasteners are all secured to the wings/belt.

85. Karami '626 states that “when the T-shaped brief 12 is made according to the present invention so that the fastener elements 41, 42 do not require landing zones and may engage directly with any portion of the nonwoven surface constituting the frontsheet 30, backsheet 32 or wings 40 of the brief, the accommodation of both small and large-waisted persons by a single brief 12 with elastic wings 40 is substantially simplified.” Ex. 1004 (Karami '626), [0040]. Mr. Jezzi suggests that, with this statement, Karami '626 is teaching that fasteners can engage any portion of the backsheet to provide size adjustability. Ex. 1012 (Jezzi), ¶ 107. I disagree. In paragraph [0040], Karami '626 is addressing the size adjustability of the T-shaped diaper. As I discuss above, Karami '626 accommodates large-waisted users where wings 40 are not long enough to engage

or fully engage to form a belt by having fasteners 41 on the front sheet of the front of the diaper engage the backsheet of wings 40 to form the belt. Ex. 1004 (Karami '626), [0041]. For small-waisted users, where wings 40 are too long leaving one wing dangling down once the belt is formed, Karami '626 discloses having one or two additional fasteners on the backsheet of one of the wings so that wing can be secured to the frontsheet of the other wing rather than be left dangling. Ex. 1004 (Karami '626), [0050], [0051]. For all of the variations of the T-shaped brief, Karami '626 describes attaching fasteners to the backsheet and frontsheet of wings 40.

86. In my opinion, one of ordinary skill in the art would understand Karami '626 to be teaching that the T-shaped diaper can be adjusted based on the size of the user by adjusting where the fasteners engage the wings. One of ordinary skill in the art would not understand the statement in paragraph [0040] that the fasteners may engage “any portion of the nonwoven surface constituting the frontsheet 30, backsheet 32 or wings” to mean that the fasteners are intended to engage any part of the T-shaped diaper including the front of the main part of the diaper. Instead, one of ordinary skill in the art would understand Karami '626 to be teaching that fasteners can engage any portion of the nonwoven of the frontsheet 30, backsheet 32 of the wings 40 because that is what Karami '626 actually teaches. In fact, when it comes to the T-shaped diaper, Karami '626 states the

nonwoven is preferably on the wings rather than on the entire article. Specifically, Karami '626 states “[p]referably the nonwoven is the article backsheet or, in the case of a T-shaped brief, the article wings.” Ex. 1004 (Karami '626), [0016]. This further shows that when it comes to the T-shape diaper, Karami '626's focus is on the wings.

87. Karami '626 states that Figure 8 shows a “ready-to-wear pull-up” and that Figure 9 shows a “diaper.” Ex. 1004 (Karami '626) [0028], [0029]. As to the diaper, Karami '626 only states that “[r]eferring now to FIGS. 9 and 10, it will be appreciated by those skilled in the art that the same or analogous improvements in the fit, appearance and economy of diapers 14 according to the present invention, with tape tab or patch fastener elements 76 (adjacent opposed lateral edges of the back portion 20), may be realized.” Ex. 1004 (Karami '626) [0055]. Karami '626 never explains what those analogous improvements in fit, appearance, and economy are or how the alleged improvements to a T-shaped brief that relies on a belt to secure the brief applies to a diaper. One of ordinary skill is not taught but left to imagine how to implement. The diaper shown in Figure 9 only has a front portion 22, a back portion 20, and crotch portion 24. It has no wings or discrete side portions. It is clear that Figures 9 and 10 are only meant to be illustrative and not a detailed example of a working embodiment. The focus of Karami '626 is on the T-shaped brief.

88. Karami '626 does not recognize or teach the different retentive forces of the Beckert patents. It does not disclose or teach a diaper where the closure is configured for detachable fastening the outer face of the chassis and to the outer face of the side parts of a diaper. It also does not disclose or teach a fastening system where the retaining forces between the closure and the outer face of the main part are lower than the retaining forces between the closure and the outer face of the side parts and are sufficient to retain the diaper on the wearer.

89. Mr. Jezzi cites paragraph [0065] in Karami '626 as a general teaching that a slightly higher basis weights in wings than the backsheet of the front and back portions are preferred for all diapers. Ex. 1012 (Jezzi) ¶¶ 94, 95, 108, 118. That is not what this paragraph says. Specifically, [0065] of Karami '626 states:

While the nonwoven is preferably a spunbond having a basis weight of 13-50 grams per square meter (gsm), slightly higher basis weights of 20-40 gsm (optimally 34 gsm) are preferred for use on the wings of a T-shaped brief, while relatively lower basis weights of 15-30 gsm (optimally 20 gsm) are preferred for the backsheet of the front and back portions.

90. In paragraph [0065], Karami '626 is specifically discussing the T-shaped diaper embodiments. And by expressly limiting it to that, one of ordinary skill in the art would understand that the preference does not apply to other

embodiments. Karami '626 does not say why a slightly higher basis weight nonwoven is preferred for the wings in the T-shaped brief; however, this slightly higher basis weight could be explained by the use of a laminated nonwoven with elastic properties for the wings all capable of accommodating the forces applied to the closures when the T-shaped diaper is put on. Ex. 1004 (Karami '626) [0039]. Nonetheless one of ordinary skill in the art would understand that, in the T-shaped brief embodiments, the wings form a belt, hold all of the weight of the diaper and need to be strong enough not to break. It is not a recognition of the differing retaining forces taught by the Beckert patents.

91. Paragraph [0065] in Karami '626 has little relevance to the Beckert patents since the T-shaped diaper in Karami '626 is designed to have all of the fasteners attach to the belt. Karami '626 does not teach or suggest attaching fasteners to the backsheet of the front portion of the T-shaped diaper, so this paragraph is not relevant to the Beckert patents, which teach having lower retaining forces between a closure and the front portion of the diaper but still sufficient retaining forces such that the fastener could be affixed to the front of the diaper and secure the diaper on the wearer.

92. Karami '626 says the following about nonwoven 50.

The nonwoven 50, which defines an exposed outer surface of at least one of the frontsheet 30, backsheet 32, and wing 40, contains a plurality of bonded fibers. The

fibers may be bonded by a variety of different means well-known in the art including thermal bonding, chemical bonding (e.g., by latex) hydroentanglement, and the like. Similarly, the fibers may be point bonded or area bonded, the area bonding typically indicating either a very large point or a plurality of very close points. Preferably the fibers are point bonded by a thermal technique such as calendering to produce a fuzzy nonwoven having a percentage bonding area of about 15-30%.

The bonded fibers define therebetween a plurality of interstices (also called pores, apertures, openings, etc.). A preferred nonwoven is a 13-50 gsm spunbond wherein the fibers have an average size of 1.3 to 3.0 denier and the average size of the interstices is at least 644 microns. While the bonding pattern may be uniform in both the machine direction (MD) and the cross direction (CD) of the nonwoven web, preferably the pattern differs for the MD and the CD. See, for example, U.S. Pat. No. 6,537,644 which discloses an orthogonally differentially bonded nonwoven.

Ex. 1004 (Karami '626) [0062], [0063]. Note that calendering usually ties down loose fibers and will not create a fuzzy nonwoven. Ex. 1021 (INDA Nonwovens Glossary) page 15. Karami '626 does not describe the further treatment used to create the fuzzy nonwoven. Karami '626 is also loose with the numbers that he

provides. For instance, Karami '626 indicates that nonwoven “fibers have an average size of 1.3 to 3.0 denier and the average size of the interstices is at least 644 microns.” Ex. 1004 (Karami '626) [0063]. Fibers having a 1.3 denier are typically 10-20 microns in diameter, which is significantly smaller than the interstices or holes between the fibers, which Karami '626 describe as being 640 microns (or 0.644 mm). Because the interstices are forty times larger than the fibers, it will hard for the hook to engage.

93. Karami '626 also says that the backsheet “may be formed of the above-identified nonwoven with a polypropylene or polyethylene film backing or as a laminate or the like composite of a plurality of nonwovens.” It gives one example of a nonwoven for the backsheet. It says a “preferred non-elastic spunbond nonwoven is available from First Quality Nonwovens, Inc. under the trade designations ‘PILLOWBOND SPUNBOND’ and ‘SPUNBOND NW147.’” Ex. 1004 (Karami '626) [0066].

94. For the wings 40, Karami '626 says they can be “elastic, non-elastic or partially elastic.” Ex. 1004 (Karami '626), [0039]. It says, “[e]lastic wings may be made of a composite of an elastic film laminated between two nonwovens preferably spunbonds” and that a “suitable composite is available from Treadgar [sic] Company under the designation FABRIFLEX 307.” Ex. 1004 (Karami '626) [0039].

VI. Diaper Characteristics and Retaining Forces in Nonwovens

A. Diaper Designs and Characteristics

95. In adult incontinence diapers, it is important that the diaper be secured on the wearer and that the wearer have confidence that it is secured and will not leak when used. Precluding leakage is a critical feature for an incontinence diaper. It is also important that diapers be sufficiently secured for both ambulatory and non-ambulatory wearers. The diaper should not fall off or leak when the wearer moves.

96. It is also important that a diaper permit a caretaker to inspect the diaper, such as by being able to detach and refasten the diaper while still preventing leaking from the diaper. Likewise, it is preferred that a diaper has some adjustability to it so can be secured on wearers with differing body types. Similarly, the topsheet of the diaper should be positioned to contact the user's body so that liquid is wicked away from the skin (preventing leakage and irritation) and passed directly to the absorbent core; to achieve this, the diaper must be fastened and adjusted correctly, and releasable fasteners are important.

97. In general, there are three common type of diapers—conventional diapers, T-shaped or belt diapers, and pull up diapers. These different types of diapers operate differently when donning the article on the wearer and attaching fasteners to secure the diaper on the wearer. A T-shaped or belt diaper typically has

two wings that are fastened together to form a belt. Generally, once the belt of the T-shaped diaper is secured around the body, the front portion of the diaper is brought up and fastened to that belt. Because all of the fasteners engage the wings that form the belt, the belt carries all of the weight of the diaper. A T-shaped diaper is shown in Karami '626 (Ex. 1004), Karami '772 (Ex. 1003), and Stupperich (Ex. 1009). Stupperich's Figure 1, which is annotated below, shows the belt 10 (orange):

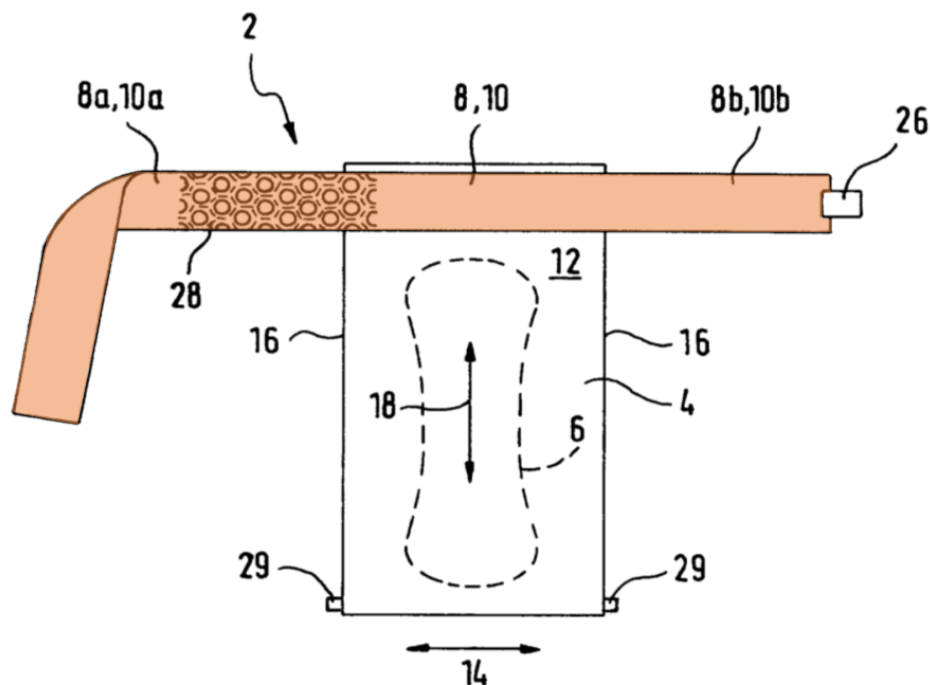
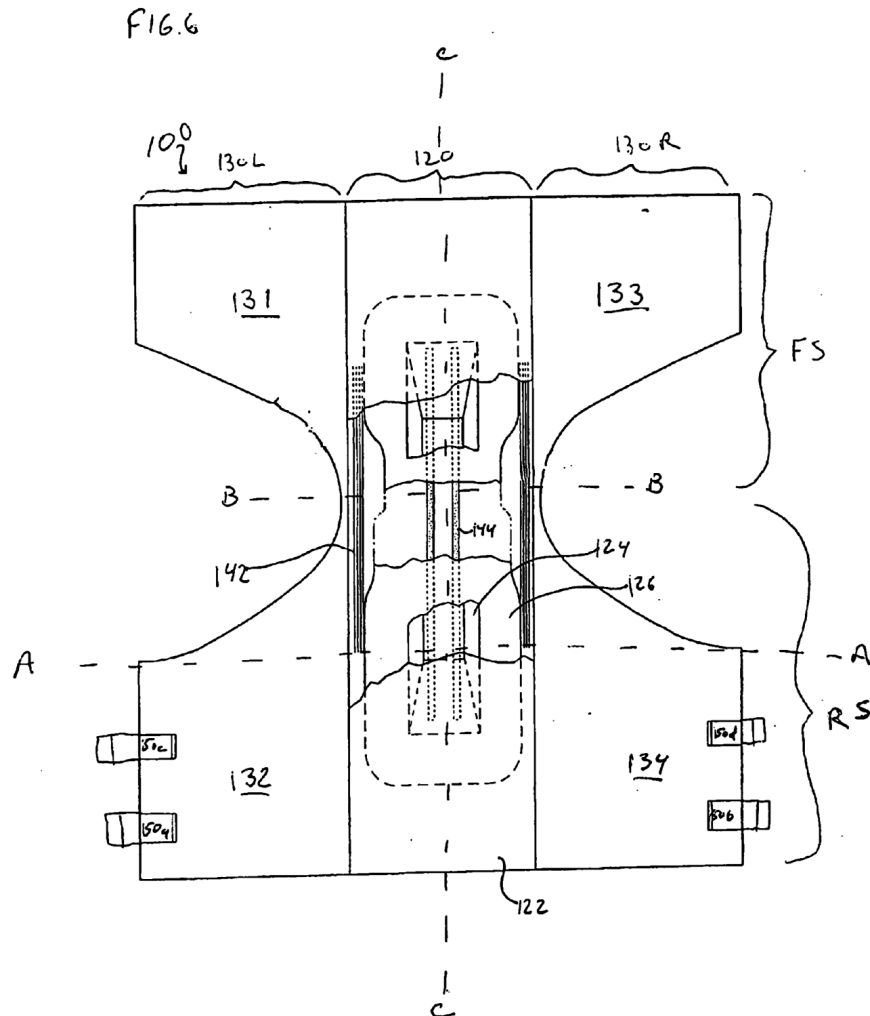


