

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LULULEMON USA INC.,

Petitioner,

v.

NIKE, INC.,

Patent Owner.

Case IPR2023-01460

Patent No. 9,730,484

PATENT OWNER'S RESPONSE UNDER 37 C.F.R. § 42.120

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EXHIBITS

Exhibit No.	Description
2001	File History of U.S. Patent No. 9,730,484 (Excerpted)
2002	Declaration of Dr. Christopher M. Pastore dated January 3, 2024
2003	Declaration of Dr. Christopher M. Pastore dated June 18, 2024
2004	Spencer, <i>Knitting Technology</i> (2001) (Excerpted)
2005	06-07-2024 Deposition Transcript of Dr. David S. Brookstein

I. INTRODUCTION

Patent Owner Nike, Inc. (“Nike”) submits this Patent Owner Response to lululemon usa, inc.’s (“lululemon’s”) Petition challenging the patentability of claims 1–19 (the “Challenged Claims”) of U.S. Patent No. 9,730,484 (Ex. 1001, “the ’484 patent”). lululemon has not carried its burden of proving that any Challenged Claim is unpatentable.

The ’484 patent relates to a footwear upper including a knitted element that “can be formed directly in desired three dimensional shapes” through a flat knitting process. Ex. 1001 at 4:55–56, 7:56–57. Each independent claim of the ’484 patent—claims 1, 10, and 11—recites an upper that includes a “domed, three-dimensional structure.”

lululemon raises four grounds of invalidity against the Challenged Claims. But two of those grounds—Grounds 1 and 2—were rendered irrelevant when the Board adopted the parties’ undisputed claim construction.

In the Institution Decision, the Board adopted the parties’ construction that the “domed, three-dimensional structure” is formed *during* the flat-knitting process, not afterward. Institution Decision at 6. Grounds 1 and 2, by lululemon’s own admission, present prior art combinations teaching a “domed, three-dimensional structure” formed only *after* knitting. Petition at 13–14. In other words, there is no dispute that the prior art combinations of Grounds 1 and 2 fail to teach the claimed

invention, as properly construed. *Id.*; POPR at 9–10; Institution Decision at 11 (noting that the Board “need not address [Grounds 1 and 2] further.”).

Only Grounds 3 and 4 remain in this proceeding. Ground 3 is based on a combination of U.S. Patent Application Publication No. 2005/0193592 (“Dua”; Ex. 1004) in view of a 1994 journal article to Hong et al. (“Hong”; Ex. 1005) and U.S. Patent No. 3,641,603 (“Lockwood”; Ex. 1003). Ground 4 adds U.S. Patent Application Publication No. 2006/0053658 (“Voughlohn”; Ex. 1006) to the combination of Ground 3. But—for at least three reasons—Grounds 3 and 4 also fail to teach or suggest the claimed inventions. First, lululemon relies on Hong as teaching a “domed, three-dimensional structure” formed *during* a flat-knitting process. But the Hong reference only discloses a process for knitting two-dimensional patterns that are later assembled into three-dimensional structures through post-knitting processes. This single deficiency undermines all of lululemon’s invalidity contentions in Grounds 3 and 4 with respect to every Challenged Claim. Second, Hong does not teach or suggest forming a partly flat and partly three-dimensional structure as recited in independent claims 1 and 11. Third, lululemon fails to show that the combinations of Grounds 3 and 4 teach the “loop” limitations of claims 2–4, 10, and 18–19.

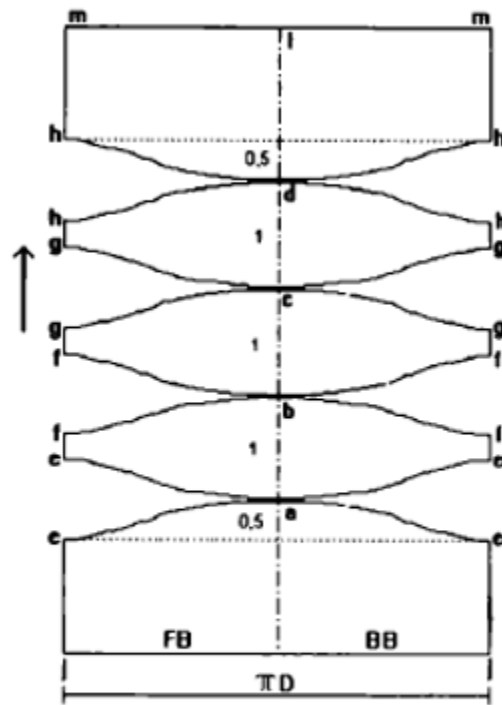
For at least these reasons, lululemon has not carried its burden of proving by a preponderance of the evidence that any claim of the ’484 patent is unpatentable.

II. BACKGROUND

A. Knitting Technology

Machine-based knitting involves the production of textiles by mechanically manipulating a yarn (or yarns) into a series of intermeshed loops. Ex. 2003 at ¶22. Knitting machines were paired with computer systems beginning in the 1970's and advanced significantly over the next several decades. *Id.*

Traditional knitting machines yielded a rectangular sheet of knitted material. Individual textile elements could be cut from these rectangular sheets, similar to the way cookie-cutters cut shapes from a broader rectangle of dough. Ex. 2003 at ¶23. The cut-outs are then sewn together to form garments. *See id.*; Ex. 2005 at 15:24–16:3. This method is often referred to as “cut-and-sew” knitting. *See id.* More modern knitting machines—e.g., the Shima Seiki SES—are capable of “knitting-to-shape.” *See id.*; Ex. 2005 at 14:23–15:14. Machines capable of knitting-to-shape can knit specifically-shaped textile elements of varying widths, eliminating the need to cut the element from a larger piece of material. *See id.* at ¶¶23–24. These knit-to-shape garments are called “fully fashioned garments.” *Id.*; Ex. 2005 at 15:5–14. An example of a pattern that can be knit-to-shape is shown below.



(2) 2D Pattern

Fig.4 - Tubular form with circular cross-section

Exhibit 1005 at 4. Knit-to-shape methods reduce waste and eliminate post-processing manufacturing steps (e.g., cutting). *Id.* at 2; Ex. 2003 at ¶24. Knitting-to-shape on computer-aided machines was a developing technology in the mid-1990's. Ex. 2003 at ¶24.

B. '484 patent

The '484 patent is directed to a footwear upper including “a knitted element formed from at least one mechanically manipulated yarn.” *See e.g.*, Ex. 1001 at 3:10–13. The knitted element is “produced through a flat knitting process.” *Id.* at 4:28–31. The '484 patent describes that the “[f]lat knitted element[] can be formed

directly in three dimensional shapes.” *Id.* at 4:55–56; *see also id.* at 7:56–57 (“the flat knitting process may be utilized to form generally three-dimensional structures”). This can be achieved by, for example, “selectively placing multiple different yarns and/or stitch patterns at multiple different locations in the overall structure during the knitting process.” *Id.* at 4:60–5:1. The ability to knit “directly in three dimensional shapes” helps avoid the need for “additional support structures in the overall footwear construction”—saving time, reducing costs, increasing flexibility, and eliminating seams and sewing. *Id.* at 4:56–60.

Figure 10A of the ’484 patent, which is reproduced below, shows an example embodiment of an upper having a knitted element with a “three-dimensional structure formed through a flat knitting process.” Ex. 1001 at 10:18–20.

