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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 9,730,484

PETITIONER'S REPLY IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 9,730,484

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1005	Hong, et al., "The development of 3D shaped knitted fabrics for technical purposes on a flat knitting machine," IJFTR 19(3), Sept. 1994 ("Hong")
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I. INTRODUCTION

The claims of the '484 patent are invalid under Grounds 3-4. Nike does not dispute that the prior art discloses the claimed physical features. Nor does Nike dispute the motivations to combine in Grounds 3-4. Instead, Nike argues that Hong fails to disclose forming a three-dimensional structure during a knitting process. But this argument is belied by Hong's disclosure, as Nike expressly acknowledged during the prosecution of the '484 patent's European counterpart.

Hong is titled: "*The development of 3D shaped knitted fabrics . . . on a flat knitting machine.*" Ex. 1005, 1. Hong specifically describes the "new electronic flat knitting machine (Shima Seiki SES 122FF) for producing three-dimensional shaped fabrics…." *Id*. Even Nike's own expert, Dr. Pastore, admitted that these Shima Seiki machines were capable of flat knitting three-dimensional structures and that a POSA would have been familiar with such machines.

Indeed, when faced with an enablement objection before the European Patent Office, Nike relied on Hong as enabling the claimed domed, three-dimensional structure by, *inter alia*, disclosing "that achieving three-dimensional knitted textiles may generally be obtained through flat knitting." Ex. 1017, 8. Nike's express representations about Hong led to the allowance of the '484 patent's European counterpart. Now, when faced with an IPR, Nike takes the opposite position,

arguing that Hong fails to disclose the very teachings Nike previously relied upon to obtain allowance.

Nike's arguments are further undermined by the fact that the '484 patent fails to describe any specific flat-knitting processes for achieving three-dimensional structures. In Europe, Nike justified this lack of disclosure by pointing to Hong, not to the '484 patent's specification. This lack of disclosure in the '484 patent confirms that a POSA would have already known how to form such structures during the knitting process. If the '484 patent is deemed to enable the challenged claims, Nike cannot now reasonably argue that Hong's disclosure is insufficient. Accordingly, Nike's arguments should be rejected, and the challenged claims cancelled.

II. CLAIM CONSTRUCTION

As explained in the Petition, the plain and ordinary meaning of claim 1 requires that the flat-knitted element's claimed features are formed from a flat-knitting process. Pet., 13-14. The Board agreed in its Institution Decision, construing "the claims to require that the 'central portion having a domed, three-dimensional structure' be formed during the flat-knitting process, and not afterward." Paper 9 ("ID"), 6. Thus, for purposes of this IPR proceeding, Petitioner will adopt this construction.

III. GROUNDS 1-2

In light of the Board's claim construction in the Institution Decision, Petitioner will refrain from further arguing Grounds 1-2.

IV. GROUNDS 3-4

A. The Challenged Claims Would Have Been Obvious in View of Dua, Hong, and Lockwood

Dua discloses an upper with a flat-knitted first layer. Pet., 41. This first layer has a central portion and first and second side portions extending from opposite sides of the central portion. *Id*. Dua thus discloses every element of independent claim 1, except for the central portion having a domed, three-dimensional structure. *Id*.; Ex. 1002, ¶92.

Lockwood discloses an upper with a domed, three-dimensional structure in the claimed location, which simplifies the assembly process, reduces the need for cutting, and reduces waste. Pet., 41-42; Ex. 1002, ¶92. Given these advantages, for example, Petitioner and its expert, Dr. Brookstein, explained that a POSA would have been motivated to include such a three-dimensional dome structure in Dua's flat-knitted upper. Pet., 41-42; Ex. 1002, ¶92.

Hong teaches how to flat knit three-dimensional structures, including a three-dimensional dome like Lockwood's. *Id*. Dua and Lockwood together show that a POSA would have been motivated to include a domed, three-dimensional structure in Dua's flat-knit upper during the knitting process. Pet., 42-43; Ex. 1002, ¶¶93-94.

Hong confirms that it was within the ability and knowledge of a POSA to do so. Pet., 43-44; Ex. 1002, ¶95.