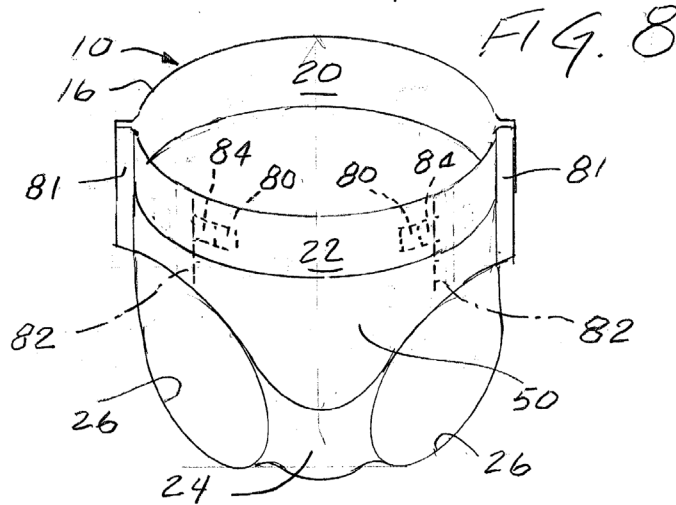
Fig. 1

A conventional diaper typically has some contouring around the legs, although some such as shown in Benning (Ex. 1002), are rectangular with four side portions. The fasteners may be located at the front or back part of the diaper. Unlike the T-shaped diaper, there is no belt that carries the entire weight of the diaper; instead,

the side portions and front of the diaper carry the weight of the diaper. A conventional diaper is shown in Karami '772 Figure 6, reproduced below.



A pull-up diaper is one that is intended to be put on similar to underpants where the diaper can be pulled up as one unit. The side seams may be permanent or pre-fastened with re-closeable fasteners. Pull-up diapers maybe adjusted to fit with fasteners at each side. A pull-up diaper is illustrated in Figure 8 of Karami '626 (Ex. 1004), reproduced below:



98. When a person of ordinary skill in the art designs an incontinence diaper, they must consider their design objectives at the start, including the type of diaper. These objectives will drive the materials selected and the manufacturing processes used. A skilled artisan would not rely solely on the basis weight of the nonwoven when designing an incontinence diaper. Nonwovens are greatly impacted by fiber properties (e.g., fiber type, density, crimp, and wetting), by fabric construction (e.g., interlacing, bonding method, fiber orientation, and chemical finishing), and by mechanical finishing (e.g., permeability, wicking, liquid run-off, bulk, strike-through, and wetness barrier). And a skilled artisan would consider all of these properties before specifying a nonwoven for an incontinence product component. In addition to these considerations, a person of ordinary skill in the art would consider how manufacturing would be impacted by the nonwoven fabric's properties. For example, a skilled artisan would know that,

when elongated, certain nonwoven fabrics (e.g., spunbonded) will shrink in the cross direction (CD); however, this is not true with carded nonwovens. Unlike spunbonded nonwovens, carded nonwovens are oriented in the machine direction (MD) and when elongated, the carded material will not shrink in the cross direction but will instead become thinner (and have a lower basis weight). Considerations such as shrinkage in the cross direction greatly impact manufacturing concerns, by impacting fabric uniformity, forming side feeding, affecting bonding, and creating blocking issues—all of which are considered product defects. All of these factors make it hard to predict how any particular combination of fiber composition and method of manufacture of nonwovens would work as a substitute for an idealized matching piece for the hook part in a diaper closure.

B. Retaining Forces in Nonwovens

99. Mr. Jezzi argues in his declaration, such as in paragraphs 99 and 120 as a couple examples, that using a nonwoven having a higher basis weight will have higher retaining forces than a lower basis weight nonwoven. In doing so, he ignores many other factors that impact the forces between a nonwoven and a fastener.

100. Nonwoven fabrics may be produced by forming a sheet or web of fibers, bonding the fibers together, and finishing the resulting fabric. Sheets or webs may be formed using a variety of techniques, such as spunbonding,

wetlaying, or carding. Spunbonding is generally a single step process for manufacturing nonwoven fabrics where a molten thermoplastic (e.g., polypropylene) is extruded onto a moving belt or screen. Heated gas is used to blow the extruded molten plastic onto the moving screen in a randomly oriented and evenly distributed (in the MD or CD) manner to cool and form a nonwoven fabric.

101. The fiber web may be bonded together mechanically (e.g., needle punching, aperturing, or water jetting), thermally (e.g., calendering, embossing, hot air), or chemically. In mechanical bonding, the nonwoven fabric is formed by entangling the fibers together. With mechanical bonding, a fiber web gains strength through inter-fiber friction as a result of the physical entanglement of the fibers. For example, mechanical bonding may be achieved through needle punching, wherein specially designed barbed needles are pushed and pulled through the web to entangle the fibers. Alternatively, mechanical bonding may be performed using hydroentanglement (sometimes referred to as water jetting). Hydroentanglement uses fine, high-pressured water jets to cause the fibers to interlace. Thermal bonding includes processes such as calendering, embossing, and/or hot air. In thermal bonding, heat sensitive components are used to fuse the fibers together. Thermal bonding may be carried out on any suitable machine, such as a calendering machine (most commonly used to bond an entire surface area with

heated rolls), embossing machine (most commonly used to bond a portion of the surface area to form a bond pattern using heated rolls) or heated through air machine (does not apply pressure with rolls during bonding). A calendering machine uses heated rolls to melt the fibers together; calendering is often used for thin fabrics. A heated through air machine feeds fabrics through an oven where heated air is pulled (or blown) through the fiber web to melt the fibers together; because pressure is not applied (like in calendering), heated through air is often used to produce loftier or bulkier fabrics. Chemical bonding commonly relies on the use of binders and/or solvents to form a nonwoven fabric.

102. After a fabric has been formed, various finishing treatments (e.g., laminates) may be applied to render desirable fabric properties tailored to the needs of the end application. Typically, when a plastic film is laminated to a nonwoven, the resulting product is referred to as a composite. Typically, lamination may be done using two types of processing: wet or dry. With wet lamination, an adhesive is applied to bond the film to the nonwoven. With dry lamination, heat sensitive materials in various forms (e.g., powders or fibers) may be applied to bond the film to the nonwoven. The film that is applied may be selected from a variety of polymers and thicknesses based on the desired performance.

103. For a nonwoven, the method and conditions by which the nonwoven fabric has been made, the inclusion or removal of materials from the fibers, and

finishing (mechanical, thermal, chemical) employed are very significant. Fiber material (typically a polyolefin such as polypropylene and polyester), fiber cross-sectional shape and crimping, diameter and finish all impact fiber, and hence, fabric behavior. If the fibers are too fine, they will inhibit penetration of the mechanical “hooks” and those that do snag fibers will find they do not have adequate load bearing capability. If the fibers are too coarse, then then they will not engage properly with the parts of the mechanical closure. Further, at the finishing state of nonwoven products, factors such as thickness, consolidation by point bonding, thermal stabilization, and bonding density and pattern, all impact subsequent performance as a closure surface. Once formed as a nonwoven, the fiber segments available to be snagged by mechanical closure parts must be engineered in such a way that the connected fastener can perform in a refastenable manner. Usually, the nonwoven works in conjunction with a film or other substrate attached by lamination specifically designed to meet the barrier and refastenable requirements of the product in use. It should be emphasized that the steps taken to create a suitable refastenable component are quite specific to each end use, be it a disposable diaper, a T-shaped diaper, an incontinence training pant, or a larger incontinence management product intended for bedridden patients.

104. Fiber materials (e.g., polypropylene, polyester) with differences in extruded cross-sectional shape and overall fiber diameter (which is directly

impacted by polymer density), all influence fiber performance in a receptive nonwoven construction.

105. All of these considerations influence how a nonwoven fabric will snag on a hook. For example, if the fibers are too fine, it can impact the penetrability of the nonwoven and, once penetrated, the fibers of the nonwoven will not have adequate load bearing capabilities to properly engage with the closure. And if the fibers are too large, they will become resistant to engaging with the hooks.

106. Fabric finishing treatments, such as lamination, further impact a nonwoven fabric's properties and ability to engage with various closure systems. When a nonwoven is laminated, its properties can be dramatically impacted based on the laminate's properties. For example, a laminate may be elastic or nonelastic, applied using a variety of processes, or subjected to post-lamination treatments to create a breathable fabric. Every design consideration impacts the end fabric's properties and performance, and the resulting end properties can be unpredictably impacted.

107. The fastener used also impacts the retaining forces between a nonwoven and the fastener. A mechanical fastener includes a number of anchor points that are intended to snag the fibers. They can have different shapes such as a mushroom, hook, or nail head to engage and retain a segment of the fiber as a loop.

I will refer to those as hooks even though they are not all hook-shaped, because their purpose is to snag or hook the fibers in the nonwoven. The size, type, geometry, inclination, spacing, and number of anchor points or hooks impact how well the fastener will be able to engage with and detach from a nonwoven surface. Also, the area coverage or physical size of the fastener will impact it.

108. Karami '626 recognizes that many factors can impact retaining forces. For instances, it states that “number of fibers and the extent to which they are bonded together in the nonwoven provide the nonwoven with the strength necessary to provide a high level of shear strength.” Ex. 1004 (Karami '626) [0068]. It also states that the “pore size in the nonwoven (that is, the size of the interstices formed by the fibers) typically affects the peel strength, a higher pore size providing greater peel strength for the fastener elements according to the present invention.” Ex. 1004 (Karami '626) [0069]. Karami '626 also notes that the fastener used can impact the retaining forces. It says that “the size of the spacing between adjacent surfaces of the pins of the fastener element at the exposed outer surface thereof is a factor of major significance providing the high level of shear strength.” Ex. 1004 (Karami '626) [0068].

109. Other patents illustrate this as well. For example, Mr. Jezzi cites Jacobs (Ex. 1007), which I understand is U.S. Patent No. 5,814,178, and Anderson (Ex. 1008), which I understand is U.S. Patent No. 6,605,172. Ex. 1012 (Jezzi)

¶¶ 153, 160. Both patents illustrate that a nonwoven can be engineered, further showing that basis weight is not the only characteristic relevant for a nonwoven. Jacobs is directed towards a process for making a bulked fabric laminate. Ex. 1007 (Jacobs) Title, Abstract. Jacobs achieves this effect by bonding “the fibrous layer and the liquid resistant layer in juxtaposition to form a laminate [with] a plurality of spaced-apart bond locations, heating the bonded laminate to a temperature that activates the latent shrinkability of the liquid resistant layer, and allowing the heated laminate to retract such that the liquid resistant layer shrinks.” Ex. 1007 (Jacobs) Abstract, 1:54–64. Jacobs says that “shrinkage of the film layer causes the fibrous layer, which has a lower latent shrinkage than the film layer, to gather and bulk up between adjacent bond sites, forming a three dimensionally texturized laminate and improving [the] textural properties of the laminate. Ex. 1007 (Jacobs) 6:6–11. Jacobs also says that it “is important to note that the size of each bond site, the total number of the bond sites and the distance between adjacent bond sites affect the extent of the three dimensional texturization.” Ex. 1007 (Jacobs) 6:11–14. Specifically, it is the increase in bulk of the fibrous layer and not an increase in weight per unit area that provides better shear and peel performance.

110. Anderson is directed towards a method of making a breathable and liquid impermeable web. Ex. 1008 (Anderson) Title. Anderson achieves this by “modifying the physical characteristics of a web [by] passing the web between at

least one pair of interengaged rolls to incrementally stretch the web.” Ex. 1008 (Anderson) Abstract. Anderson reports that the resulting “modified web has a microporous structure containing few large pores and capillaries,” rendering a web that is “breathable to air or vapor, but acts as a liquid barrier” and has “a soft, cloth-like textured surface.” Ex. 1008 (Anderson) Abstract, 2:64–67. For any nonwoven to act as a liquid barrier, one must bring fibers closer to each other which can result in a change in refastenability. Anderson, as well as Jacobs, illustrate that there are many aspects of nonwoven that can be modified or manipulated, and that those modifications will impact the characteristics of the nonwoven.

111. Mr. Jezzi relies on the Beckert patents to argue a higher basis weight will result in higher retaining forces. For instance, in paragraph 120 of his declaration, Mr. Jezzi cites the ’788 patent at 13:34–41 and 7:19–26 for that proposition. But I think he misreads the Beckert patents. In my opinion, one of ordinary skill in the art would not understand the Beckert patents to teach that a nonwoven with a higher basis weight always provides greater retaining forces than a nonwoven with a lower basis weight. The Beckert patents teach how much retention should occur at the sides and front part of the diaper in order to achieve the advantage of encouraging proper fastening of the diaper but still enabling the diaper to function if it is not fastened properly. ’788 patent 2:9–37. And the

Beckert patents do more. They teach how to engineer the nonwovens to make them receptive to fasteners. '788 patent 5:21–9:33, 12:54–14:10, 14:42–15:44. One of ordinary skill in the art would understand that the nonwoven is being asked to serve a different purpose as between side parts and outer surface of the main body part of the diaper and that this difference can be achieved by engineering the nonwoven to have more intense interconnections between the hooks and the side part of the diaper than between the hooks and the front of the main body part of the diaper.