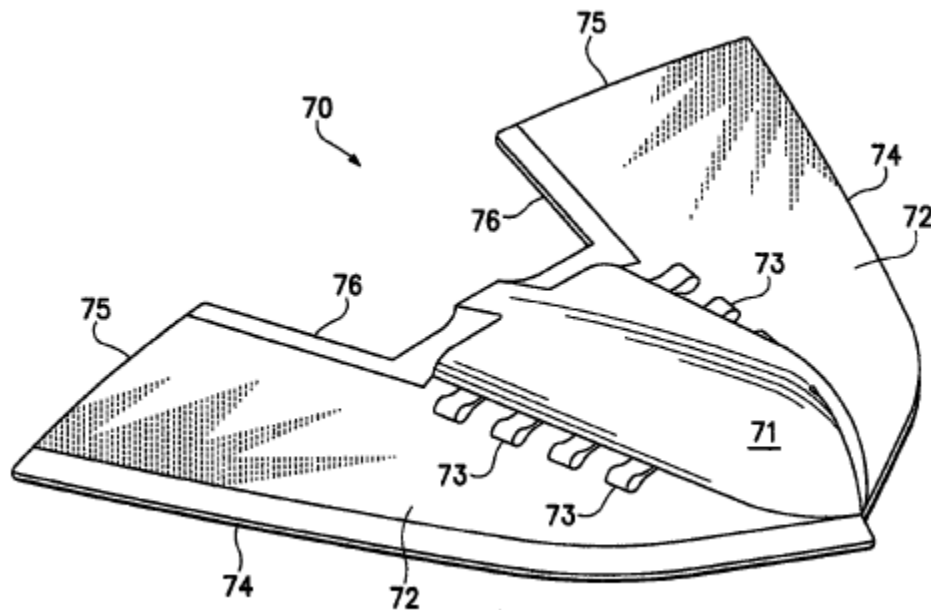
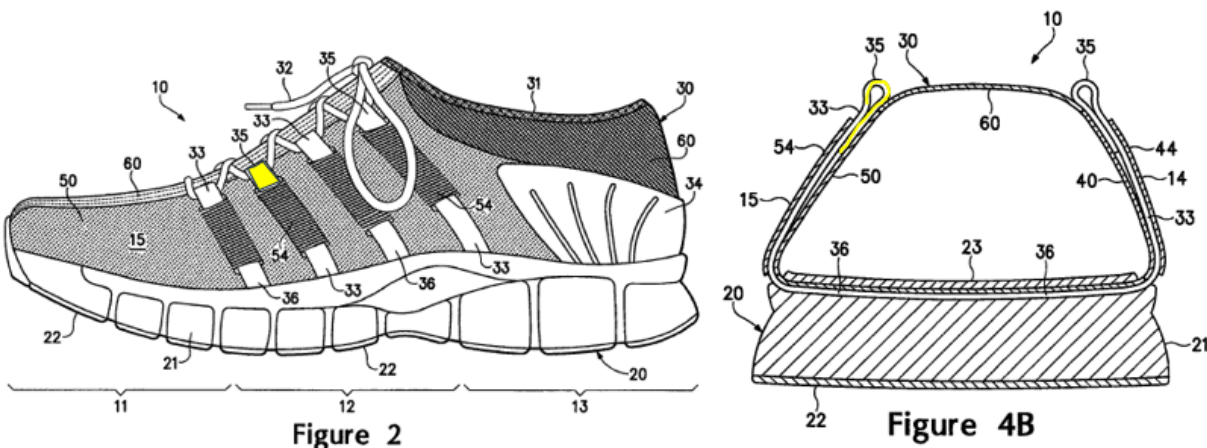


Figure 10A

Upper 70 includes “a central portion 71” and “a pair of side portions 72.” *Id.* at 10:20–21. When assembled into an article of footwear, “central portion 71 extends over the foot, and side portions 72 wrap under the foot.” *Id.* at 10:23–25. The “side portions 72 are relatively flat,” while “central portion 71 has a domed shape formed through the flat knitting process.” *Id.* at 10:34–36.

The '484 patent specification further discloses certain “loops” in the footwear upper, which are formed through the flat knitting process. *See* Ex. 1001 at 5:66–6:1, 10:1–5, 10:18–21. For example, Figure 10A depicts “lace loops 73.” The loops are knitted as a “second layer” of unitary construction with the “first layer” of the upper. *See, e.g., id.* at 3:12–18. One such loop is highlighted in Figures 2 and 4B below.



C. Relevant File History

During prosecution of the '484 patent, the Examiner considered two references now asserted by lululemon. First, the Examiner issued a non-final rejection of claims 1–20 of the '484 patent based on Dua—the primary reference

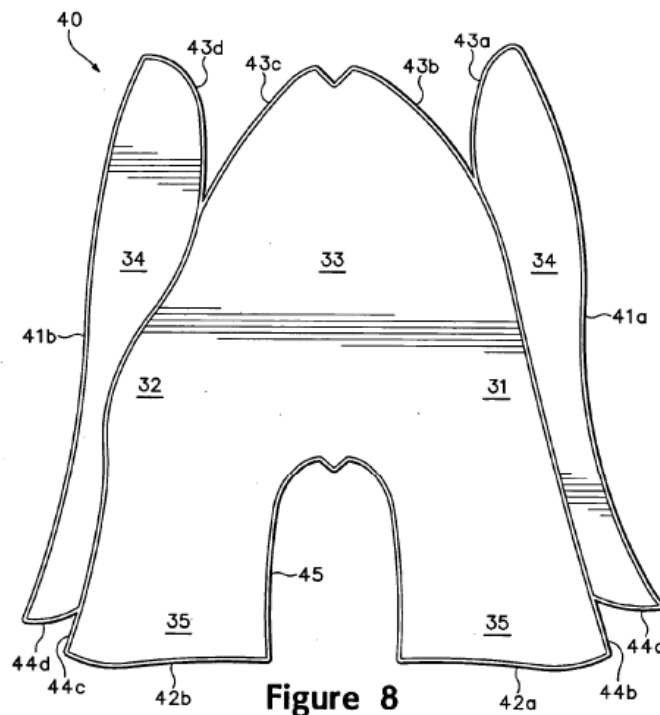
that lululemon asserts in all four grounds of its Petition. Ex. 2001 at 7–11 [8/2/2016 Non-Final Rejection, 2–6] (rejecting claims 1, 5–9, and 12–18 over Dua and rejecting claims 2–4, 10, 11, 19, and 20 over Dua in view of U.S. Patent No. 6,366,168 to Hatfield). In response, Nike amended independent claims 1 and 12 (now claim 11) to add “the domed three-dimensional structure shaped to extend above the plane of the first side portion and the second side portion when the flat-knitted element is in a flattened configuration.” *Id.* at 33, 35 [1/30/2017 Amendment, 2, 4]. Nike further amended independent claim 10 to add that the “central portion” has “a domed, three-dimensional structure configured for extending over the top of a foot.” *Id.* at 34 [1/30/2017 Amendment, 3]. In view of those amendments, the Examiner allowed the claims over Dua. *Id.* at 45 [6/5/2017 Notice of Allowability]. Second, Nike identified in its Information Disclosure Statement the Norton reference that lululemon asserts in Ground 2. *Id.* at 20 [3/13/2014 IDS, U.S. Patents Item No. 72]. The Examiner considered Norton and allowed the claims over Norton. *See id.*

D. Alleged Prior Art References

1. Dua

Dua is a patent application publication assigned to Nike. As noted above, the Examiner already considered Dua during prosecution: rejecting all claims of the ’484 patent based on Dua, and then allowing the claims in view of Nike’s amendments. Ex. 2001 at 7–11 [8/2/2016 Non-Final Rejection, 2–6].

Dua is directed to “an upper for an article of footwear, the upper incorporating a textile element formed with a knitting machine.” Ex. 1004 at [0013]. Dua explains that the textile element may be formed through either warp knitting or weft knitting processes. *Id.* at [0013]; *see also id.* at [0044]–[0045]. Dua does not disclose forming—*during the knitting process*—any three-dimensional structures in its upper. *See, e.g., id.* at [0039] (“Textile element 40 ... has a generally planar configuration.”). An embodiment of Dua’s textile element is shown in Fig. 8 below.