For Grounds 3-4, Nike does not dispute that a POSA would have been motivated to combine the teachings of Dua, Hong, and Lockwood. POR, 19-36. Specifically, Nike does not dispute that a POSA would have been motivated to flat knit a three-dimensional structure, as taught by Hong, into an upper like Dua's, given Lockwood's disclosure of such a structure that simplifies the assembly process, reduces the need for cutting, and reduces waste. Pet. 41-44.

However, with respect to Grounds 1-2, Nike argues that a POSA would not have been motivated to combine the teachings of Lockwood and Dua. POR, 16-19. Nike presents four arguments to support this assertion (*id*.), but none of these arguments address the motivations outlined in Grounds 3-4 for modifying Dua in view of Hong and Lockwood. Pet., 41-44. To the extent Nike suggests these arguments regarding the combination of Lockwood and Dua apply to Ground 3-4, that argument fails.

First, Nike argues that a POSA would not have been motivated to combine the molding features of Lockwood with the knitting features of Dua because molding plastic uppers with fibrous reinforcement differs from creating knitted uppers. POR, 16-17. However, these arguments do not apply to Grounds 3-4, which show that a POSA would have been motivated by Hong to flat knit a three-dimensional structure

in an upper like Dua's based on Lockwood's domed, three-dimensional structure (Pet., 41-44). The motivations presented in the Petition are substantiated by the benefits and motivations set forth in the prior art references themselves. *Id*., 18-22, 41-44. Moreover, creating a knitted upper with the desirable shape of Lockwood would have been a simple substitution of one known method for another to yield a predictable result. *Id*., 43-44; *KSR Intern. Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007); *see also Agrizap, Inc.* v. *Woodstream Corp.*, 520 F.3d 1337 (Fed. Cir. 2008) (finding claims obvious where simple substitution of one known element (resistive switch) for another (mechanical switch) yielded no more than predictable result). For this additional reason, the challenged claims of the '484 patent should be held unpatentable.

Second, Nike argues that "[a]ny benefits that derive from the unitary construction of or varying textures in Dua's textile element would be lost in Lockwood's upper." POR, 17-18. But Grounds 3-4 do not involve incorporating Dua's textile element into Lockwood's upper. Nike has not shown, nor can it show, that flat knitting an upper like Dua's to include a domed, three-dimensional structure would compromise the unitary construction or varying textures disclosed in Dua. Moreover, none of the claims require varying textures of the upper. Additionally, Lockwood itself teaches the use of a textile element, and a POSA would have been

motivated to flat knit such an element for all the reasons provided in the Petition. Pet. 16-22.

Third, Nike argues that Lockwood's system uses a "blank" in the form of a "plane rectangular piece of sheet material," asserting that any benefits of flat knitting would not apply to Lockwood's upper. POR, 18. However, this argument is irrelevant to Grounds 3-4 because it pertains solely to modifications of Lockwood's upper, not to the flat knitting of a three-dimensional upper.

Fourth, Nike argues that relying on the existence of a finite number of options for producing Lockwood's fibrous element is insufficient to demonstrate a motivation to combine Lockwood and Dua. *Id*., 18-19. But this argument is irrelevant to Grounds 3-4, which do not involve modifying Lockwood's upper or fibrous element. Pet., 41-44. Moreover, the Petition presents multiple motivations for the combination, with the finite number of options being just one among them. *Id*. 18-22.

A POSA would have been motivated to combine the teachings of Dua, Hong, and Lockwood, as set forth in Grounds 3-4.

B. Hong Teaches Flat Knitting Three-Dimensional Structures During the Knitting Process

Nike argues that Hong fails to teach flat-knitting processes capable of producing three-dimensional structures. POR, 19-20. But, as set forth in the Petition, Nike previously took the exact opposite position, explicitly arguing Hong

teaches "that achieving three-dimensional knitted textiles may generally be obtained through flat knitting." Pet., 5-6, 11-12, 43-44.

Specifically, during prosecution of the '484 patent's European counterpart, the European Patent Office objected to Nike's claims, reasoning that the application does not teach how to create "a domed shape formed through the flat knitting process such that the central portion has a three-dimensional structure." Ex. 1017, 15. To overcome the objection, Nike pointed to Hong as evidence that such processes were known and stated that Hong teaches forming three-dimensional structures through a flat-knitting process. *Id*., 8.