112. For example, the Beckert patents teach that the nonwoven used for the outerface of the backsheet is preferably made of a nonwoven with a single or multi-layer foil (i.e., a film) laminated on the nonwoven. '788 patent 5:21–36. They also explain how to make it more breathable. '788 patent 6:3–16, 9:13–15. At the same time, the Beckert patents teach that “[b]ecause many of the lamination methods for producing the nonwoven-foil laminates impair the plushness of the nonwoven component and therefore clearly reduce the over-abdomen retaining forces, it has proven advantageous to temperature-treat the nonwoven-foil laminate after lamination.” '788 patent at 8:8–12. They explain how the “shrinkage of the foil forces the nonwoven component connected to gather, resulting in an increase in mass per unit area, so that the nonwoven component can subsequently better engage with the closure means having mechanical closure aids and exhibits higher

over-abdomen retaining forces than before temperature-treatment.” ’788 patent 8:17–23. In this way, the nonwoven has been engineered to better engage fasteners. The bulk of the nonwoven provides higher retaining forces.

113. The Beckert patents also teach that embossing patterns can impact the nonwoven’s ability to engage fasteners. They explain that to “prevent fibers from being torn out of the nonwoven composite material when the mechanical closure aids are pulled apart, it is advantageous to provide the nonwoven component with an embossing pattern by means of which all fibers of the nonwoven component are preferably bound.” ’788 patent 6:36–40. And the Beckert patents go on to describe types and shapes of patterns and further explain that this type of embossing on a nonwoven can enable fasteners to securely engage loop regions formed by the embossing. ’788 patent 6:40–7:11.

114. The Beckert patents also provide examples where they describe, for both the side parts and main body part, the type of nonwoven, the fiber size (called thickness in the Beckert patents), type of embossing, embossing pattern, depth of embossing, percent embossing area, and any additional treatment the laminate underwent. ’788 patent 14:43–15:23, 12:54–13:33. In one example, the Beckert patents explain that front and rear side parts are constituted by a nonwoven material component, which is a “PP spunbond nonwoven with a mass per unit area of 30 g/m²” and “fiber thickness is 2 dtex.” ’788 patent, 12:54–58. “The outer face

of the nonwoven material has an embossing pattern 20 that is only indicated schematically in FIG. 1.” ’788 patent, 12:58–60. The Beckert patents also provide more details about the embossing pattern 20 (’788 patent, 12:60–13:5):

The joining regions produced by hot calander embossing are formed by a multiplicity of lines, that is, by two groups of lines extending parallel within each group, wherein the lines of one group intersect the lines of another group to form a regular rhombic pattern at an angle of 33° to produce unconnected rhombic loop regions 21 disposed in an island-like a fashion surrounded by line-like joining regions 22. The lines forming the joining regions 22 have a width of 1.0 mm in the case shown and an embossing depth of 0.6 mm. The distance between pairs of adjacent parallel lines of both groups of lines is 4.7 mm. The embossing area, that is, the sum of the area of all joining regions 22 with reference to the total area of the embossing pattern (joining regions+loop regions) is 32%.

115. The Beckert patents further explain that, in this example, the backsheet material is made from a “PP spunbond nonwoven” with “a mass per unit area of 20 g/m^2 ” and “fiber thickness is 2 dtex.” ’788 patent, 13:17–20. “The outer face of this spunbond nonwoven bears an embossing pattern 40,” which “extends over the entire outer face of the main part 4.” ’788 patent, 13:20–24. The Beckert patents explain that “the embossing pattern 40 of the backsheet nonwoven material

component 10a is identical to the embossing pattern 20 of the nonwoven material component of the front side parts 16.” ’788 patent, 13:30–33. Thus, in this example the side parts and the backsheet of the main part of the diaper are the same down to the embossing pattern, except for the basis weight of the nonwoven.

116. Following this very specific and detailed description of the nonwoven used for the side parts and back sheet of the main part, the Beckert patents state (’788 patent, 13:34–41):

The over-abdomen retaining forces between the closure means 32 and the outer face of the side parts 16 are preferably at least 58 N/25 mm and are higher than the over-abdomen retaining forces between the closure means 32 and the outer face of the backsheet nonwoven material component, which are preferably at least 20 N/25 mm. This is essentially ensured by the higher mass per unit area of the nonwoven component of the side parts.

117. Here, the statement that this “is essentially ensured by the higher mass per unit area of the nonwoven component of the side parts” is made in reference to the specific example provided. One of ordinary skill in the art would not understand it to be an assertion that a nonwoven component with a higher mass per unit area will also have a higher over abdomen retaining force than a nonwoven with a lower mass per unit area, particularly because the Beckert patents

explain many factors that impact retaining forces apart from basis weight. In this example, the Beckert patents identified the type of nonwoven, fiber size, and the specific embossing pattern used and that they were the same for the backsheet and side parts. The only difference was basis weight. The Beckert patents teach that this example provides the desired of over abdomen retaining forces between the closure and the outer face of the side parts and the desired over abdomen retaining force between closure and the outer face of the backsheet to retain the diaper on the wearer. It is not a broader statement that a higher basis nonwoven will always have higher retentive forces than a lower basis nonwoven regardless of the material used, the size of fiber, or the embossing pattern used.

118. One of ordinary skill in the art would likewise understand the similar statement at column 7 of the Beckert patents ('781 patent, 7:19–35) to be a reference to the specifically disclosed examples and not a statement that a nonwoven with a higher basis weight will always have higher retaining forces than a nonwoven with a lower basis weight. The Beckert patents teach how to get greater retaining strengths at less weight per unit area. The Beckert patents give one of ordinary skill in the art more flexibility in choosing a less costly nonwoven while not debasing the product or losing performance on closure strength. It does not teach that a higher basis weight nonwoven necessarily has higher retaining forces than a lower basis weight nonwoven.

VII. Combinations of Karami '772 and Benning

119. I understand that Attends asserts that claims of the Beckert patents would have been obvious over the Karami '772 patent modified based on Benning. I understand that some of the combinations include additional references in the combination. Here, I address the combination of Karami '772 with Benning and the arguments made by Mr. Jezzi regarding the combination of Karami '772 and Benning. Mr. Jezzi appears to address modifying Karami '772 at pages 66-86 of his declaration, which covers paragraphs 78-103. Mr. Jezzi also discusses the Karami '772 reference at pages 55-66, which covers paragraphs 66-77.

120. As I discuss below, in my opinion, the Beckert patents would not have been obvious based on the Karami '772 and Benning combination, whether or not additional references are included in the combination. None of those references disclose or teach the claimed differing retaining forces between side parts and front part. None of those references disclose or teach a diaper with retaining forces between the closures and the outer face of the front part of the diaper that are sufficient to secure the diaper on the wearer and at the same time are lower than the retaining forces between a closure and the outer face of the side parts of the diaper. And the combination of those references does not result in that either.

121. Focusing on the embodiment shown in Figure 6 of Karami '772, I understand that Mr. Jezzi proposes making wings 150a-150d separate from the

central chassis because Benning shows a diaper having wings that are distinct from the backsheet. He shows that modified version of Figure 6 of Karami '772 on page 68 of his declaration.

A. One of ordinary skill in the art would not use the stay-away zone in Karami '772 to engage fasteners and secure the diaper on the wearer

122. Mr. Jezzi asserts that the “stay-away” zone would be able to engage fasteners to secure the diaper on the wearer. Ex. 1012 (Jezzi) ¶ 75. He says: “As explained in my paragraphs 68-70, above, the retaining forces between the fasteners 150a-150d and stay-away zone 160 (i.e., untreated nonwoven) are sufficient to hold diaper 100 on a wearer.” Ex. 1012 (Jezzi) ¶ 75. I disagree. It cannot be both a stay-away zone and an attachment zone. The term stay-away zone indicates that the fasteners should not be engaged there. Damaghi teaches that a stay-away zone is a portion of the diaper “to which fasteners could not attach.” Ex. 1028 (Damaghi) [0051]. Karami '772 likewise teaches that the stay-away zone either has a film or reduced affinity section, which one of ordinary skill in the art would understand was to prevent attachment of the fasteners to the zone. Ex. 1003 (Karami '772) ¶ [0053].

123. In my opinion, one of ordinary skill in the art would not seek to affix fasteners to the stay-away zone at the front of the diaper. It is also my opinion that fasteners would not necessarily be able to engage the nonwoven at the stay-away

zone and secure the diaper on the wearer. Karami '772 teaches that the nonwoven must be treated in order for the fasteners to securely engage the nonwoven.

Ex. 1003 (Karami '772) [0025], [0039], [0042], [0048]. One of ordinary skill in the art would understand that the untreated portions of the Karami '772 diaper would not be able to engage fasteners so as to secure the diaper on the wearer. Karami '772 makes this even more clear when it describes an untreated nonwoven at the front of the diaper as a stay-away zone. Ex. 1003 (Karami '772) [0052], [0053].

1. Karami '772 only discloses attaching fasteners to nonwovens that have been treated

124. As I explain above in my discussion of Karami '772, Karami '772 only discloses affixing fasteners to a nonwoven that has been treated by water jet treatment, aperturing, or both. Ex. 1003 (Karami '772) [0010], [0011], [0013], [0025], [0039], [0033], [0035], [0042], [0048], [0051]. Karami '772 states “hook-type fasteners are able to securely attach to a bonded nonwoven surface that has been subjected to a water jet treatment and/or aperturing.” Ex. 1003 (Karami '772) [0025]. It further explains:

Water jet treating and/or aperturing the nonwoven wings 40 obviates the need for corresponding loop-type landing zones to mate with the hook-type fasteners 41, 46 and 48. The increased shear and peel strength of the water jet treated and/or apertured bonded nonwoven allows the hook-type fastener 41 at the free end of one of the wings

40 to be securely fastened at any point along the outer surface of the other wing 40 and the hook-type fasteners 46, 48 on the front portion 22 to be securely fastened at any point along the outer surface of either wing 40.

Ex. 1003 (Karami '772) [0042]. Karami '772 states throughout that the nonwoven is treated “so that” the fasteners can attach to the treated portion of the nonwoven.

Ex. 1003 (Karami '772) [0039], [0048], [0051]. One of ordinary skill in the art would understand that the nonwoven in Karami '772 would have to be treated in order for fasteners to be securely fastened.

125. Karami '772 also specifies where on a diaper the fasteners should be attached. And with the exception of one modified T-shaped diaper embodiment, Karami '772 teaches attaching the fasteners to the wings, not the front portion of the diaper. Ex. 1003 (Karami '772) [0033], [0048], [0051]. For the diaper embodiment of Figure 6, which Mr. Jezzi relies on for the Karami '772-Benning combination, Karami '772 explains that “hook-type fasteners 150a-150d can securely engage with any portion of the wings 131 and 133 when the diaper 100 is placed on the wearer.” Ex. 1003 (Karami '772) [0048]. One of ordinary skill in the art would understand that this could include the wings at the front portion of the diaper. But Karami '772 does not teach or suggest engaging the fasteners at the front of the chassis or main body portion of the diaper in Figure 6.

126. As a result, the Figure 6 embodiment of Karami '772 does not have fasteners that engage the outer face of the front of the chassis or main part of the diaper as required by the Beckert claims.

2. Fasteners would not engage the stay-away zone to secure the diaper on the wearer

127. In my discussion of the Karami '772 patent, I explain that one of ordinary skill in the art would understand a stay-away zone generally, and specifically as used in the Karami '772 patent, to refer to an area of the diaper to be avoided. One of ordinary skill in the art would understand the stay-away zone in Karami '772 to refer to an area that would not engage fasteners to secure the diaper on the wearer. I will not repeat my entire discussion but instead will address some of Mr. Jezzi's arguments.

128. Mr. Jezzi argues that the tests reported in Table 1 of Karami '772 confirmed that "there were retaining forces between the hooks and the untreated nonwovens." Ex. 1012 (Jezzi) ¶ 68. As I explain above, because the testing methods were not disclosed and were flawed and because of the issues with the reported results, one of ordinary skill in the would not be able to draw any conclusions from the data presented in Table 1 and would not make generalizations based on it. Also, Karami '772 never reported that the tests showed that the retaining forces for an untreated nonwoven would have been sufficient to retain a diaper on the wearer. In fact, Karami '772 discloses that water jetting and/or

aperturing must be done to achieve a functioning closure system. As a result, one of ordinary skill in the art would understand that whatever retaining forces there were between the hooks and an untreated nonwoven, they were not enough to secure the diaper on the wearer.

129. Also, while Mr. Jezzi alleges that Table 1 shows “there were retaining forces between the hooks and the untreated nonwovens,” Ex. 1012 (Jezzi) ¶ 68, the only untreated nonwoven that Karami ’772 tested was one having a basis weight of 33.9 gsm. Ex. 1003 (Karami ’772) [0041], Table 1. I understand that in his modified Karami ’772 diaper, Mr. Jezzi argues that one of ordinary skill in the art would have used a nonwoven having a basis weight of 20 gsm for backsheet 130 for the containment assembly. Ex. 1012 (Jezzi) ¶ 93. But Karami ’772 did not even test an untreated nonwoven having a basis weight of 20 gsm. Ex. 1003 (Karami ’772) [0041], Table 1. It only discloses testing a 20 gsm nonwoven subject to water treatment and water treatment and aperturing at 16 pins/in². Ex. 1003 (Karami ’772) [0041], Table 1. One of ordinary skill in the art would have understood that because Karami ’772 did even not consider the retaining forces of an untreated 20 gsm to be worth evaluating, Karami ’772 understood that an untreated 20 gsm nonwoven would not be able to securely engage fasteners in the disclosed diapers. Karami ’772 sought to determine through its testing whether it could make a 20 gsm nonwoven able to securely engage fasteners through water

treatment and/or aperturing. As a result, one of ordinary skill in the art would have understood that Mr. Jezzi's modified Karami '772 diaper having a 20 gsm nonwoven backsheet as the stay-away zone on the front portion would not have been expected to be able to engage fasteners to secure a diaper on the wearer and certainly would not have considered the modified diaper necessarily able to engage fasteners to secure a diaper on the wearer.

3. The Karami '626 patent does not show that the stay-away zone in Karami '772 could engage fasteners to secure the diaper on the wearer

130. I understand that Mr. Jezzi points to Karami '626 as somehow showing that the stay-away zone in Karami '772 could be used to engage fasteners and secure the diaper on the wearer. I further understand that Mr. Jezzi must show that Karami '626 necessarily shows that the stay-away zone in Karami '772 could be used to engage fasteners and secure the diaper on the wearer. In my opinion, Karami '626 does not show that the stay-away zone has sufficient retaining forces to secure the diaper on the wearer, and it certainly does not show that it necessarily would have sufficient retaining forces.