2. Lockwood

Lockwood (U.S. Pat. No. 3,641,603) is directed to methods of shaping plastic shoe uppers using molds. *See e.g.*, Ex. 1003 at Abstract, 1:3–6, 2:22–31. Lockwood describes that shaping may be effected using heat, pressure differential, or a

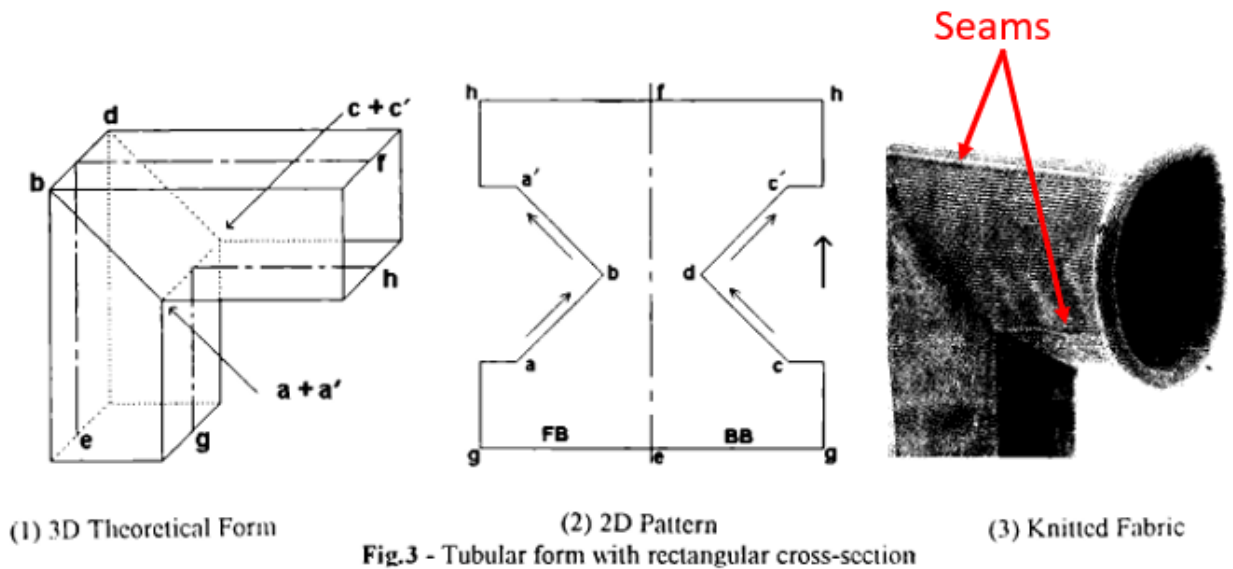
combination of both. *Id.* at Abstract, 6:46–50, 7:72–8:7. In operation, one or more “plane rectangular piece[s] of sheet material” are shaped by means of the mold. *See id.* at 6:51–54. During the molding process, “a central portion” of the blank is “deformed by the mold,” and the upper may “be severed from the rectangular sheet material,” such as “by means of a knife.” *Id.* at 6:54–61.

In one example, Lockwood discloses using a plastic shoe upper that includes “fibrous reinforcement.” Ex. 1003 at 8:66–72; *see also id.* at 8:34–40, 9:8–10. The “fibrous reinforcement” may be a “woven, knitted or nonwoven sheet adhered to or embedded” in the plastic material. *Id.*

3. Hong

Hong is directed to using flat knitting machines to form textiles “to a particular shape or form.” Ex. 1005 at 1. Hong does not disclose knitting footwear. Hong explains that “the ability of knitting to shape of the flat knitting machines” “reduce[s] waste of expensive materials during cutting.” *Id.* Hong discloses techniques for knitting three-dimensional structures that involve “transferring” a “three-dimensional form” to a “two-dimensional pattern” for knitting on a flat-knitting machine. *Id.* at 3. The “three-dimensional shaped knitted fabrics presented in [Hong] are all knitted by using this technique.” *Id.*

Hong shows a series of working examples created using this process. Annotated Figure 3 below depicts the knitting operation for a “knee” form fabric.



From left to right, Figure 3 shows: the three-dimensional concept (“3D Theoretical Form”); the two-dimensional pattern (“2D Pattern”); and the final knitted fabric, after the two-dimensional pattern is assembled into shape (“Knitted Fabric”). *Id.* As annotated in red, the final Knitted Fabric includes seams where the edges of the 2D Pattern are joined together after knitting.

4. Norton

Norton is directed to a “method of manufacturing a multi-layer, composite footwear upper having a three-dimensional geometry.” Ex. 1011 at Abstract, 3:39–44. The Examiner considered Norton during prosecution of the ’484 patent. Ex. 2001 at 20 [3/13/2014 IDS, 7]. Norton’s method includes steps of “forming a substantially planar composite sheet from two or more layers, heating the composite sheet, and compression molding the composite sheet into the three-dimensional geometry of

the footwear upper.” Ex. 1011 at Abstract. Norton’s composite sheet includes three layers: two plastic layers with a third fabric layer sandwiched between. *Id.* at 4:7–18. Norton describes that the fabric layer may be knitted, but does not describe any particular knitting process. *Id.*

5. Voughlohn

Voughlohn is directed to a system for fastening footwear using laces. *See, e.g.*, Ex. 1006 at Abstract. Voughlohn describes footwear having “two opposite sides,” each side having a “plurality of lace-receivers disposed thereon.” *Id.* at [0036]. The lace-receivers may be hooks, rings, or equivalent structures. *See id.* In one embodiment, Voughlohn describes that the lace-receiver may be a “fabric ring” “attached to or integrated into the under-side of a footwear with rivet(s) or thread(s).” *Id.* at [0377]–[0379]. Voughlohn never discloses a knitted upper, or that the fabric ring is attached to a knitted upper. Voughlohn also does not disclose knitting lace-receivers with the footwear.

III. CLAIM CONSTRUCTION

Claims challenged in *inter partes* review proceedings “shall be construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. [§] 282(b).” 37 C.F.R. § 42.100(b). Under this standard, claims “are generally given their ordinary and customary meaning,” as

understood by a person of ordinary skill. *Phillips v. AWH Corp.*, 415 F.3d 1303 at 1312–13 (Fed. Cir. 2005) (citation omitted).

In the Institution Decision, the Board adopted the parties’ agreed upon construction that the “domed, three-dimensional structure” of the “flat-knitted element,” recited in claims 1, 10, and 11, is formed “during the flat-knitting process.” *See* Institution Decision at 6; Petition at 13–14; POPR at 9–10. For purposes of this IPR, Nike contends that no other terms require construction. All other terms and phrases in the ’484 patent claims have their ordinary and customary meanings, which are readily apparent, and no further construction is required.

IV. LEGAL STANDARDS

Petitioner has “the burden of proving a proposition of unpatentability by a preponderance of the evidence.” 35 U.S.C. § 316(e); *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1375 (Fed. Cir. 2016).

A. Obviousness

For obviousness, lululemon must prove that “the differences between the subject matter sought to be patented 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 skilled artisan. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). An obviousness determination is based on four inquiries: (1) the scope and content of the prior art; (2) the differences between the claims and the prior art; (3) the level of ordinary skill

in the art; and (4) objective indicia of nonobviousness. *Id.*, 406 (citing *Graham v. John Deere Co. Kan. City*, 383 U.S. 1, 17–18 (1996)). lululemon must articulate specific reasoning, and cannot rely on conclusory statements or attorney argument. *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1362–63 (Fed. Cir. 2016); *Facebook, Inc. v. Windy City Innovations, LLC*, 973 F.3d 1321, 1342 (Fed. Cir. 2020) (affirming nonobviousness where petitioner’s challenge was “based on attorney argument rather than evidence in the record”).

lululemon must prove that a POSITA would have been motivated to modify or combine teachings from different references. *See KSR*, 550 U.S. at 418; *see also In re Stepan Co.*, 868 F.3d 1342, 1345–46 (Fed. Cir. 2017). lululemon must also show that a skilled artisan would have “reasonably expected success in achieving the goal,” i.e., the achieving the claimed invention. *See Institut Pasteur & Universite Pierre Et Marie Curie v. Focarino*, 738 F.3d 1337, 1346 (Fed. Cir. 2013); *see also Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.*, 876 F.3d 1350, 1360–61 (Fed. Cir. 2017).

V. LEVEL OF ORDINARY SKILL IN THE ART

For the purposes of this Response, Nike applies lululemon’s proposed level of skill in the art: a POSITA for the technology of the ’484 patent would have had a bachelor’s degree in mechanical engineering, textile engineering, or similar technical degree and at least 3 years of experience working with knitted textiles for

use in fabric-based articles, including apparel such as footwear. Petition at 12–13. For individuals with different educational backgrounds, a person could still be of ordinary skill in the art provided that person’s additional experience compensates for any differences in that person’s education as stated above. *Id.*

VI. GROUNDS 1 AND 2: LULULEMON’S LOCKWOOD-BASED GROUNDS DO NOT RENDER OBVIOUS ANY CHALLENGED CLAIM

lululemon’s Ground 1 challenges claims 1 and 5–9 as obvious over Lockwood in view of Dua. lululemon’s Ground 2 adds Norton to the combination. lululemon admittedly based its Grounds 1 and 2 on a claim construction that significantly differs from the construction advanced by the parties and adopted by the Board. Under this construction, the “domed, three-dimensional structure” is formed only *after* knitting. In Grounds 1 and 2, lululemon thus argues that the asserted prior art combinations disclose a “domed, three-dimensional structure” formed only *after* the flat-knitting process is complete. Because both parties agree that the domed, three-dimensional structure is formed—at least in part—during the knitting process, lululemon’s Grounds 1 and 2 fail to teach or suggest any challenged claim. *See* POPR at 9–10; Institution Decision at 11. The Board needs not consider lululemon’s Grounds 1 and 2 further. But in the event that it does, those grounds fail for the reasons set forth below.

A. Lockwood in combination with Dua and/or Norton fails to teach or suggest that the “domed, three-dimensional structure” of the “flat-knitted element” is formed ... in a flat-knitting process,” as recited in claim 1

As described above, the Board adopted the parties’ agreed upon construction that the “domed, three-dimensional structure” of the “flat-knitted element” must be formed ... in a flat-knitting process,” as recited in claim 1. Lockwood in combination with Dua and/or Norton fails to teach or suggest this limitation.

Lockwood does not disclose or suggest an upper having a “domed, three-dimensional structure” formed *during* a knitting process. In fact, Lockwood does not disclose a knitting process at all. Ex. 2003 at ¶37. Lockwood discloses shaping an upper using a mold. Ex. 1003 at Abstract, 1:3–6, 2:22–31, 6:46–54, 7:72–8:7; Ex. 2003 at ¶37.

Combining Lockwood with Dua and/or Norton does not cure this deficiency. lululemon does not allege that Dua or Norton teach or suggest a “domed, three-dimensional structure.” lululemon combines Dua with Lockwood only to substitute Dua’s “flat knit” element for Lockwood’s “fibrous reinforcement.” *See* Petition at 18 (“Lockwood, thus discloses every element of claim 1 except for the knitted element being *flat knit*.”); Ex. 2003 at ¶38. And Dua does not disclose forming—during the knitting process—any three-dimensional structures in its upper. *See, e.g., id.* (citing Ex. 1004 at [0039] (“Textile element 40 ... has a generally planar

configuration.”)). lululemon combines Norton with Lockwood and Dua in case “the disclosures of Lockwood and Dua were somehow deemed insufficient for teaching limitations generally relating to the size and structure of Lockwood’s knitted reinforcement layer.” Petition at 36; Ex. 1002 at ¶84; Ex. 2003 at ¶47. Similar to Lockwood, Norton does not disclose a knitting process at all. Norton discloses manufacturing a “substantially planar composite sheet,” and then heating and compression molding the composite sheet into the shape of an upper. *See, e.g.*, Ex. 1011 at Abstract.

Thus, lululemon fails to show that Lockwood in combination with Dua and/or Norton renders obvious any challenged claim in Grounds 1 or 2.

B. A POSITA would have had no motivation to combine Lockwood and Dua

lululemon argues that a POSITA “would have been motivated for multiple reasons to use a flat-knitted element like Dua’s for the knitted element in Lockwood’s upper.” Petition at 18–19. But none of lululemon’s arguments hold water.

First, lululemon argues that a POSITA would have been motivated to combine Lockwood and Dua because they are in the same field of endeavor (manufacturing shoe uppers) and “address the same problem” (reducing cost and increasing efficiency in manufacturing). Petition at 19. But these similarities are

superficial and conclusory. Lockwood is directed to a process for molding *plastic* uppers, whereas Dua is directed to a method for *knitting* footwear uppers. Ex. 2003 at ¶41. As a matter of law, conclusory statements of general similarity are alone insufficient to support motivation to combine. *William Wesley Carnes, Sr., Inc. v. Seaboard Int’l Inc.*, IPR2019-00133, Paper 10 at 17–18 (PTAB May 8, 2019) (rejecting Petitioner’s conclusory argument that references solving similar problems in oil and gas drilling provided motivation to combine). And the opinions of lululemon’s expert, Dr. Brookstein, are similarly conclusory and unsupported and thus entitled to no weight. Ex. 1002 at ¶55; *see One World Techs., Inc. v. Chervon (HK) Ltd.*, PGR2020-00059, 2020 WL 7222691, at *16 (PTAB Dec. 7, 2020).

Second, lululemon argues that a POSITA would have been motivated to modify Lockwood with Dua because of the “benefits of flat knitting a knitted element of an upper.” Petition at 19. lululemon argues that the capability of flat knitting to produce unitary elements that may have “various textures, different properties, or different yarn types” would benefit Lockwood. This is wrong. Lockwood discloses a plastic upper that is molded into shape. Ex. 1003 at Abstract, 1:3–6, 2:22–31, 6:46–54, 7:72–8:7, Fig. 35. Lockwood discloses that the upper may be molded into shape with or without the inclusion of a fibrous reinforcement. *Id.* at 8:34–40, 8:66–72, 9:8–10. Indeed, Lockwood discloses that the plastic upper

“preferably does not include fibrous reinforcement.” *Id.* In other words, the specific structural qualities of the fibrous reinforcement, i.e., knitted element, do not impact the molded upper. Ex. 2003 at ¶¶42–44. Any benefits that derive from the unitary construction of or varying textures in Dua’s textile element would be lost in Lockwood’s upper. *Id.* Thus, a POSITA would not have been motivated to combine Dua’s flat knitted element with Lockwood’s upper.

Third, lululemon argues that a POSITA would have been motivated “to use a flat knitting machine to produce Lockwood’s knitted element” as those machines provide “vast knitting design options and ease of use.” Petition at 20. lululemon explains that a POSITA would have known that such machines “could easily be programmed to create a knitted element with specific features and shape.” *Id.* But Lockwood’s system takes a “blank” in the form of a “plane rectangular piece of sheet material,” and deforms the blank using a mold. lululemon has not shown that any benefits of flat knitting would benefit Lockwood’s upper. Ex. 2003 at ¶45.

Fourth, lululemon argues that a POSITA would have viewed flat knitting “as one of a finite number of options for producing Lockwood’s knitted element.” Petition, 20. But the proper analysis is not whether a POSITA *could* have combined Dua’s flat-knitted element with Lockwood’s upper: The proper analysis is whether a POSITA *would* have been motivated to make the combination to arrive at the claimed invention. *See Nautilus Hyosung Inc. v. Diebold Self-service Sys.,*

IPR2016-00633, Paper 9 at 21–22 (PTAB Aug. 22, 2016); *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1337 (Fed. Cir. 2016) (“The real question is whether that skilled artisan would have plucked one reference out of the sea of prior art.”). lululemon has not shown that here. Ex. 2003 at ¶46.

For at least these reasons, lululemon has not shown that a POSITA would have been motivated to combine Lockwood and Dua to arrive at the claimed invention.

VII. GROUND 3: DUA IN VIEW OF HONG AND LOCKWOOD DOES NOT RENDER OBVIOUS ANY OF CLAIMS 1–19

Under the Board’s claim construction advanced by the parties and adopted by the Board, the “domed, three-dimensional structure” of the “flat-knitted element” is formed “*during* the flat-knitting process.” *See* Petition at 13–14; POPR at 9–10; Institution Decision at 6. lululemon relies exclusively on Hong to provide this claim limitation. *Id.* at 41, 47 (citing Ex. 1002 at ¶100) (claiming Hong shows “flat knitting a three-dimensional structure was well-known and common.”); Ex. 2005 at 114:9–17.