131. Mr. Jezzi says that his understanding that the untreated nonwoven in Karami '727 would have retaining forces high enough to hold the diaper on a wearer during use "is confirmed by Karami '626 which teaches a nonwoven specifically designed for engaging with hooks of a hook-type fastener when 'use[d]

by both large- and small-waisted persons.” Ex. 1012 (Jezzi) ¶ 70. I disagree. For one thing, Karami ’626 only discusses size adjustability in the context of T-shaped diapers, and in those T-shaped diaper, the fasteners only engage the wings, not the backsheet of the main body part of the diaper. Ex. 1004 (Karami ’626) [0039]–[0041], [0050]–[0051]. And when explaining how to adjust the T-shaped diaper, Karami ’626 teaches that fasteners can engage different parts of the wings to accommodate small- and large-waisted wearers. This does not show that main part of the Karami ’626 diaper can engage fasteners to secure the diaper on the wearer or that the stay-away zone in Karami ’772 does.

132. As further support, Mr. Jezzi also argues that “Karami ’626’s described nonwoven is preferably a spunbond having a basis weight of 13-50 grams per square meter (gsm), which is within the range contemplated by Karami ’772’s untreated nonwoven.” Ex. 1012 (Jezzi) ¶ 70. But the fact that Karami ’626 and Karami ’772 state that nonwovens can be used having broad ranges of basis weights does not mean that the stay-away zone in Karami ’772 could engage fasteners. Also, as I note above, basis weight is not the only factor that determines retaining forces between a nonwoven and a fastener. Also, Karami ’772 also states that backsheet 32 preferably has a basis weight of between 5-45 gsm, so even the disclosed basis weights are not the same. Ex. 1003 (Karami ’772) [0031]. One of ordinary skill in the art would also understand a 5 gsm nonwoven to be very thin

and unable to engage fasteners if used as the backsheet in Karami '772's diaper, particularly if it is untreated in the stay-away zone.

133. I understand that Mr. Jezzi tries to identify a specific example from both Karami '626 and Karami '772 to show that they use the same nonwoven. Ex. 1012 (Jezzi) ¶ 70. Specifically, Mr. Jezzi argues that both Karami '626 and Karami '772 disclose using FABRILEX and Binder 25445 and that this somehow shows that the stay-away zone in Karami '772 could engage fasteners to secure the diaper on the wearer. Ex. 1012 (Jezzi) ¶ 70. I do not think Mr. Jezzi's argument makes much sense. I do not see the relationship that Mr. Jezzi is trying to draw between Karami '626 and the stay-away zone in Karami '772. Also, I note that while both Karami '772 and Karami '626 mention using FABRILEX, they disclose using it for the wings. Ex. 1003 (Karami '772) [0034]; Ex. 1004 (Karami '626) [0039]. Neither suggests using FABRILEX for the backsheet for the main part of the diaper or even for the front portion of a diaper. And even if both Karami '626 and Karami '772 use FABRILEX in the wings, that would not have any bearing on whether the stay-away zone in the front of the main part of the diaper in Karami '772 could engage fasteners to secure the diaper on the wearer. One of ordinary skill in the art also would not seek to use an elastic nonwoven, such as FABRILEX, as the backsheet 130 for the containment assembly 120 in the Karami '772 Figure 6 diaper. This is because if you make the backsheet of the absorbent

core elastic, as the backsheet expanded, the core will lose its ability to absorb fluids. Because the backsheet could expand, the absorbent core could develop fissures, which would destabilize the core. Fluids entering the core and encountering a fissure would stop flowing to other portions of the core, making the core less absorbent. Given that the containment assembly is intended to hold fluids and waste, an elastic nonwoven for backsheet 130 would be inappropriate and would also sag under the weight of fluids and waste, leading to leakage around the leg and discomfort for the wearer.

134. Mr. Jezzi further argues that the diaper in Figures 9 and 10 of Karami '626 uses only two fasteners. Ex. 1012 (Jezzi) ¶ 75. He says that because Karami '772 shows the diaper in Figure 6 having four fasteners, those fasteners must be able to sufficiently engage the stay-away zone since two fasteners worked in Karami '626. I disagree. One of ordinary skill in the art would not make that connection or that leap from those two figures. Also, Karami '626 only shows the diaper in Figures 9 and 10 as a broad illustration and provides little description of it. Ex. 1004 (Karami '626) [0055]. Karami '626 never explains how to adapt alleged improvements disclosed for the T-shaped diaper to the regular diaper and never identifies any details of the regular diaper, including what should be used as the backsheet in order to engage fasteners to secure the diaper on the wearer. Ex. 1004 (Karami '626) [0055].

135. In my opinion, the stay-away zone with an untreated nonwoven in Karami '772, particularly if it is a 20 gsm nonwoven as Mr. Jezzi suggests for the modified Karami '772 diaper, would not be intended for nor would it necessarily be able to engage fasteners to secure the diaper on the wearer as Beckert claims require.

B. It would not have been obvious to use a higher basis weight nonwoven on the wings in the Figure 6 diaper embodiment of Karami '772

136. Mr. Jezzi has proposed modifying the diaper shown in Figure 6 of Karami '772 based on Benning. Ex. 1012 (Jezzi) page 68. Among his changes, Mr. Jezzi argues one of ordinary skill in the art would have sought to use a higher basis weight nonwoven backsheet in the wings than in the body of the diaper to provide the strength necessary to withstand a high level of shear strength. Ex. 1012 (Jezzi) ¶ 94. I disagree that one of ordinary skill would have been motivated to make such a change.

137. Karami '772 teaches providing a nonwoven with sufficient strength to engage a fastener and secure a diaper by treating the nonwoven through water jetting or aperturing. Ex. 1003 (Karami '772) [0025]. In this way, one of ordinary skill in the art would understand that you could use a cheaper, more comfortable nonwoven that cannot on its own secure a diaper but can be treated so that it can engage a fastener and secure the diaper. There would have been no reason to use a

higher basis weight nonwoven, which Mr. Jezzi agrees would be more expensive and make the diaper more uncomfortable. Ex. 1012 (Jezzi) ¶ 92.

138. Besides arguing for a higher basis weight nonwoven in the wings than in the main body of the diaper, Mr. Jezzi selects various basis weight ranges and values for his modified diaper. Ex. 1012 (Jezzi) ¶¶ 93–95. Mr. Jezzi cites Young (Ex. 1022), Kleinschmidt (Ex. 1006), and Horn (Ex. 1020) for design considerations, but none of them suggests the ranges and specific values for the backsheet of the front body portion and the wings that Mr. Jezzi has selected. Ex. 1012 (Jezzi) ¶ 92. In fact, Young says that “it is a particular challenge to provide nonwovens having each of these properties” (strength, coverage, and softness) “such that they are suitable for use in absorbent articles.” Ex. 1022 (Young) 1:36–42. Young’s warning is particularly apt given that Mr. Jezzi’s design considerations are focused solely on basis weight and not any of the other properties required of a nonwoven.

139. Mr. Jezzi cites Kleinschmidt (Ex. 1006) as teaching a “higher basis weight region of the side panel ‘deliver[s] the material strength needed for the securing a fastening device to the diaper.’” Ex. 1012 (Jezzi) ¶ 94. But Kleinschmidt was comparing the side panel to leg cuff, which was designed for softness against the leg. Ex. 1006 (Kleinschmidt) 8:11–39. It was not comparing the basis weight of the side panel and the front of the diaper and did not identify the basis weight used.

Mr. Jezzi cites Horn (Ex. 1020) as teaching that the problem of hooks pulling fibers loose upon disengaging the hook is “especially significant for low basis weight nonwoven webs.” Ex. 1002 (Jezzi) ¶ 94. This is a problem that is especially significant with lower basis weight nonwovens. Ex. 1020 (Horn) [0006]. Horn teaches trying to solve this problem by using a bonding so that the nonwoven has “a pattern of intersecting bond lines.” Ex. 1006 [0014]. Horn thus illustrates that basis weight is not the only determining factor in how well a nonwoven will retain a fastener, and that other properties, such as bonding, may be used to modify a fabric’s properties. And neither Horn nor Kleinschmidt would have led one of ordinary skill in the art to use higher basis nonwoven for the wings than for the main body part in the Karami ’772-Benning diaper.

140. As I note above, when a person of ordinary skill in the art designs an incontinence diaper, they must consider their design objectives at the start. These objectives will drive the materials selected and the manufacturing processes applied. And there are many factors that go into this, which I describe above. All of these factors make it hard to predict how any particular combination of fiber composition and method of manufacture of nonwovens would work as a substitute for an idealized matching piece for the hook in a diaper closure. By focusing on basis weight as a primary consideration, it is my opinion that Mr. Jezzi is ignoring or lacks an understanding of the complex nature of nonwoven design and

production and fails to recognize the requirements to design a successful end product.

C. The claimed retaining force ranges would not have been obvious

141. Mr. Jezzi argues that it would have been obvious to use “the claimed, workable retaining-force ranges in the modified Karami ’772 diaper.” Ex. 1012 (Jezzi) page 79 (heading 4), ¶¶ 97–103. His arguments are a bit hard to follow. He seems to suggest that because Karami ’772 seeks to “strike a balance between size adjustability and encouraging proper diaper sizing,” as does the Beckert patents, the specific desired retaining force ranges taught in the Beckert patents somehow would have been obvious. Ex. 1012 (Jezzi) ¶¶ 97–98. I do not agree with Mr. Jezzi’s premise and, in any event, do not think it leads to the claimed retaining force ranges being obvious.

142. Karami ’772 and the Beckert patents teach different approaches to diaper sizing and fastening. The Beckert patents disclose an incontinence diaper that encourages correctly fastening the side parts to the closure to secure the diaper, but also instills user confidence by reliably securing the diaper on the wearer if the closures are attached to the front area instead of the side parts (even though this is not preferred). The Beckert patents teach the specific and different retaining forces between the closure and the side parts and the closure and the front that achieve this. ’788 patent 2:9–37.

143. On the other hand, Karami '772 teaches proper fastening by treating a nonwoven so that the nonwoven can engage fasteners to secure the diaper on the wearer and to have the untreated portion, i.e., the stay-away zone, unable to engage the fasteners to secure the diaper on the wearer. In this way, proper fastening is ensured because the fasteners cannot engage the untreated nonwoven. Karami '772 only sought to eliminate loop landing zones. Ex. 1003 (Karami '772) [0002], [0003], [0006]. It still uses landing zones, it just teaches creating them by treating the nonwoven rather than by using separate loop material. Ex. 1003 (Karami '772) [0025]. Karami '772 does not disclose using an alternate but less desirable landing zone or fastening location. To the extent, Karami '772 can be viewed as teaching size adjustability, it does so by indicating that the fasteners can engage any portion of the treated nonwoven. Ex. 1003 (Karami '772) [0039], [0043], [0048], [0051]. One of ordinary skill in the art would understand that size adjustability would come about by being able to attach fasteners to different portions of a nonwoven having the same retaining forces. Karami '772 does not teach providing size adjustability by nonwovens with different basis weights or through differing retaining forces. As a result, Karami '772 does not teach or appreciate having lower but sufficient retaining forces between the front of the diaper and the fastener and does not teach or appreciate the claimed differing retaining force ranges.

144. Claims of the Beckert patents recite specific retaining force ranges. For instance, claims 2, 27, 28, and 30 of the '398 patent recite that the over-abdomen retaining forces between the closure and the outer face of the chassis are 57-20 N/25 mm. Claims 16 of the '398 patent recites that the over-abdomen retaining forces between the closure and the outer face of the chassis is 50-25 N/25 mm. Claims 3 and 4 of the '398 patent recite that the over-abdomen retaining forces between the closure and the outer face of the side parts in the front are 90-58 N/25 mm and 80-60 N/25 mm, respectively. The other Beckert patents include similar claims.

145. Mr. Jezzi states that “the Diaper Patents do not assign a particular rationale or significance to these ranges.” Ex. 1012 (Jezzi) ¶ 98. I disagree. The Beckert patent teaches that the claimed retaining force ranges achieved the surprising result of leading the users of the diaper to fasten the diaper correctly while still securing the diaper when it is not fastened in the preferred manner. '788 patent, 2:9–37. The Beckert patent further explains that this also “increases the wearing comfort of the diaper” and reduces “the risk of damage to the backsheet of the main part and therefore the risk of liquid passing through the mechanical closure aids is reduced.” '788 patent, 2:20–27.

146. I also disagree with Mr. Jezzi's assertion that Karami '772 encompasses these retaining force ranges. Ex. 1012 (Jezzi) ¶ 98. As discussed

above, the Karami '772 untreated nonwoven at the front of the diaper in the stay-away zone would not engage a fastener to secure the diaper on the wearer and thus would not encompass the claimed retaining force ranges. And Mr. Jezzi does not show that it does. He merely argues that one of ordinary skill in the art would have been able to achieve the claimed retaining force ranges. Ex. 1012 (Jezzi) ¶¶ 99, 100–102. That one of ordinary skill in the art could achieve them once taught by the Beckert patents to do so does not mean that one of ordinary skill in the art would have sought to do so absent the Beckert patents.

D. One of ordinary skill in the art would not have been motivated to combine Karami '772 and Benning

147. Mr. Jezzi argues that one of ordinary skill in the art would have been motivated to modify Karami '772's diaper shown in Figure 6 based on Benning to use separate wings that are distinct from the backsheet bonded to the chassis based on manufacturing cost and to use a higher basis weight nonwoven for the wings than for the containment assembly. Ex. 1012 (Jezzi) ¶¶ 78, 80–82. I disagree.

148. Mr. Jezzi supports his argument with motivations relating to reducing the costs of manufacturing. He argues that a person of ordinary skill would understand that manufacturing diapers with distinct wings would render manufacturing flexibility and allow for smaller equipment to be used. Ex. 1012 (Jezzi) ¶¶ 80, 81.

149. I believe that a person of ordinary skill in the art would recognize the opposite to be true: using distinct wings would likely increase the cost of production and difficulty of manufacturing. In order to manufacture distinct wings, a manufacturer would be required to invest in additional equipment to produce the wings. This would require additional space on the mill floor to accommodate the equipment and additional employees to oversee production. Further, once the distinct wings are manufactured, they may require spooling (which requires even more costly equipment) in order to be stored for use. This would require additional warehouse space, generating storage identification numbers, and careful planning to ensure that the appropriate number of wings was made. Further, when the wings are needed, an employee must deliver the wings to the area of the mill where they are needed; if an employee is not immediately available to deliver the wings, there could be machine downtime resulting in a reduced production efficiency. If production speeds are slowed, then the cost of manufacturing is further increased. These increased overhead expenses could deter a person of ordinary skill from manufacturing a diaper with distinct wings.