But lululemon fails to show that Hong teaches forming a three-dimensional knitted fabric *during* the knitting process.¹ Nor does Hong teach the specific type of three-dimensional structure recited in the claims, i.e., one that “extend[s] above the plane” of the “side portion[s]” that are in a “flattened configuration.” For these reasons, lululemon fails to meet its burden with respect to any Challenged Claim in Ground 3. And for independent claim 10 and dependent claims 2 and 18, lululemon fails to meet its burden for a second reason: the asserted prior art combination does not teach or suggest the claimed “loop” features.

A. Hong fails to teach or suggest forming three-dimensional structures *during* a knitting process

lululemon cites to nothing in Hong that teaches or suggests forming three-dimensional structures *during* a knitting process. The cited disclosures in Hong merely describe flat knitting precisely-shaped, two-dimensional patterns—that can

¹ In its Petition, lululemon mischaracterizes a statement that Nike Innovation C.V., a Nike, Inc. subsidiary, made during prosecution of a foreign patent application. Petition at 10–11. In that foreign prosecution, Nike only acknowledged that certain prior art documents generally disclose three-dimensional knitted textiles “formed through flat knitting.” Ex. 1017, 8. This includes achieving three-dimensional structures through post-knitting processes.

later be formed into three-dimensional structures. It simply wasn't possible in 1994 or 2006 for a flat-knitting machine to output a three-dimensional "Knitted Fabric" as shown in Figures 3(3)–9(3). Ex. 2003 at ¶¶49–51. And nothing in Hong indicates otherwise. And even under lululemon's strained interpretation of certain, cherry-picked portions in Hong, a skilled artisan would not reasonably expect to succeed in forming three-dimensional structures *during* a knitting process, as recited in the claims.

1. Hong does not teach or suggest forming three-dimensional structures during a knitting process

Collectively, lululemon and Dr. Brookstein point to five aspects of Hong in as allegedly teaching or suggesting the formation of three-dimensional structures during a knitting process—but none stand up to scrutiny.

First, lululemon points to several instances in which Hong discloses "producing," "developing," or "knitting" three-dimensional shaped fabrics. Petition at 12, 40 (citing Ex. 1005 at 1–6). For example, lululemon points to Hong's disclosure that "[t]his work describes the use of the new flat knitting machines to knit 3D structures by using different techniques in the Shima Seiki SES 122FF flat knitting machine." Ex. 1005 at 1. Nike does not dispute that Hong discloses a method in which flat knitting machines are used to knit a fabric that ultimately takes a three-dimensional shape. But Hong produces these three-dimensional fabrics in

three steps: (1) conceiving of a “theoretical” three-dimensional object; (2) flat knitting a knit-to-shape, “two-dimensional pattern,” and (3) later forming that two-dimensional pattern piece into a three-dimensional structure. Ex. 2003 at ¶49; Ex. 1005 at 3. In other words, Hong’s three-dimensional fabrics are certainly “knitted,” but they only assume a three-dimensional shape *after* the knitting process is complete. Hong programs the knitting machine to knit a precisely-shaped, two-dimensional pattern piece, which is formed into a three-dimensional structure *after* the knitting operation:

[T]he fashioning operation (increasing or decreasing the number of knitting needles) is ***only determined according to two-dimensional patterns***. The three-dimensional shaped knitted fabrics presented in this work are all knitted by using this technique.

Ex. 1005 at 3. lululemon’s expert, Dr. Brookstein, confirmed as much.

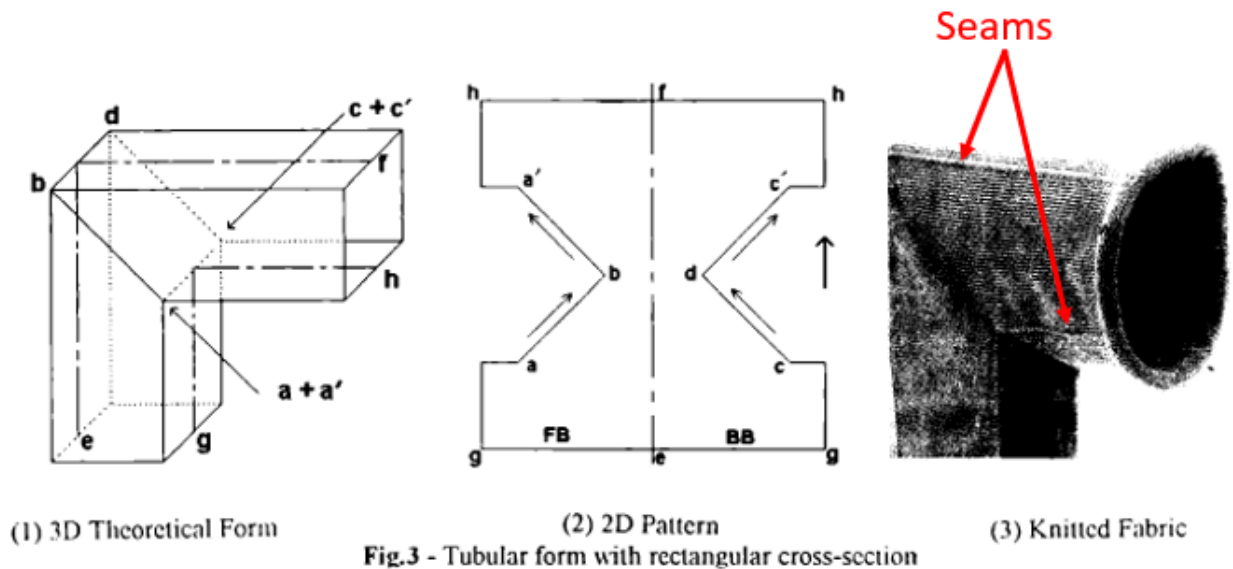
Q: [Hong] says, “When this method is used to knit three-dimensional structures, the main techniques consist in transferring the three-dimensional form to two-dimensional patterns because the fashioning operation, increasing or decreasing the knitting needles, is only determined according to two-dimensional patterns.” What does that mean?

MR. SMITH: Objection, beyond the scope.

A: Well, it’s ***knitted on the V-bed machine, which means it’s two-dimensional***, and then when it comes off the machine, it becomes three-dimensional.

Ex 2005 at 165:4–20 (recross). Hong’s mere mention of “producing,” “developing,” or “knitting” three-dimensional-shaped fabrics does not teach or suggest knitting three-dimensional structures *during* the knitting process.

Second, lululemon cites to Hong’s “working examples.” Petition at 39–40 (citing Ex. 1005 at Figures 3–9). Each working example shows the three-step process described above. But none of Hong’s seven working examples teach or suggest knitting three-dimensional structures *during* the knitting process. In fact, these working examples demonstrate the opposite. The “Knitted Fabrics” depicted in Figures 3(3)–9(3) would have required post-knitting processing to reach their final “as-shown” form. Ex. 2003 at ¶49. For example, in Figure 3, Hong depicts the three-step process for developing its “knee” form three-dimensional object. Ex. 1005 at 3. As Dr. Pastore explains, it would not have been possible to join together edges “h–h” and “g–g” of Figure 3(2), i.e., the left and right edges of the “2D Pattern,” *during* the knitting process. *See* Ex. 2003 at ¶51. Those edges could only be joined by seaming the edges together *after* the knitting process. This is visible in annotated Figure 3(3) below, which shows seams joining edges of the two-dimensional pattern of Figure 3(2). *See id.*



This is the case for all of Hong's three-dimensional "Knitted Fabrics": they are assembled by seaming together the knit-to-shape "two-dimensional patterns." See Ex. 2003 at ¶49. Perhaps this is why lululemon's expert, Dr. Brookstein, simply declined to consider all but one of them:

Q: So when you reviewed the Hong reference . . .

A: Right.

Q: . . . 20 times I think you said . . .

A: At least.

Q: . . . you never considered figures 3, 4, 5, 6, 8 or 9 or their corresponding descriptions; is that right?