150. Additionally, the extra steps required to produce and control a diaper with distinct wings creates more opportunities for line stoppages and missed product defects. For example, weak bonding at the wings could cause the wing to come off during use, but too much bonding could cause the wing to tear at the

seam. Troubleshooting manufacturing issues and engineering a successful production process cuts into profits by requiring a team of highly trained employees and investing in research and development. All of these issues would increase the cost per unit of the end product and cut into profits.

151. Mr. Jezzi relies on Glaug (Ex. 1015) to argue that one of ordinary skill would have combined Karami '772 and Benning for ease of manufacture. Ex. 1012 (Jezzi) ¶¶ 80–81. But Glaug does not show the same configuration as the Karami '772 Figure 6 diaper, so the manufacture of the two diapers would not be the same. Ex. 1015 (Glaug) Figure 1; Ex. 1003 (Karami '772) Figure 6. For instance, Glaug discloses that the diaper's front section 22 has a different shape than the back section 24, has an elasticized intermediate section and landing zones 38, leading to different manufacturing requirements than Figure 6 of Karami '772. Ex. 1015 (Glaug) 9:5–55.

152. Mr. Jezzi also said that one of ordinary skill in the art would have modified the Figure 6 diaper of Karami '772 based on Benning to be able to use “a higher basis weight for wings 131-134 for strength and a lower basis weight nonwoven for containment assembly 120's backsheet for comfort.” Ex. 1012 (Jezzi) ¶ 82. I disagree that this would have been a reason to modify the Karami '772 diaper. As I discuss above, Karami '772 teaches treating wings 131-134 so that they will have sufficient strength to engage a fastener and secure the diaper on

the wearer. Ex. 1003 (Karami '772) [0048]. Karami '772 calls this the inventive concept of the patent. Ex. 1003 (Karami '772) [0040], [0044], [0052]. One of ordinary skill in the art seeking to utilize Karami '772's diaper would not want to eliminate the inventive concept. One of ordinary skill in the art would also understand that the treatment taught by Karami '772 would enable the use of a lower cost, more comfortable nonwoven that could not on its own sufficiently engage a fastener, but could once that nonwoven is treated.

153. One of ordinary skill in the art would not have sought to use a higher basis weight nonwoven on the wings because it would have unnecessarily increased the cost given that Karami '772 teaches that treating the wings provides the desired shear strength in a lower basis weight nonwoven. In addition to the higher cost of a nonwoven having a higher basis weight, Mr. Jezzi's change would lead to other increased costs. The higher basis weight would increase the bulk of the product and the package size, which would also increase shipping costs. In addition, it would require that the supply rolls used for manufacturing be replaced more frequently.

154. One of ordinary skill in the art also would not have sought to increase the basis weight of wings 131-134 because that would be less comfortable for the wearer. Adult consumers would not like thicker wings because it would make the diaper more apparent under clothing. Similarly, the added bulkiness at

the hip would have been less breathable and less comfortable, making the diaper less desirable.

VIII. Combinations of Benning and Karami '626

155. I understand that Attends asserts that claims of the Beckert patents would have been obvious over the Benning reference modified based on the Karami '626 reference. I understand that some of the combinations include additional references in the combination. Here, I address the combination of Benning with Karami '626 and the arguments made by Mr. Jezzi regarding the combination of Benning and Karami '626. Mr. Jezzi appears to address modifying Benning based on Karami '626 at pages 93-108 of his declaration, which covers paragraphs 112-131. Mr. Jezzi also discusses the Karami '626 reference at pages 86-93, which covers paragraphs 104-111.

156. As I discuss below, in my opinion the Beckert patents would not have been obvious based on the Benning and Karami '626 combination, whether or not additional references are included in the combination. None of those references disclose or teach the claimed differing retaining forces. None of those references disclose or teach a diaper with retaining forces between the closures and the outer face of the front part of the diaper that are sufficient to secure the diaper on the wearer and are lower than the retaining forces between a closure and the outer face

of the side parts of the diaper. And the combination of those references do not result in that either.

157. I understand that Mr. Jezzi proposes using a film non-woven like the backsheet in Karami '626 as Benning's underlayer 30. Ex. 1012 (Jezzi) ¶¶ 112, 113. Mr. Jezzi further proposes using the fasteners in Karami '626 for the fasteners 42 in Benning. Ex. 1012 (Jezzi) ¶¶ 114–116.

A. One of ordinary skill in the art would not have looked to Karami '626 to modify the Benning diaper and would not have used backsheet 32 from Karami '626 for the Benning diaper

158. Looking to modify Benning based on Karami '626, Mr. Jezzi focuses on and highlights Figure 1 of Karami '626 showing a T-shaped brief. Ex. 1012 (Jezzi) ¶¶ 105–106. And he relies on the Karami '626 description of and statements about the T-shaped brief when arguing to modify the underlayer 30 of the Benning diaper to use the backsheet 32 of Karami '626. Ex. 1012 (Jezzi) ¶¶ 112–113. In my opinion, one of ordinary skill in the art would not have looked to Karami '626 to modify Benning and in particular would not have looked to Karami '626 to modify the fluid-impermeable underlayer of the main body portion in Benning's diaper because the diapers are designed differently and have different principals of operation.

1. With his modified Benning diaper, Mr. Jezzi creates a diaper that is not designed to engage fasteners

159. In his proposed combination, Mr. Jezzi has essentially created a diaper that is not designed to engage fasteners to secure a diaper on the wearer. Mr. Jezzi has taken a portion of Karami '626 that was not designed to engage fasteners to secure the diaper on the wearer, namely backsheet 32 of the front and back portions of a T-shaped diaper, and put it in place of Benning's fluid impermeable underlayer 30, which was designed to engage fasteners and secure the diaper on the wearer. Benning's side flaps were not designed to engage fasteners. The resulting combination includes side flaps and an underlayer that is not designed to engage and secure fasteners.

160. Specifically, Karami '626 is primarily directed to a T-shaped brief, as I described above. Mr. Jezzi acknowledges that Karami '626 describes a T-shaped brief with front portion 22, back portion 20, and two wings 40, and that these wings form a belt around the waist of a wearer with fasteners elements 42 located on the front of the diaper engaging with the belt. Ex. 1012 (Jezzi) ¶ 106; Ex. 1004 (Karami '626) [0035], [0037]. Karami '626 thus describes wings 40 being used to engage fasteners to hold up and secure the T-shaped brief. Ex. 1004 (Karami '626) [0037]. Karami '626 does not teach attaching fasteners to backsheet 32 of the front and back portion of the T-shaped diaper. As a result, the backsheet of the front and back portions of the T-shaped diaper is not used to secure fasteners

in order to retain the diaper on the wearer, and Karami '626 does not allege that the backsheet used on the front and back portion of the T-shaped diaper would be able to do that.

161. Benning, on the other hand, secures the diaper by engaging fasteners to the fluid impermeable underlayer of the diaper in the front area, not the side flaps as in Karami '626. Ex. 1002 (Benning) [0055]. This is very different than what Karami '626 is doing with the T-shaped brief. One of ordinary skill in the art would not look to replace the fluid impermeable underlayer of Benning's front and back portion, which is designed to receive and secure fasteners to retain the diaper on the wearer, with a backsheet from the front and back portion of Karami '626's T-shaped diaper, which is not designed to receive and secure fasteners to retain the diaper on the wearer.

162. Because the backsheet of the front and back portions of Karami '626's T-shaped diaper are not designed to engage fasteners and secure fasteners, one of ordinary skill in art would not look to it when considering the Benning diaper, which is intended to support and secure the diaper at the front portion. One of ordinary skill in the art would not have selected the backsheet of the front and back portions of the T-shaped diaper in Karami '626 because it was not designed for a diaper such Benning's, where the fluid impermeable underlayer of the front portion supports and secures the diaper.

163. Mr. Jezzi asserts that once Benning's diaper is modified, it would have a nonwoven underlayer having a basis weight of 15-30 gsm and specifically 20 gsm. Ex. 1012 (Jezzi) ¶¶ 117, 119. Mr. Jezzi further asserts that the modified diaper would have nonwoven side parts having a basis weight of 10-150 gsm, 15-50 gsm, and specifically 30 gsm. Ex. 1012 (Jezzi) ¶¶ 117, 119. He makes a point of noting that the modified diaper would have a nonwoven for the side flaps that has a higher basis weight than the nonwoven used for the underlayer 30 in Benning. Ex. 1012 (Jezzi) page 97 (heading 3), ¶¶ 117–120. Benning, however, teaches that the material sections or side flaps should be “less rigid than the main body portion or the chassis-forming materials or the main part, such as in particular the backsheet.” As a result, one of ordinary skill in the art would not have wanted to use a backsheet for the main part of the diaper that had a lower basis weight than the side flaps since the side flaps would not be more flexible than the backsheet and main body portion.

2. The T-shaped diaper in Karami '626 does not operate similarly to Benning's diaper, so the alleged similarity of them is not a reason to combine the references

164. In support of the combination, Mr. Jezzi suggests that Karami '626's T-shaped brief operates similarly to Benning's diaper because they both have wings and fasteners. Ex. 1012 (Jezzi) ¶ 117. For instance, Mr. Jezzi states that the “advantages as described for Karami '626's T-shaped diaper would also benefit the

modified Benning diaper given that its wings were also separate from the backsheet, would encircle a wearer's waist when worn, and would be engaged by fasteners." Ex. 1012 (Jezzi) ¶ 117. I disagree.

165. Karami '626's T-shaped brief and Benning's diaper are different designs that operate fundamentally differently. Karami '626's T-shaped diaper has two wings that are fastened together like a belt before the rest of the diaper is donned, and then the main part of the diaper is attached to and hangs off of the belt. Ex. 1004 (Karami '626) [0037], [0038]. The fasteners in the T-shaped diapers engage the wings/belt to secure the diaper on the wearer, not the backsheet at the front of the diaper. Ex. 1004 (Karami '626) [0037], [0038]. Benning, on the other hand, has four side material sections or side flaps. Ex. 1002 (Benning) [0028], [0054], [0055], Figure 4. The side flaps are wider than the wings/belt used in T-shape diapers. Ex. 1002 (Benning) [0028]. The fasteners in the Benning diaper are located on the side flaps and are secured to the front of the diaper, not to the side parts. Ex. 1002 (Benning) [0055]. Thus, in Karami '626's T-shaped diaper, fasteners engage the wings, not the front part, to secure the diaper on the wearer while in Benning's diaper fasteners engage the front part, not the side flaps, to secure the diaper on the wearer. The similarities that Mr. Jezzi identifies between Benning's diaper and the T-shaped brief of Karami '626 do not exist. And modifying Benning's underlayer to use the backsheet of Karami '626's main body

would not turn Benning's diaper into a T-shaped diaper, change the way the Benning side flaps function, or otherwise make the diapers similar.

166. Karami '626 does briefly reference a regular diaper shown in Figures 9 and 10, but Mr. Jezzi relies on the T-shaped diaper in Karami '626. Ex. 1012 (Jezzi) ¶¶ 112, 113. Also, as I discuss above, Karami '626 does not say much of anything about the Figure 9 and 10 diaper and does not explain how the "improvements in the fit, appearance and economy" of the T-shaped brief would apply to the generic diaper illustration of Figure 9. Ex. 1014 (Karami '626) [0055]. Karami '626 does not describe the diaper of Figure 9 as having a backsheet or frontsheet or what it would be made of. Ex. 1014 (Karami '626) [0055]. The diaper in Figures 9 and 10 of Karami '626 does not have wings but only a front portion and back portion. The most one of skill in the art would take away from this embodiment is that any backsheet covering the diaper in Figures 9 and 10 would have to function more like the wings in a T-shaped brief embodiment in order to be able to retain the diaper on the wearer.

167. Karami '626 does not teach that a backsheet of the front and back portions in the T-shaped diaper embodiment would be able to hold a fastener and secure the diaper on the wearer. For the T-shaped diaper, Karami '626 only requires that the wings do that. Karami '626 does not even care if a nonwoven is used for the front and back portion of the T-shaped diaper because it says that

“[p]referably the nonwoven is the article backsheet or, in the case of a T-shaped brief, the article wings.” Ex. 1004 (Karami ’626) [0016]. As a result, one of ordinary skill in the art looking to adapt the alleged improvements in the T-shaped brief to the diaper shown in Figures 9 and 10, would have to look at the wings of the T-shaped diaper for creating a surface that could engage fasteners, not the front and body portions. Because one of ordinary skill in the art would have to first adapt the alleged improvements described for the T-shape diaper to the diaper shown in Figures 9 and 10 (despite Karami ’626 not teaching how to do that) before modifying Benning based on the diaper shown in Figures 9 and 10, one of ordinary skill would not look to modify Benning based on Karami ’626. In short, Karami ’626 does not explain or describe the diaper in Figures 9 and 10, and one of skill in the art would not seek to modify the Benning diaper based on it.

3. Size adjustability is not a reason to combine the references

168. Mr. Jezzi further cites Karami ’626’s desire to have size adjustability as a reason to modify the Benning diaper based on Karami ’626. Ex. 1012 (Jezzi) ¶ 116. But Karami ’626 teaches size adjustability by permitting fastening at different parts of the wings having the same retaining forces. It does not teach fastening to either the wings OR the front or back portion for size adjustability.

169. Specifically, Mr. Jezzi asserts that Karami ’626 teaches that fasteners can be fastened anywhere for size adjustability (Ex. 1012 (Jezzi) ¶¶ 115–116), but

one of ordinary skill in the art would recognize that Karami '626 does not teach that fasteners can be affixed anywhere on the diaper. Karami '626 explains that fasteners can be attached along the belt to adjust for large- and small-waisted persons. For instance, Karami '626 states that for a large-waisted wearer, “the wings 40 need not be secured together at the front of the wearer” and instead fasteners 42, located on the front portion, are secured to the wings “so that the wings 40 form a belt 44 including both the front and back portions 22, 20.” Ex. 1004 (Karami '626) [0041]. For a small-waisted person, Karami '626 states that an auxiliary fastener 70 can be provided on the second wing as shown in Figure 2 to fasten the overlapping end of the wing and that an auxiliary fastener 72 can be included to “provide another point of engagement between the two wings 40A, 40B, so as to prevent formation of a pocket therebetween.” Ex. 1004 (Karami '626) [0050]. In both instances, the fasteners are secured to the belt, not to the front of the main part of the diaper. The diaper broadly illustrated in Figures 9 and 10 of Karami '626 is not described as providing size adjustability, does not have side portions, and describes very limited fastener placement. Ex. 1004 (Karami '626) [0055]. Because Karami '626 only teaches size adjustability by permitting fasteners to engage different parts of the wings, that adjustability is not a reason to modify Benning's fluid impermeable underlayer. In fact, since the modified Benning diaper is not a T-shaped diaper and does not use wings to form a belt, the

modified Benning diaper would never attain “Karami ’626’s size adjustability,” as Mr. Jezzi alleges. Ex. 1012 (Jezzi) ¶ 116.

4. Avoiding using a landing zone in Benning is not a reason to combine references

170. Mr. Jezzi further suggests using the fasteners as in Karami ’626 to avoid using a landing zone in Benning. Ex. 1012 (Jezzi) ¶¶ 114, 115. Mr. Jezzi notes that Karami ’626 states a desire to eliminate miniloop fasteners elements added to diapers to engage a hook fastener. Ex. 1012 (Jezzi) ¶ 114; Ex. 1004 (Karami ’626) ¶ [0003], [0004]. But Benning does not teach having to use a landing zone in the form of loop mating fastener added to the diaper. Ex. 1002 (Benning) [0055]. In the Benning diaper, “landing zone” is used to refer to the desired fastening location, not an additional material added for mating with a fastener. Ex. 1002 (Benning) [0030, [0055]. Benning states that “the material sections have closures which can be designed to grip mechanically or adhesively” and states the closures are “of a type which can act in concert in a releasably gripping or adhering fashion with a landing zone on the main part of the diaper.” Ex. 1002 (Benning) [0030]. Benning provides an example of such closures and landing zone by stating that “tapes 44 interact in a releasably adherent manner with an outside 46 of the front region 22 of the main body portion.” Ex. 1002 (Benning) ¶ [0055]. One of skill in the art would understand that the landing zone in Benning refers to the desired fastening location, which in the case of Benning’s diaper is the

front region of the main body, and does not refer to additional material added to mate with a fastener. As a result, there is no added miniloop element to remove from Benning.

B. The modified Benning diaper would not meet the retaining forces limitation and would not have retained the diaper on the wearer

171. In modifying the Benning diaper, Mr. Jezzi replaces the fluid impermeable underlayer 30 in Benning with backsheet 32 for the front and back portion Karami '626's T-shaped diaper, which was not designed to engage fasteners to secure the diaper on the wearer. The resulting modified diaper therefore has Benning's side flaps, which were not designed to engage fasteners to secure the diaper on the wearer, and Karami '626's backsheet 32, which was not designed to engage fasteners to secure the diaper on the wearer. Benning and Karami '626 therefore both teach that the modified diaper would not necessarily have sufficient retaining forces to secure the diaper on the wearer. The modified diaper would also not necessarily have lower retaining forces between the fasteners and the front of the diaper than the retaining forces between the fasteners and side part of the diaper.

1. The fluid impermeable underlayer in the modified Benning diaper would not be able to engage the fasteners to secure the diaper on the wearer

172. Mr. Jezzi asserts that once Benning's fluid impermeable underlayer 30 is modified, it would have a basis weight of 20 gsm, relying on paragraph

[0065] of Karami '626. Ex. 1012 (Jezzi) ¶ 119. Paragraph [0065] of Karami '626 states:

While the nonwoven is preferably a spunbond having a basis weight of 13-50 grams per square meter (gsm), slightly higher basis weights of 20-40 gsm (optimally 34 gsm) are preferred for use on the wings of a T-shaped brief, while relatively lower basis weights of 15-30 gsm (optimally 20 gsm) are preferred for the backsheet of the front and back portions.

173. In this paragraph, Karami '626 is referring to the T-shaped diaper. As I discuss above, in the T-shaped diaper, none of the fasteners engage the front portion. All of the fasteners engage the wings/belt. Ex. 1004 (Karami '626) [0037], [0038], [0041], [0049]. The backsheet 32 of the front and back portions of Karami '626's T-shaped diaper is not designed to engage fasteners to secure the diapers on the wearer. And one of ordinary skill in the art would understand that backsheet 32 of the front and back portions would not necessarily be able to engage fasteners to secure the diaper on the wearer. One of ordinary skill in the art also would not expect the backsheet 32 when used on the modified Benning diaper to be able to engage fasteners to secure the diaper on the wearer. That understanding is confirmed by Karami '772, which did not even consider testing an untreated 20 gsm nonwoven for use in any of its diaper embodiments. Ex. 1003 (Karami '772) [0041], Table 1. As I note above, one of ordinary skill in the art would understand

Karami '772 to teach that a 20 gsm nonwoven would have to be treated in order to engage a fastener sufficiently to secure a diaper on the wearer. As a result, one of ordinary skill in the art would understand that the modified Benning diaper with an untreated 20 gsm nonwoven for the underlayer at the front and back portion would not have sufficient retaining forces between the nonwoven and a fastener to secure the diaper on the wearer.

2. The side flaps in the modified Benning diaper would not be able to engage the fasteners to secure the diaper on the wearer

174. For the side flaps in the modified Benning diaper, Mr. Jezzi asserts they would be made of a nonwoven having a basis weight of 25-50 gsm, citing paragraph [0032] in Benning. As a result, Mr. Jezzi is retaining the existing Benning side flaps in his modified diaper. But the Benning side flaps were not designed to engage the fastener and retain the diaper on the wearer. Benning is designed to fasten a closure to the front region of the main body portion of the diaper. Ex. 1002 (Benning) [0003], [0030], [0055]. It does not teach or suggest fastening the closures to any other location and does not teach fastening the closure to the material sections attached to the main body portion also referred to as side flaps in Benning.

175. Benning also explains that the material sections or side flaps “are configured to breathe at least in sections, with microporosity, which allows an

exchange of air as well permeability for moisture in the form of vapor, being regarded as advantageous.” Ex. 1002 (Benning) [0032]. The side flaps are also wider than the belt of a T-shaped diaper. Ex. 1002 (Benning) [0028]. And Benning teaches that the side flaps should be less rigid than the main body portion and its backsheet should be skin-friendly. Ex. 1002 (Benning) [0033]. Benning thus makes it clear that the side flaps are designed for comfort, not for securing the diaper on the wearer and not for engaging fasteners to secure the diaper on the wearer. And Mr. Jezzi has not shown that the side flaps in Benning necessarily would have been able to engage the fasteners such that the diaper would have been secured on the wearer. And Mr. Jezzi has not shown that the side flaps in the modified Benning diaper necessarily would have been able to engage fasteners such that the diaper would have been secured on the wearer.

3. Using a higher basis weight nonwoven on the sides does not necessarily lead to higher retaining forces

176. Mr. Jezzi also argues that the retaining forces between a fastener and the side flaps would be higher than the retaining force between a fastener and the front portion in the modified Benning diaper. Specifically, Mr. Jezzi alleges that the modified Benning diaper “with heavier basis weight nonwovens used for side panels 34 than for underlayer 30’s nonwoven—would have included those in which the retaining forces between minihook closures 42 and the front side panels’ nonwovens are higher than the retaining forces between the closures and the

nonwoven of the underlayer.” Ex. 1012 (Jezzi) ¶ 121. As I discuss above, retaining forces between a nonwoven and a fastener are not determined by basis weight alone. As a result, even Mr. Jezzi’s modified diaper would not necessarily have had higher retaining forces between the closures and the side flaps than the retaining forces between the closures and the front part of the diaper and would not necessarily have had sufficient retaining forces to retain the diaper on the wearer.

177. In support of his argument about a higher basis weight nonwoven necessarily leading to higher retaining forces with a fastener than a lower basis weight nonwoven, Mr. Jezzi cites Gorman (Ex. 1040) at 2:35–39 and Gehring (Ex. 1044) at 5:3–7. Ex. 1012 (Jezzi) ¶ 120. Mr. Jezzi asserts that these references teach that “[b]ecause higher basis weight nonwovens have more fibers per unit area with which a mechanical fastener can interact, the retaining forces (e.g., peel and/or shear strength) between the fastener and such a nonwoven are higher than those between the fastener and a lower basis weight but otherwise similar nonwoven.” Ex. 1012 (Jezzi) ¶ 120. Gorman and Gehring, however, relate to loop fastener material that is intended to be cut to form landing zones that are added to other materials. Ex. 1040 (Gorman) 1:17–22; Ex. 1044 (Gehring) 1:11–15.

178. Gorman discloses sheets of loop material with a thermoplastic backing material that are cut into pieces to form loop portions for fasteners, which can be added to garments such as disposable diapers. Ex. 1040 (Gorman) 1:16–22,

1:49–2:2. This is the type of loop material that Karami '626 is trying to avoid.

Ex. 1003 (Karami '626) [0002]. Gorman even teaches that individual fibers could be up to 32 denier in size and the “sheet of fibers preferably has a higher basis weight in the range of 75 to 150” gsm, which greatly exceeds anything that Mr. Jezzi is suggesting for his modified diapers. Ex. 1040 (Gorman) 2:28–40. The material is not analogous to the nonwoven material that Mr. Jezzi suggests for underlayer 30 of Benning. The properties of the Gorman sheets of loops cannot be compared to the nonwoven suggested for Benning. Also, Gorman uses a backing to anchor the loops (Ex. 1040 1:61–2:2), which cannot compare to single layer nonwoven.

179. Mr. Jezzi quotes Gorman (Ex. 1040) at 2:35–39 as saying “the sheet of fibers preferably has a higher basis weight . . . so that more loops are available for engagement by the hook portion of the fastener.” Ex. 1012 (Jezzi) ¶ 120. The quoted portion, however, comes from the section in Gorman about using the fastener more than 10 times and up to 50,000 times. Ex. 1040 (Gorman) 2:27–40. One of ordinary skill in the art would understand that such a use would be for durable goods, not for disposable diapers. And while Gorman references a higher basis weight, it identifies it as 75-150 gsm (Ex. 1040 2:35–36), which is much higher than the 20 gsm and 30 gsm that Mr. Jezzi selected as the basis weight for the backsheets of the main part and side flaps of the modified Benning diaper (Ex.

1012 ¶ 119). Gorman also says that the “individual fibers could be up to 32 denier in size” (Ex. 1040 2:39–40), which means that the increased basis weight may largely be due to the size of the individual fibers for which a more a durable and heavier hook part would engage and not more fibers per area as Mr. Jezzi suggests (Ex. 1012 ¶ 120).

180. Gehring is also not comparable. Gehring discloses “providing a hook-and-loop fastener wherein the loop component is a knit fabric with said loops being formed by a monofilament yarn” and discloses more specifically that the loop component “includes a knit base fabric and pile of a plurality of loops extending erect away from one surface thereof, said loops being made of monofilament pile yarn.” Ex. 1044 (Gehring) 2:29–38. Knits are not nonwoven fibers. Knits are fabric and yarn loops and have very different fabric properties than nonwovens; for example, knits stretch more than nonwovens, which would have an impact on the peel and shear. Knits are also more expensive than nonwovens. Gehring does say that “because of the higher density of loops per unit area, more hooks and loops are engaged [than] in the prior art,” but it also explains that “the subject loop component . . . has a low weight.” Ex. 1044 (Gehring) 5:3–13. This further shows that weight is not determinative of retaining forces or even the number of fibers per unit area.

181. Mr. Jezzi does not allege and does not attempt to show that the retaining forces for the modified diaper would necessarily have been sufficient to secure the diaper on the wearer if secured on the side flaps or on the front portion. Ex. 1012 (Jezzi) ¶¶ 117–120. One of ordinary skill in the art would not understand the modified diaper to be sufficient to secure the diaper on the wearer, particularly since Mr. Jezzi has only identified basis weights for the nonwovens and because Mr. Jezzi has combined portions of two diapers that were not designed to secure the diaper on the wearer. Merely identifying the basis weight of the nonwoven is not enough to show that the nonwoven has been sufficiently engineered to engage a fastener to secure the diaper on the wearer. The claims of the Beckert patents require that the retaining forces between the closure and the front part of the diaper be sufficient to secure the diaper on the wearer and be lower than the retaining forces between the closures and side portions of the diaper. The modified Benning diaper does not do that.

C. It would not have been obvious to use a higher basis weight nonwoven on the wings in the modified Benning diaper

182. Mr. Jezzi argues that a person of ordinary skill in the art “would have been motivated to use a higher basis weight nonwoven for side panels 34 than for underlayer 30 for the reasons I discussed in Section VII.B.3.” Ex. 1012 (Jezzi) ¶ 117. Section VII.B.3, spanning paragraphs 90-96, and relates to the Karami ’772-Benning combination. Mr. Jezzi also argues that one of ordinary skill in the art

“would have understood that higher basis weights (e.g., around 30 gsm or higher) tended to promote strength—and thus were warranted for wings that often were subject to higher forces—while lower basis weights (e.g., around 20 gsm) tended to promote comfort and cost-savings and thus were warranted for backsheets that may not need to be as strong as the wings and, covering a larger portion of the diaper that receives exudates, have a larger impact on wearer comfort.” Ex. 1012 (Jezzi) ¶ 118. Benning, however, teaches that the side sections should be designed for comfort since the side sections are felt by the skin and should be experienced as pleasant by the wearer. Ex. 1002 (Benning) ¶ [0033]. Under Mr. Jezzi’s own reasoning, seeking a more comfortable side section would lead to a lower basis weight nonwoven at the side section.

183. Also, as I note above, Benning teaches that the material sections or side flaps should be “less rigid than the main body portion or the chassis-forming materials or the main part, such as in particular the backsheet.” As a result, one of ordinary skill in the art would not have wanted to use a backsheet for the main part of the diaper that had a lower basis weight than the side flaps since the side flaps would not be more flexible than the backsheet and main body portion. In addition, Benning teaches that the side flaps are wider than the belt in T-shaped diaper. Ex. 1002 (Benning) [0028]. As a result, because the side flaps in the modified Benning-Karami diaper would have more material than the belt in the Karami ’626

diaper, using a higher basis weight nonwoven would be even heavier than the wing/belt in Karami '626. The side flaps would be even less flexible and more uncomfortable, both of which would be contrary to what Benning seeks.