A: That's what I testified to, yes.

Ex. 2005 at 108:23–109:9. Ultimately, none of Hong's seven working examples teach or suggest knitting three-dimensional structures *during* the knitting process.

Third, lululemon points to Hong's disclosure of three methods for "flat knitting three-dimensional shapes":

Hong discloses three different methods for flat knitting three-dimensional shapes, including “using different structural combinations, using different loop lengths, and altering the number of knitting needles and knitted courses.”

Petition at 40 (citing Ex. 1005 at 1). But as Hong makes clear, these “three different methods” are simply “techniques for knitting to shape”:

3 Techniques for Knitting to Shape

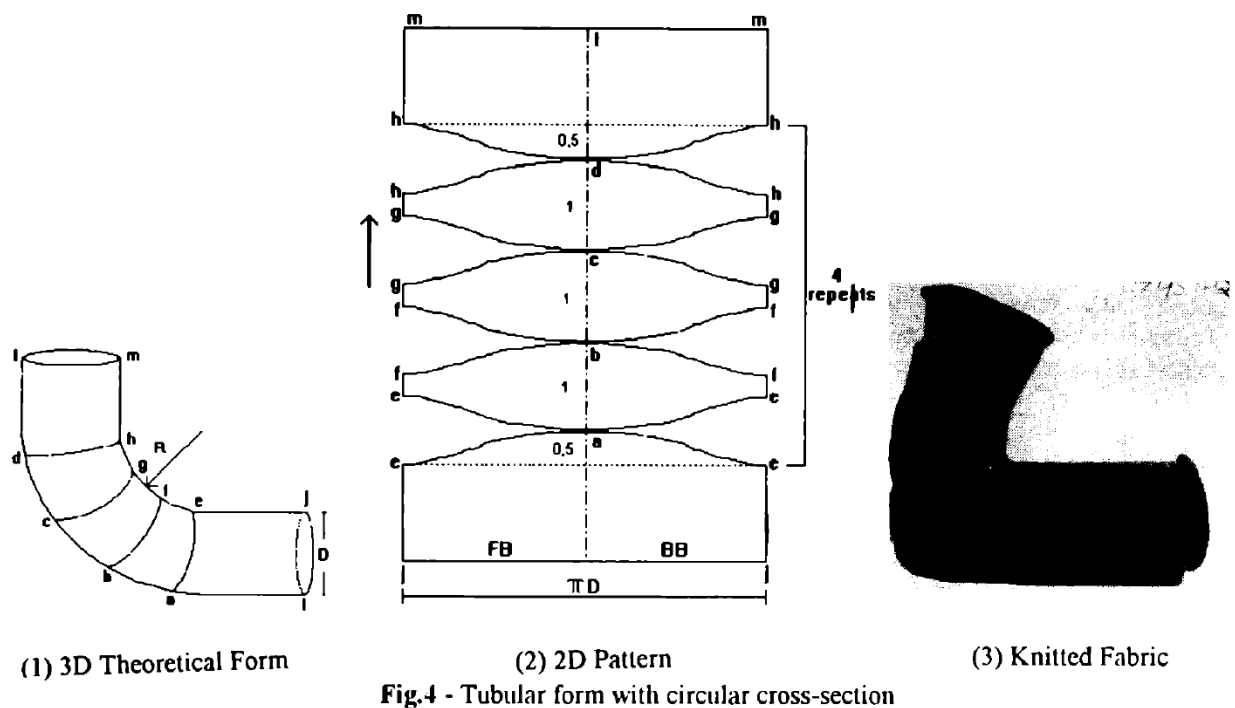
On flat knitting machines, it is possible to use the following techniques for knitting to shape:

- using different structural combinations;
- using different loop lengths; and
- altering the number of operating needles from course to course.

Ex. 1005 at 1. Hong’s discussion of these methods only reaffirms the true nature of Hong’s claimed invention: methods of knitting precisely-shaped, two-dimensional pattern pieces that can later be formed into three-dimensional structures. This disclosure does not teach or suggest forming three-dimensional structures *during* the flat knitting process.

Fourth, lululemon points to Hong’s disclosure of certain benefits of the described knitting methods. Petition at 6, 41, 42, 48 (citing Ex. 1005 at 5). For example, lululemon repeatedly cites to Hong’s disclosure that “knitting directly the 3D shapes can overcome fabric waste and diminish the labour cost inherent to the use of two-dimensional fabrics.” *Id.* But these benefits stem from Hong’s disclosed

methods of knitting-to-shape, i.e., knitting precisely-shaped, two-dimensional pattern piece, which can then be formed into three-dimensional structures. *See* Ex. 1005 at 1–6. The specific shapes of Hong’s two-dimensional patterns allow for the creation of three-dimensional knitted fabrics without any post-knitting cutting. *Id.*; Ex. 2003 at ¶54.



Hong’s elimination of cutting steps reduces waste and labor costs. *Id.* at ¶54. lululemon’s expert, Dr. Brookstein, agreed that the benefits articulated in Hong are simply the benefits of knitting knit-to-shape garments vs. cut-and-sew garments.

Q: Earlier, we talked about some of the benefits of knitting to shape, like reducing the wasted material that you’d otherwise have to cut away and saving the steps and the labor involved in cutting away the textile element. Do you remember that?

A: Yes, and the makeup operation.

Q: Right. Do those benefits apply to knit-to-shape two-dimensional objects as compared with cut-and-sew two-dimensional objects?

MR. SMITH: Objection, form, beyond the scope.

A: Yes. Knit-to-shape is going to be more efficient than cut-and-sew.

Ex. 2005 at 114:18–115:10. And thus the recitation of these benefits does not teach or suggest knitting three-dimensional structures *during* the knitting process.

Fifth, lululemon and Dr. Brookstein repeatedly espouse the alleged ability of Hong to knit “fully fashioned garments.” *See* Petition at 39–43, 47–48. But as Dr. Brookstein admitted, “fully fashioned” is simply a synonym for “knit-to-shape.” Ex. 2005 at 15:5–14.

In sum, nothing in Hong teaches the formation of three-dimensional structures *during* the knitting process, as recited in the claims. *See* Ex. 2003 at ¶55. Neither Dr. Brookstein nor lululemon are able to explain about *how* Hong purportedly uses a flat knitting machine to yield the three-dimensional “Knitted Fabrics” shown in Figures 3(3)–9(3). *See* Ex. 1002 at ¶¶89–95, 100–101, 104. Dr. Brookstein’s opinions on this limitation are conclusory, unsupported by Hong, and thus should be given no weight. *See One World Techs.*, 2020 WL 7222691, at *16.

2. A skilled artisan viewing Hong in 2006 would not have reasonably expected to succeed in forming a three-dimensional structure during the knitting process

lululemon’s Hong-based obviousness arguments also fail because a skilled artisan viewing Hong would not have had a reasonable expectation of succeeding in forming a three-dimensional structure *during* the knitting process. Nowhere does Hong teach a POSITA how to create the “Knitted Fabrics” shown in Figures 3(3)–9(3) during the knitting process. Ex. 2003 at ¶¶50, 53. As Dr. Pastore explains, a skilled artisan would not understand Hong to teach the creation of any these as-depicted structures during the knitting process. *Id.* at ¶49. In fact, Dr. Pastore explains, a POSITA would have understood that most of Hong’s “Knitted Fabrics” could not *possibly* be formed during the knitting process. Ex. 2003 at ¶51. These “Knitted Fabrics” could only be shaped into their as-depicted form through the use of post-knitting processing such as folding and sewing. *Id.* at ¶49. As a result, even under the strained interpretation of Hong that lululemon advances—its obviousness arguments fail because a skilled artisan would not have reasonably expected to succeed in making the claimed invention. *See Institut Pasteur*, 738 F.3d at 1346 (holding that “knowledge of the goal does not render its achievement obvious”); *see also Arctic Cat*, 876 F.3d at 1360–61 (Fed. Cir. 2017).