184. Mr. Jezzi also argues that Karami '626 suggests a “slightly” higher basis weight for the wings than the back sheet, citing paragraph [0065] of Karami '626. Ex. 1012 (Jezzi) ¶ 118. But as I have noted above, paragraph [0065] relates to the T-shaped diaper in Karami '626. And since Karami '662 limited the preference for “slightly” different basis weights to the T-shaped diaper, one of ordinary skill in the art would have understood that different basis weights were not preferred for other types of diapers. Also, in the T-shaped diaper, all of the fasteners engage the wings, not the backsheet of the front and back portions. Ex. 1004 (Karami '626) [0037]–[0041], [0048]–[0051]. As a result, if Mr. Jezzi seeks to modify Benning’s underlayer based on Karami '626 so that it can engage fasteners, it would have led one of ordinary skill in the art to use the higher basis weight nonwoven of the Karami '626 wings/belt, not the backsheet of the main part of the diaper that does not engage fasteners. Thus, Karami '626 would actually teach using a higher basis weight nonwoven on the underlayer since Benning seeks to have the closures engage the underlayer at the front of the diaper.

D. The claimed retaining force ranges would not have been obvious

185. Mr. Jezzi argues that it would have been obvious to use hook and nonwoven materials in the Benning-Karami '626 diaper that would have yielded the retaining forces claimed in the Beckert patents. Ex. 1012 (Jezzi) page 101 (heading 4), ¶¶ 123–131. Mr. Jezzi argues that the material and fasteners disclosed in the Beckert patents “would have been obvious options for use in the Benning-Karami '626 diaper and would have yielded the same or similar over-abdomen retaining forces within the ranges recited by the Diaper Patents.” Ex. 1012 (Jezzi) ¶ 123. Mr. Jezzi seems to suggest that since materials and fasteners similar to the material and fasteners disclosed in the Beckert patents were commercially available, the specific examples and retaining forces taught in the Beckert patents would have been obvious. Ex. 1012 (Jezzi) ¶¶ 123. It is particularly hard to follow Mr. Jezzi’s arguments in paragraphs 123-131 because he merely says that everything disclosed in the Beckert patents would have been “obvious options” (Ex. 1012 (Jezzi) ¶¶ 123, 124), “suitable, logical options” (¶ 125), “a logical option” (¶ 125), “logical selections” (¶ 126), and “obvious to use” (¶¶ 128, 130). He does not provide any reason for using the materials, fasteners, and embossing disclosed in the Beckert patents other than that the Beckert patent teaches them. Mr. Jezzi has not shown the particular combinations disclosed in the Beckert patents are taught anywhere in the prior art. In my view, Mr. Jezzi has not shown

the obviousness of the examples in the Beckert patents. To the contrary, Mr. Jezzi's recitation of all of the aspects of the Benning-Karami '626 diaper that would have to be changed to achieve the invention disclosed and claimed in the Beckert patents shows that the claims would not have been obvious.

186. The claims recite specific retaining force ranges, which I describe above in the section on the Karami '772 combinations. Mr. Jezzi states that "the Diaper Patents do not assign a particular rationale or significance to these ranges." Ex. 1012 (Jezzi) ¶ 98. I disagree. The Beckert patents teach that the claimed retaining force ranges achieved the surprising result of leading the users of the diaper to fasten the diaper correctly while still securing the diaper when it is fastened, even if it is not fastened in the preferred manner. '788 patent, 2:9–37. The Beckert patents further explain that this also "increases the wearing comfort of the diaper" and reduces "the risk of damage to the backsheet of the main part and therefore the risk of liquid passing through the mechanical closure aids is reduced." '788 patent, 2:20–27.

187. Mr. Jezzi picks and choose values and properties in the prior art related to the Beckert patents, but he does not show that the prior art teaches the specific combinations that the Beckert patents teach. In my view, the combinations taught by the Beckert patents to achieve the claimed retaining forces are not

obvious and would not have been obvious to person of ordinary skill in the art as of 2006.

E. Stupperich

188. Mr. Jezzi also discusses a reference called Stupperich (Ex. 1009), which I understand refers to German Patent Application No. DE 10 2004 053 469.1. Ex. 1012 (Jezzi) ¶¶ 132-141. Mr. Jezzi proposes using Stupperich's bonded nonwoven in the Benning-Karami '626 combination by using 30 gsm nonwoven example in Stupperich for the backsheet of the main body part of the diaper and the 45 gsm nonwoven example in Stupperich for the side parts. Ex. 1002 (Jezzi) ¶¶ 138-139. Mr. Jezzi again asserts "it would have been obvious to use a higher basis weight nonwoven for the Benning-Karami '626 diaper's side flaps than for its backsheet" and argues that "a POSITA would have done the same when using Stupperich's nonwovens in those components." Ex. 1012 (Jezzi) ¶ 138. I disagree.

189. Stupperich is directed to a loop forming nonwoven material suitable for diapers. Ex. 1009 (Stupperich) [0001]. Stupperich seeks to achieve a looped surface that will "not unintentionally loosen" by forming a fabric with "first larger nonbonded areas [that] are delimited by bonded contours and are surrounded outside of the limitation by second smaller nonbonded areas and are spaced from one another by the second smaller nonbonded areas." Ex. 1009 (Stupperich) [0002], [0008]. According to Stupperich, these larger nonbonded areas "make it

possible to create an anchored area” for engaging with hooks. Ex. 1009 (Stupperich) [0016]. Stupperich states that the bonded areas may be formed by “thermo embossing, in particular by calender embossing or ultrasonic welding.” Ex. 1009 (Stupperich) [0020].

190. Stupperich describes using the disclosed nonwoven as a loop mechanical closure element and, in particular, on the belt of a “disposable belt diaper” or T-shaped diaper. Ex. 1009 (Stupperich) [0056], [0058]. In the described diaper, a “one-piece material section 8, which forms a hip belt 10 of the belt diaper, is attached to the main part 4.” Ex. 1009 (Stupperich) [0056]. It includes a mechanical closure element on the belt section referred to as flap 26 and mechanical closure elements on the main part 4 of the diaper referred to as flaps 29. Ex. 1009 (Stupperich) [0058], [0059]. The belt-diaper disclosed in Stupperich is donned the same way as other T-shaped diapers. The user closes the hip belt on itself using flap 26 to form a belt and then brings the main part forward between their legs to detachably fix the main part of the diaper “to the hip belt 10 by means of flaps 29.” Ex. 1009 (Stupperich) [0059]. This embodiment does not teach fastening closure elements to the main part of the diaper at the front, and it does not teach differing retaining forces. Instead, Stupperich focuses on using the disclosed loop forming nonwoven 28 in the material section that forms the belt

(shown below in orange) because this is the fastener engaging surface. Ex. 1009 (Stupperich) [0058], Fig. 1.

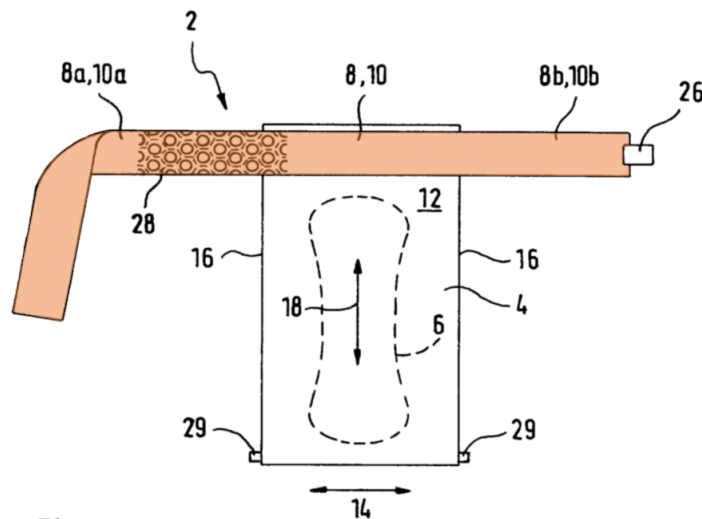


Fig. 1

191. Stupperich discloses one embodiment where the “nonwoven material 28 consists of a nonwoven laminate 30.” Ex. 1009 (Stupperich) [0059]. “It has a polypropylene spunbonded material layer 32 consisting of fibers of a fiber thickness of 2.2 dtex with a surface weight of 30 g/m₂ as carrier, which has been pre-consolidated by oval bonding points 34 with a density of 48.37 units/cm₂ (thermo embossing points), the dimensions of the semi-axes of the oval bonding points being 0.85 mm and 0.59 mm respectively and the pressing area of the oval bonding points corresponding being 0.394 mm² and the proportion of bonding points in the total area thus being 19.0%.” Ex. 1009 (Stupperich) [0060]. Stupperich further says that “depth of the bonding points is 0.80 mm” and that a “card web layer 36 is added to this spunbonded material 32 by hot calender

embossing.” Ex. 1009 (Stupperich) [0060]. And “the card web consists of hydrophilized polypropylene fibers with a thickness of 4.4 dtex and fiber length of 40 mm” and has embossing pattern 38. Ex. 1009 (Stupperich) [0060].

192. Stupperich discloses another embodiment where “the surface weight of the spunbonded fabric was increased to 45 g/m²” and the “embossed pattern 38 connecting the nonwovens was modified.” Ex. 1009 (Stupperich) [0067].

Stupperich discloses how the embossed pattern was modified. Ex. 1009 (Stupperich) [0067]. Stupperich does not teach or suggest using these two nonwoven examples in the same diaper. Stupperich describes them as different embodiments, which one of ordinary skill in the art would understand to mean that they are alternatives that could be used. One of ordinary skill in the art would understand Stupperich to be teaching using one example or the other on a diaper to engage fasteners. As a result, I disagree with Mr. Jezzi that one of ordinary skill in the art would look at Stupperich as suggesting using different basis weight nonwovens in the same diaper or that one of ordinary skill in the art would look to use both embodiments disclosed in Stupperich in the Benning-Karami ’626 diaper.

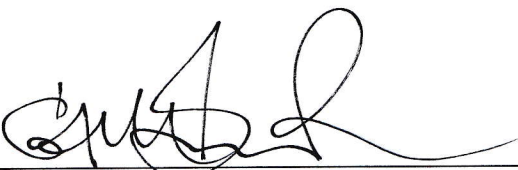
193. Also, as I discuss above, I disagree with Mr. Jezzi that one of ordinary skill in the art would have sought to use a higher basis weight nonwoven in the side flaps of the Benning-Karami ’626 diaper than the underlayer of the main part of the diaper. I also disagree that one of ordinary skill in the art would

have had any reason to use the 45 gsm fabric embodiment from Stupperich as the side flaps and at the same time use the 30 gsm fabric embodiment from Stupperich as the underlayer in the Benning-Karami '626 diaper. Benning teaches that the material sections or side flaps should preferably be “less rigid than the main body portion or the chassis-forming materials of the main part, such as in particular the backsheet or a laminate of the main part consisting of the backsheet and topsheet.” Ex. 1002 (Benning) [0033]. Stupperich teaches that the example using the 45 gsm spunbonded fabric is stiffer (0.28 N) than the example using the 30 gsm spunbonded fabric (0.13 N). Ex. 1009 (Stupperich) [00660], [0069]. As a result, if the 45 gsm spunbonded fabric example in Stupperich were used on the wings and the 30 gsm spunbonded fabric example was used for the underlayer, the side flaps would be *more* rigid than the underlayer. This would be contrary to Benning. Also, in my opinion, there would have been no reason to use the higher basis weight nonwoven embodiment from Stupperich in the Benning-Karami '626 diaper since Benning implements wider side flaps than either Karami '626 or Stupperich does in the wings that form the belt. Ex. 1002 (Benning) [0028]. Using a higher basis weight nonwoven there would make the side flaps less flexible, which would be contrary to Benning, and would be heavier and more expensive than a lower basis weight nonwoven as Mr. Jezzi acknowledges.

194. As I noted, I disagree that one of ordinary skill in the art would use both the Stupperich 45 gsm example and the 30 gsm example in the Benning-Karami '626. But if they did, one of ordinary skill in the art would use the 30 gsm example for the side flaps and the 45 gsm example for the underlayer since that would achieve side flaps that are more flexible than the underlayer as taught by Benning. According to Mr. Jezzi, this would result in higher retaining forces between the closures and the front of the diaper than between the closures and the side flaps.

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Dated: June 2, 2021

Signed: 
G.A.M (Tony) Butterworth

Appendix A

Case	Paper No.	Description
IPR2020-01477	12	Corrected Petition for <i>Inter Partes</i> Review
IPR2020-01477	6	Patent Owner's Preliminary Response
IPR2020-01477	13	Decision Granting Institution of <i>Inter Partes</i> Review
IPR2020-01478	12	Corrected Petition for <i>Inter Partes</i> Review
IPR2020-01478	6	Patent Owner's Preliminary Response
IPR2020-01478	13	Decision Granting Institution of <i>Inter Partes</i> Review
IPR2020-01479	12	Corrected Petition for <i>Inter Partes</i> Review
IPR2020-01479	6	Patent Owner's Preliminary Response
IPR2020-01479	13	Decision Granting Institution of <i>Inter Partes</i> Review
IPR2020-01480	12	Corrected Petition for <i>Inter Partes</i> Review
IPR2020-01480	6	Patent Owner's Preliminary Response
IPR2020-01480	13	Decision Granting Institution of <i>Inter Partes</i> Review
Case	Exhibit	Description
IPR2020-01477	1001	U.S. Patent No. 8,152,788 (the '788 patent)
IPR2020-01478	1001	U.S. Patent No. 8,784,398 (the '398 patent)
IPR2020-01479	1001	U.S. Patent No. 8,771,249 (the '249 patent)
IPR2020-01480	1001	U.S. Patent No. 8,708,990 (the '990 patent)
Shared Exhibit	1002	U.S. Patent App. Pub. No. 2005/0256496 (Benning)
Shared Exhibit	1003	U.S. Patent App. Pub. No. 2006/0058772 (Karami '772)
Shared Exhibit	1004	U.S. Patent App. Pub. No. 2003/0220626 (Karami '626)
Shared Exhibit	1005	U.S. Patent App. Pub. No. 2004/0016499 (Miyamoto '499)
Shared Exhibit	1006	U.S. Patent No. 6,547,773 (Kleinschmidt)
Shared Exhibit	1007	U.S. Patent No. 5,814,178 (Jacobs)
Shared Exhibit	1008	U.S. Patent No. 6,605,172 (Anderson)
Shared Exhibit	1009	Certified Translation of German Patent Application DE 10 2004 053 469 A1, Certificate of Translation, and Original German-Language Document (Stupperich)
Shared Exhibit	1010	WO Patent Pub. No. 2006/099000 (Mandzu)