For at least these reasons, lululemon has not shown that the combination of Dua with Hong and Lockwood teaches or suggests forming the “domed, three-dimensional structure” of the “flat-knitted element” *during* the “flat-knitting process.” Thus, lululemon fails to show that Dua, in view of Hong and Lockwood, renders obvious any challenged claim in Ground 3.

B. Hong does not teach or suggest knitting a “domed, three-dimensional structure” “shaped to extend above the plane of the first side portion and the second side portion,” as recited in independent claims 1 and 11

lululemon also fails to show that Hong teaches or suggests forming a flat-knitted element with a three-dimensional structure that “extend[s] above the plane” of the “side portion[s]” that are in a “flattened configuration.” Even if Hong teaches forming three-dimensional structures during the knitting process, Hong at best shows closed-periphery three-dimensional structures held together by seams lacking any flattened portions. *See* Ex. 1005 at Figs. 3(3)–3(9); Ex. 2003 at ¶56. Hong provides no guidance on how to form the claimed configuration. *See* Ex. 2003 at ¶56. A POSITA in 2006 would not have looked to combine Hong’s finished structures with Dua and Lockwood to reach this limitation. *Id.* Nor would they have reasonably expected to succeed in making the combination. *Id.*; *Institut Pasteur*, 738 F.3d 1346 (“[T]he expectation-of-success analysis must match the highly desired

goal, not switch to a different goal that may be a less challenging but also less worthwhile pursuit.”).

Thus, lululemon fails to show that Dua, in view of Hong and Lockwood, renders obvious any claims 1 or 11.

C. Neither Dua nor Hong teach or suggest that the “flat-knitted element” includes “a second layer being flat-knitted with the first layer at opposite ends of the second layer to form an overlapped loop,” as recited in limitation 10[e]

Independent claim 10 recites a “flat-knitted element” formed in a “flat-knitting process,” the flat-knitted element having “a first layer” and “a second layer,” where the “second layer” is “flat-knitted with the first layer at opposite ends of the second layer to form an overlapped loop.” Neither Dua nor Hong teach or suggest this limitation.

lululemon contends that Dua teaches this limitation. lululemon and Dr. Brookstein rely on two pieces of disclosure from Dua as purported support. First, lululemon points to Dua’s disclosure that “textile element 40 may include laces and be ‘a single material that is formed to exhibit a *unitary (i.e., one-piece) construction.*’” Petition at 56 (citing Ex. 1004 at [0037]), 66, 73; Ex. 1002 at ¶¶111, 129–130, 145. lululemon and Dr. Brookstein apparently infer from this disclosure that any components on Dua’s upper must have been knit together. *See* Ex. 2003 at ¶59. But as Dr. Brookstein testified in his deposition, this is unsupported by Dua.

See Ex. 2005 at 130:18–23, 132:1–6.

Dua’s paragraph 37 discusses “textile element 40” in the embodiment shown in Figures 2–7. See Ex. 1004 at [0037]. In these figures, textile element 40 constitutes substantially the entire upper 30. *Id.* at Figs. 2–7; Ex. 2003 at ¶60. Dua teaches—with respect to more detailed uppers like that shown in Figure 12 below—that the upper may “incorporate a plurality of additional components.” See *id.* at [0057] (“Whereas upper 30 was almost exclusively formed by textile element 40, upper 130 also includes lace 131 and elements 132–135.”); Ex. 2003 at ¶60.

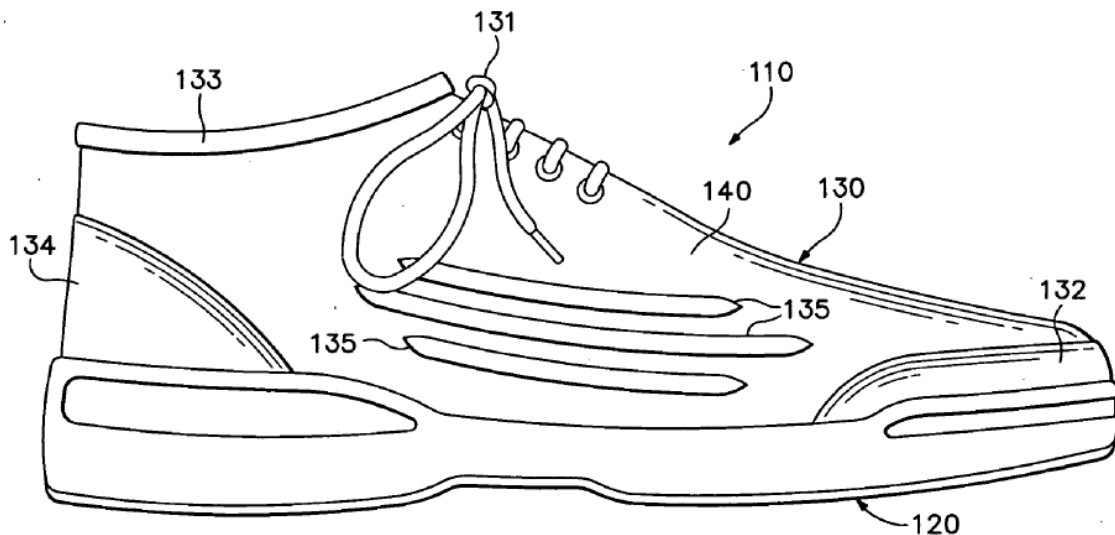
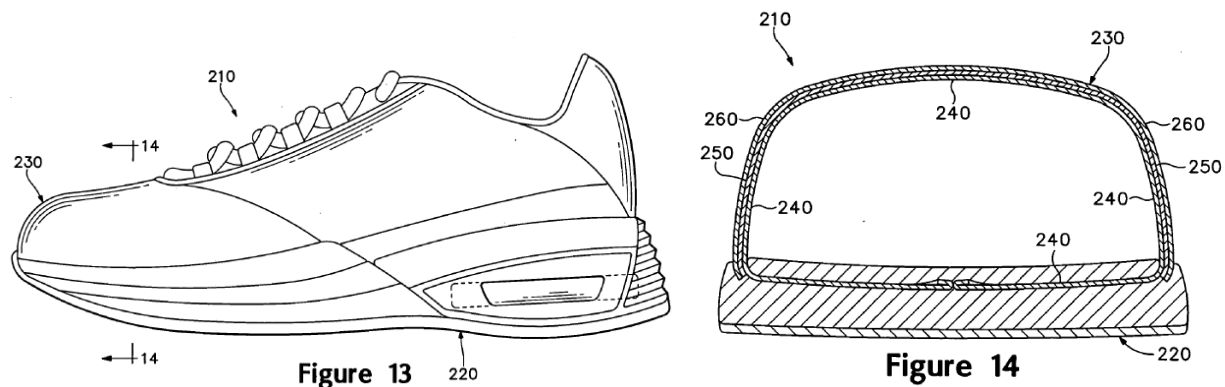


Figure 12

These additional components may include laces, toe guards, edge finishings, and other reinforcement materials. See Ex. 1004 at [0057]. Dua states that these components may be formed of “leather or rubber” or “synthetic leather.” *Id.* And they are separate components that are attached to textile element 140 after the

knitting process. *See id.*; Ex. 2003 at ¶61.

Second, lululemon argues that Dua’s Figure 13, reproduced below, shows “lace loops that are knit with the first layer.” Petition at 56, 66, 73; Ex. 1002 at ¶¶111, 129–130, 145.



Dua explains that the upper 230 shown in Figure 13 is a “conventional upper” with “various material layers.” Ex. 1004 at [0059]. Specifically, upper 230 includes interior layer 240, intermediate layer 250, and exterior layer 260. *Id.* Interior layer 240 is a textile element. *Id.* Intermediate layer 250 may be formed from a “lightweight polymer foam material,” and exterior layer 260 may be formed from materials “selected based on the properties of wear-resistance, flexibility, and air-permeability.” *Id.* Dua’s description of Figure 13 includes no mention whatsoever of the lace loops. *See* Ex. 2003 at ¶63. Dua does not teach or suggest that these loops are even connected to the interior layer 240, let alone knitted with the interior layer in a “flat-knitting process.” *See id.* Dr. Brookstein confirmed this—first testifying that he “can’t tell” which layer the loop structures are attached to, and then guessing

that the loops are attached to the foam intermediate layer. *See* Ex. 2005 at 144:10–145:2.