Shared Exhibit	1011	U.S. Patent No. 6,255,236 (Cree)
Shared Exhibit	1012	Declaration of Arrigo “Rick” Jezzi (Jezzi Declaration)
Shared Exhibit	1013	Davis Dyer, <i>Seven Decades of Disposable Diapers: A Record of Continuous Innovation and Expanding Benefit</i> (EDANA, Aug. 2005)
Shared Exhibit	1014	USA Volume 2 Huggies
Shared Exhibit	1015	U.S. Patent No. 6,514,233 (Glaug)
Shared Exhibit	1016	U.S. Patent App. Pub. No. 2006/0282053 (Rohrl)
Shared Exhibit	1017	U.S. Patent App. Pub. No. 2001/0023341 (Karami ’341)
Shared Exhibit	1018	U.S. Patent No. 5,549,592 (Fries)
Shared Exhibit	1019	U.S. Patent No. 5,695,868 (McCormack)
Shared Exhibit	1020	U.S. Patent App. Pub. No. 2004/0158957 (Horn)
Shared Exhibit	1021	INDA Nonwovens Glossary (INDA 2002)
Shared Exhibit	1022	U.S. Patent No. 5,626,571 (Young)
Shared Exhibit	1023	U.S. Patent No. 6,852,904 (Sun)
Shared Exhibit	1024	U.S. Patent No. 5,053,028 (Zoia)
Shared Exhibit	1025	WO Patent Pub. No. 2006/071211 (Braverman)
Shared Exhibit	1026	U.S. Patent App. Pub. No. 2007/0134489 (Neugebauer)
Shared Exhibit	1027	U.S. Patent App. Pub. No. 2004/0236303 (Igaue)
Shared Exhibit	1028	U.S. Patent App. Pub. No. 2005/0261650 (Damaghi)
Shared Exhibit	1029	U.S. Patent No. 6,235,011 (O’Connell)
Shared Exhibit	1030	U.S. Patent App. Pub. No. 2001/0042584 (Karami ’584)
Shared Exhibit	1031	U.S. Patent No. 5,845,375 (Miller)
Shared Exhibit	1034	ASTM D5169-98 (1998)
Shared Exhibit	1035	ASTM D5170-98 (1998)
Shared Exhibit	1036	U.S. Patent 6,840,930 (Miyamoto ’930)
Shared Exhibit	1037	U.S. Patent App. Pub. No. 2002/0174931 (Couillard)
Shared Exhibit	1039	U.S. Patent No. 6,843,949 (Brady)
Shared Exhibit	1040	U.S. Patent No. 5,256,231 (Gorman)
Shared Exhibit	1041	U.S. Patent No. 6,569,136 (Tao)

Shared Exhibit	1042	U.S. Patent App. Pub. No. 2004/0224132 (Roe)
Shared Exhibit	1044	U.S. Patent No. 6,854,297 (Gehring)
Shared Exhibit	1045	U.S. Patent App. Pub. No. 2002/0193776 (Fernfors)
Shared Exhibit	1046	EP0734243B1 (Huang)
Shared Exhibit	1047	<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)
Shared Exhibit	1048	U.S. Patent App. Pub. No. 2004/0137200 (Chhabra)
Shared Exhibit	1049	U.S. Patent No. 6,537,644 (Kauschke)
Shared Exhibit	2003	Jezzi Deposition Transcript

Appendix B

G.A.M. (TONY) BUTTERWORTH
555, Carolina Meadows Villa, Hawthorne Drive,
Chapel Hill, North Carolina
Telephone: 919-933-9444
Email: Expertfiberman@gmail.com

QUALIFICATIONS SUMMARY

An established record of successful accomplishments:

- Developing fiber-based materials supporting timely introductions of new products
- Providing technical expertise to suppliers, plants and manufacturers in creating, upgrading and launching products internationally
- Managing cost effective specifications, purchasing strategies, fiber development and supplier compliance for raw materials
- Expert witness with 32 authored/co-authored patents, frequent conference presentations and 35 technical publications

PROFESSIONAL EXPERIENCE

Procter & Gamble, Cincinnati, OH

1996 - 2001

Principal Scientist

- Contracted external expertise supporting short and longer-term product development needs
- Managed fiber development and absorbent materials strategy
- Surveyed fiber-based technologies seeking cost and feature opportunities

Tambrands Inc. (formerly Tampax Inc.), Palmer, MA

1982 - 1996

Vice President and Corporate Officer, Advanced Technology

1994 - 1996

- Sourced, assessed, and developed materials and technologies to reduce costs, and improve the design and product features of tampons
- Managed R&D contribution to margin improvement, which resulted in a \$3.8M improvement in 1995 and a \$5.3M improvement in 1996
- Analyzed value of various products and processes
- Trained employees, and raised internal awareness of materials, technologies and products

Vice President, Material Technology

1993 - 1994

- Developed materials and supplier R&D relationships for product and process initiatives
- Reengineered R&D supply chain resulting in \$8M in savings, reduced documentation by 40% and supplier base by 20%, and an R&D savings of \$2M

- Negotiated supplier certificate of compliance against specifications, reduced inventory and testing and allowed shipment to stock

Vice President, Fibers and Absorbents **1991 - 1993**

- Managed \$40M cotton and rayon sourcing and purchasing, commissioned scouring and bleaching, and negotiated supply, exclusivity and joint development agreements with suppliers
- Directed blend development and product upgrades
- Documented fiber processing and managed raw materials specification

Director, International Product Development **1986 - 1991**

- Designed products, and specified materials and equipment requirements to meet business expectations for diaper, pad, panty shield and tampon start-ups in China, Russia, Ukraine, Mexico, Brazil, Turkey and Israel

Director, Product Development **1982 - 1986**

- Established R&D facilities, programs, and functions
- Developed continuous upgrades for Maxithins folded and wrapped pads resulting in an 11% market share
- Developed Tampax® plastic applicator and compact tampons

American Hospital Supply, Evanston, IL **1979 - 1982**

Director of Product Development

- Established R&D facilities, programs and functions
- Directed development of drape fabrics, burn dressings, surgical facemasks, and clean room apparel

Johnson & Johnson, Chicago, IL **1972 – 1979**

Manager, R&D

- Managed development efforts on non-woven top sheets (used in diaper and Carefree® panty shields), baby wipes (used in Johnson's baby wash cloth), high speed web formers and stabilized absorbents
- Organized fiber and absorbent technology programs across company divisions

Fabric Research Laboratories, Dedham, MA **1960 - 1972**

Project Scientist through to Vice President - Contract Research & Development

- Directed applied research in materials science for medical, consumer, industrial, nonwovens and upstream technologies

EDUCATION

- M.Sc: Fibers and Polymers, Massachusetts Institute of Technology, Cambridge, MA, 1961
- B.Sc. (Hons.) Fibers/Polymers/Textiles, University of Manchester Institute of Science and Technology, UK, 1958

PROFESSIONAL ACTIVITIES

- Fellow and Chartered Textile Technologist of The Textile Institute
- Past president and recipient of Fiber Society Distinguished Achievement Award, The Fiber Society
- Past Chairman, Executive Committee, Board of Trustees of Textile Research Institute
- Past Member, Mayor of Chicago Science Advisory Board

PUBLICATIONS AND PRESENTATIONS

“The Mechanics of Heat Transfer in Fibrous Assemblages” M.I.T. Thesis submitted as part of the M.Sc. Program, January 1961.

“Development of a Nuclear Radiation Face Mask Protection System” Quartermaster Research and Development Command, U.S. Army, July 1962.

“Tensile Properties of Textile Structures” Textile Mercury International, November 1963.

“Torsional Recovery of Filaments and Singles Yarns and Plied Yarn Balance” Textile Research Journal Volume 36 No. 1, 1966.

“Redesign of Nuclear Radiation Face Mask Protection System” Quartermaster Research and Development Command, U.S. Army, July 1965.

“Mechanical Testing of Polymeric Fibrous Materials” ASTM Fiber Evaluation Symposium, Philadelphia, October 1965.

“Mechanical testing of Polymeric Fibrous Materials” ASTM Journal of Materials, Volume 2, September 1967.

“The Response of Nylon Tire Cord in Rubber Systems to Cyclical Strain” Fiber Society Meeting, Princeton, October 1967.

“Prediction of Stretch Woven Fabric Properties from False Twisted Textured Filament Yarn Properties” Textile Research Institute 37th Annual Meeting, New York, April 1967.

“The Dependence of Fabric Stretch Upon Yarn Shrinkage and Stretch properties” Textile Research Journal, Volume 38, August 1968.

“A Study of the Mechanical Behavior of Spider Silks” Report to U.S. Army Research Laboratories, September 1968.

“The Manufacture of Non Woven Fabrics” 23rd Plastics – Paper Conference, TAPPI , Philadelphia, September 1968.

“Phenomenological Research on Failure Mechanisms of Cord Reinforced Rubber Systems” U.S. Department of Transportation, October 1968.

“Opportunities for Limited Use Garments” Second Annual Apparel Research Conference, Washington D.C., October 1968.

“The Engineering and Manufacturing of Textile Substitutes “ Western Michigan Pulp and Paper Conference, January 1969.

“Research: Wet or Dry Lay for Disposables” Pulp and Paper, January 1969.

“Properties and Functions of Additives in Worsted Processing” Textile Research Institute 39th Annual Conference, New York, April 1969.

“Tire Cord Deformation and Failure Phenomena” American Institute of Chemical Engineers, Williamsburg, V.A., April 1969.

“Weaving Non Woven Research/Markets into Perspective” Paper Film and Foil Converter, June 1969.

“How Non Wovens are Made: Review of Wet and Dry Processes” Pulp and Paper International, August 1969.

“Textile Testing” Kirk-Othmer Encyclopedia of Chemical Technology, 2nd Edition, Volume 20, 1969.

“Non Wovens Technomic Program: The Mechanical Properties of Fibrous Materials and Products” New York, September 1969.

“Failure Phenomena in Tire Reinforcing Systems” American Chemical Society, Akron, January 1970.

“Durable Press Performance of Fabrics Prepared from Blends of Cotton and Resin Sensitized Cotton” Tenth Cotton Utilization Research Conference, U.S. Department of Agriculture, New Orleans, April 1970.

“Einfluss der Mechanischen Eigenschaften des Bindern auf das Textile Verhalten von Vliesstoffen” Textil Veredlung, Volume 5, 1970.

“Filter Fabric Selection and Design” Fabric Filter Symposium, Environmental Protection Agency, Charleston, March 1971.

“Development and Properties of New Fibrous Sheet Structures” Disposables and Non Wovens, July 1971.

“Durable Press Cotton Fabrics” Eleventh Cotton Utilization Conference, U.S. Department of Agriculture, New Orleans, May 1971.

“Failure Mechanisms in Cord Reinforced Rubber Systems” Federal Highway Administration, National Technical Information Service, May 1971.

“Dispersion Bonding of Fibers with Particular Reference to The Manufacture of Bonded Non Wovens” Verein Textil Chemiker und Coloristen Baden, Germany, June 1971.

“Bonding of Non Wovens” 26th Annual Plastics and Paper Conference, Technical Association of the Pulp and Paper Industry, Chicago, September 1971.

“New Fabrics” American Association of Textile Chemists and Colorists, Golden Jubilee Conference, Boston, October 1971.

“Characterization of the Mechanics of Human Aortic and Mitral Valve Leaflets”. American College of Surgeons Conference Atlantic City, October 1971. Published in Surgical Forum XX11, 134, 1971.

“The Influence of Non Woven Material Properties upon Garment Assembly Techniques” International Disposables Conference, Philadelphia, October 1971.

“A Complete Characterization of the Mechanics of Human Aortic and Mitral Valve Leaflets” Annual Meeting, Association for the Advancement of Medical Instrumentation, Las Vegas, April 1972. Published in Circulation Supplement 11, 1971.

“Fabric Research in the 70’s” American Association of Textile Chemists and Colorists, Tenth Annual Conference, Gatlinburg, May 1972.

“Practical and Theoretical Property Requirements for Fibrous Materials used for Reinforcing Non Wovens and Paper” International Union of Pure and Applied Chemistry, Helsinki, Finland, June 1972.

“Dispersionsbinder und Faser –ein Beitrag zur Vleisverfestigung” Melliand Textilberichte, Vol. 6, 1972.

“New Fabrics and New Fabric Developments” Textile Chemists and Colorists, August 1972.

“Tire Cords” Symposium on Failure in Use of Cord reinforcements, Manchester Institute of Science and Technology, England, 1973.

“Characteristic Properties of Human Aortic and Mitral Valve Prostheses” 32nd Annual Conference of the Society of Plastics Engineers, Vol. 20 p. 734, 1974.

“Man Made Fibers in Non Woven Fabrics” National Symposium on Fiber Frontiers, Carnegie Institute, Washington, D.C., June 1974.

“Elemental Failure in Repetitively Deformed Fibrous Materials” Fiber Society Symposium on the Mechanics of Fibrous Materials, Atlanta, May 1975.

“Forming of Low Density Non Woven Fabrics: Technology and Directions” Insight Conference. Atlanta, November 1979.

Contributor to Harvard Business School Case Study-Tampax-Femtech Soviet Joint Commercial Venture To Manufacture and Sell Tampax Tampons in the Ukraine, March 1990.

“Universal Tampon Analyzer” Procter & Gamble Supplier Conference, July 1998.

“Product features Influenced by Fiber Entanglement” Insight Absorbent Products Conference, Orlando, October 2001.

“Airlaid Structures, Fabrics and Absorbents: A Review of the Early Patents” Nonwovens Technical Conference, Ottawa, Canada, May 2002.

“Design and Manufacture of Shaped Products from Fiber and Pulp” International Non Wovens and Disposables Association, TAPPI Conference, Atlanta, September 2002.

“Wipes: Process versus Entanglement Properties” Non Wovens World, October-November 2002 Vol. 11, No. 5, p. 56-67.

“Observations on Nonwoven Wipes and the Influence of Component Fiber Organisation” December 2002.

“Nonwovens in the Third Dimension: Drape, Shape, Contour and Conformity in Designing Products” Insight International Conference, Nashville, October 2003.

“Spunlace: Present Markets, Future Needs and Technology Challenges” Nonwovens World, October-November 2004.

“Evaluation of a Novel Low Cost Vaginal Drug Delivery Device” International Partnership for Microbiocides, July 2007. Cooperative Agreement Number: GPO-A-00-05-00041-00 Under Contract with Family Health International, Durham, NC, USA

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