Dua never discloses loops knitted with textile element 40. *See* Ex. 2003 at ¶63. The Board preliminarily noted that “Dua indisputably describes” “textile element 40” as showing a “single material element that may include regions for laces.” Institution Decision at 10 (citing Ex. 1004 at ¶¶37, 59). Nike respectfully disagrees. Neither paragraph 37 nor 59 of Dua teaches that textile element 40 or 240 includes regions to receive laces that are knitted with textile element 40 or 240. To the contrary, paragraph 37 discloses that upper 30 “may also include laces or other elements associated with a conventional upper for footwear.” Ex. 1004 at ¶37. But as discussed above, Dua discloses that the upper may be adorned with additional non-knitted components.

lululemon, relying on Dr. Brookstein, alternatively argues that it “would have been obvious in view of Hong to form an overlapped loop as a unitary construction with the first layer.” Petition at 66 (citing Ex. 1002 at ¶131); 57 (citing Ex. 1002 at ¶¶112–113). lululemon and Dr. Brookstein rely on Hong’s disclosure of knitting “loop structures” as part of creating “fully fashioned garments.” Petition at 57; Ex. 1002 at ¶¶112–113). This argument fails for two reasons. First, Hong doesn’t disclose knitting the claimed “overlapped loop” with a “first layer” of a textile element. *See* Ex. 2003 at ¶65. lululemon points to no evidence that it does.

Second, the “loops” disclosed in Hong are a different kind of loops. “Loops” or “looping” is a term of art in knitting. Ex. 2003 at ¶65. Indeed, the entire concept of knitting is defined by the formation of loops. *See id.* (citing Ex. 1001 at 2:53–54 (explaining that knitting is the “most common method of interlooping,” i.e., the “formation of a plurality of columns of intermeshed loops”); Ex. 1004 at [0043] (same); Ex. 2004 at § 2.1 (“The term *knitting* describes the technique of constructing textile structures by forming a continuous length of yarn into columns of vertically intermeshed loops.”)). Hong repeatedly refers to this type of “loops” that are intrinsic in knitting:

- “... some of these characteristics might be found in ‘loop based structures.’” Ex. 1005 at 1.
- “By using the new flat knitting machines, it is possible not only to knit the new loop structures which are not possible on the conventional flat knitting machines ...” *Id.*
- “On flat knitting machines, it is possible to use the following techniques for knitting to shape: ... using different loop lengths ...” *Id.* at 2.
- “... by using different loop structural combinations when knitting a technical course ...” *Id.*
- “Fabric knitted with the same knitted structure but using different loop lengths having different geometrical dimensions.” *Id.*
- “... changing the loop length from course to course.” *Id.*
- “... some needles are rendered inactive for a long time while retaining their loops.” *Id.*

Ex. 2003 at ¶¶65–66. Dr. Brookstein agrees. *See* Ex. 2005 at 118:17–120:11 (testifying that the loops discussed in Hong are “[t]otally different” from those recited in claims 2, 10, and 18). Thus, Hong does not disclose knitting an “overlapped loop” with a first layer, as recited in claim 10. Because neither Hong nor Dua disclose this limitation, lululemon’s argument that it would have been obvious to modify Dua with Hong must fail. *See St. Jude Med., Inc. v. Access Closure, Inc.*, 729 F.3d 1369, 1381–82 (Fed. Cir. 2013) (finding claimed invention non-obvious where neither reference of prior art combination taught claimed feature).

Thus, lululemon has not shown that Dua in view of Hong and Lockwood teaches or suggests claim 10.

D. Neither Dua nor Hong teaches or suggests that the “flat-knitted element” includes “a first loop being formed as a second layer of unitary construction with the first layer,” as recited in dependent claim 2

For the same reasons discussed above with respect to limitation 10[e], lululemon fails to show that Dua or Hong teaches or suggests that the “flat-knitted element” includes “a first loop being formed as a second layer of unitary construction with the first layer,” as recited in dependent claim 2. *See* Ex. 2003 at ¶¶58–66.

Thus, lululemon has not shown that Dua in view of Hong and Lockwood teaches or suggests claim 2.

E. Neither Dua nor Hong teaches or suggests that “the flat-knitting process includes forming a first loop of unitary construction in the textile element,” as recited in dependent claim 18

For the same reasons discussed above with respect to limitation 10[e], lululemon fails to show that Dua or Hong teaches or suggests that the “flat-knitting process includes forming a first loop of unitary construction in the textile element,” as recited in dependent claim 18. *See* Ex. 2003 at ¶¶58–66.

Thus, lululemon has not shown that Dua in view of Hong and Lockwood teaches or suggests claim 18.

VIII. GROUND 4: DUA IN VIEW OF HONG, LOCKWOOD, AND VOUGHLOHN DOES NOT RENDER OBVIOUS ANY OF CLAIMS 2–4, 18, AND 19

lululemon's Ground 4 challenges only dependent claims stemming from independent claims 1 and 11. For at least the reasons discussed above with respect to claims 1 and 11 in Ground 3, lululemon fails to show that Dua, in view of Hong, Lockwood, and Voughlohn, renders obvious any challenged claim in Ground 4.

Recognizing the weaknesses of Ground 3 against the “loop” limitations, lululemon adds Voughlohn to the combination. *See* Petition at 74 (“Ground 4 addresses the obviousness of the challenged claims in Ground 3 in the event the disclosures of Dua, Hong, and Lockwood were somehow deemed insufficient for teaching limitations relating to producing one or more loops of unitary construction

with first layer of an upper such as Dua's upper.”). But for the reasons described below, Voughlohn fails to cure the deficiencies in Dua and Hong.

A. The Dua, Hong, Lockwood, and Voughlohn combination fails to teach or suggest a “loop” being formed of “unitary construction” with the “flat-knitted element,” as recited in dependent claims 2 and 18

Voughlohn doesn't teach a knitted upper. *See* Ex. 2005 at 152:13–18. lululemon doesn't allege that it does. Petition at 76–77. Voughlohn only teaches “lace-receivers” that may include a “fabric ring” attached to an upper by riveting or sewing. Ex. 1006 at [0377]–[0379]; *see* Ex. 2005 at 153:6–155:22. Thus, Voughlohn contemplates attaching separate lace-receiver structures to an upper by non-knitting processes. *See* Ex. 2003 at ¶68. Voughlohn does not teach or suggest a lace-receiver formed of unitary construction, i.e. knitted together with, a flat-knitted element, as recited by claims 2 and 18. *See id.*

Claims 3–4 depend from claim 2, and claim 19 depends from claim 18. lululemon fails to show that Dua in view of Hong, Lockwood, and Voughlohn teaches or suggests claims 3, 4, and 19 for at least the reasons described above. Thus, lululemon has not shown that Dua in view of Hong, Lockwood, and Voughlohn teaches or suggests any of claims 2–4, 18, or 19.

IX. CONCLUSION

For the reasons set forth above, lululemon has failed to prove by a preponderance of the evidence that any of claims 1–19 of the '484 patent are unpatentable. Nike requests that the Board enter a final written decision affirming the patentability of those claims.

Dated: June 18, 2024

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CERTIFICATE OF WORD COUNT

Under the provisions of 37 C.F.R. § 42.24(d), the undersigned hereby certifies that the Microsoft Office word count including all footnotes for the foregoing Patent Owner's Response, excluding the table of contents, table of authorities, certificate of word count, appendix and certificate of service, totals 7,499 words, which is less than the 14,000 words allowed under 37 C.F.R. § 42.24(b)(1).

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CERTIFICATE OF SERVICE

The undersigned hereby certifies service on the Petitioner, pursuant to 37 C.F.R. § 42.6(e) and by agreement of counsel, by electronic (e-mail) delivery of a true copy of the foregoing **PATENT OWNER'S RESPONSE**, which was served on June 18, 2024 to the following Counsel for Petitioner via e-mail:

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