Nike asserts that these arguments in Europe were made by one of its subsidiaries, Nike Innovation C.V., and that the arguments were somehow "mischaracterize[d]" in the Petition. POR, 20 fn. 1. However, as an initial matter, the arguments were made in relation to the European counterpart of the '484 patent and directed to a limitation also in dispute in this IPR. Nike cannot use corporate formalities to distance itself from these express admissions. Furthermore, although Nike baldly claims that Petitioner "mischaracterizes" the record, Nike neither explains how the arguments were allegedly mischaracterized nor provides an alternative interpretation. *Id*. The reason is evident—Nike's admissions are unambiguous when viewed in the full context of Nike's correspondence with the

European Patent Office. The European examiner had objected to the specification's lack of support, stating:

> The application does not meet the requirements of Article 83 and 84 EPC, because claim 1 is not clear to such an extent that it cannot be carried out by the skilled person.
>
> The subject-matter of claim 1 discloses an upper comprising a central portion, wherein the central portion has "a domed shape formed through the flat knitting process such that the central portion has a three-dimensional structure"; the present subject-matter is only disclosed (see above point 2.) at para. 54 and 55 of the description, wherein nothing is described nor disclosed nor explained on how a domed three-dimensional knitted element could be manufactured through a flat-knitting process. It is clear to any skilled person that the present subject-matter lacks essential information on how such an effect (domed portion) could be achieved.

Ex. 1017, 15. In response, Nike pointed to Hong, asserting that it was well known that three-dimensional structures could be flat knitted:

> In view of the objection raised in item 3 that the person skilled in the art is allegedly not provided with sufficient information to rework the

> subject matter of pending claim 1 in view of the three-dimensional knit structure, we also respectfully disagree.
>
> There are numerous prior art documents which disclose that achieving three-dimensional knitted textiles may generally be obtained through flat knitting, such as e.g. "The development of 3D shaped knitted fabrics for technical purposes on a flat knitting machine," Hong et al., IJFTR 19(3), Vol. 19, Sept. 1994, pp. 189-194. Hence, the objection appears to be unfounded.

Id., 8. Subsequently, the European examiner withdrew the objection and indicated the claim appeared to be allowable. *Id*., 3-5.

There is no ambiguity or mischaracterization of these statements. Nike cannot credibly argue that Hong fails to teach flat knitting three-dimensional structures in textiles.

Regardless of Nike's new and inconsistent arguments, Hong clearly discloses making three-dimensional structures during the flat-knitting process. Hong is a 1994 article titled: "*The development of 3D shaped knitted fabrics . . . on a flat knitting machine.*" Ex. 1005, 1. It would have been unremarkable in 1994 to knit two-dimensional fabrics and then process them into a three-dimensional article. Ex. 2005, 86:21-87:23. Instead, Hong describes the "new electronic flat knitting machine (Shima Seiki SES 122FF) for producing three-dimensional shaped

fabrics…." Ex. 1005, 1. Nike's own expert, Dr. Pastore, admitted that "Shima Seiki machines that had the[] capabilities to flat knit three-dimensional structures were available since the 1990s." Ex. 1022, 23:4-27:15. Pastore further confirmed that a POSA would have been familiar with such machines. *Id*., 19:19-21:7, 26:2-11.

Hong also states that "knitting directly the 3D shapes can overcome fabric waste and diminish the labour cost inherent to the use of two-dimensional fabrics." Ex. 1005, 5. The Institution Decision correctly noted that Hong teaches creating a three-dimensional shape through Hong's flat-knitting process rather than simply a post-knitting step. ID, 8.

Hong describes "the use of the new flat knitting machines to ***knit 3D structures***." Ex. 1005, 1[1]. For example, Hong explains that "***[d]uring knitting***, the two smaller tubes are separately knitted with two cam systems." *Id*., 4. This describes how the flat knitting machine closes the curved three-dimensional structures, such as tubes, during the knitting process. Ex. 2005, 23:11-19, 49:20-50:10, 166:1-8. Additionally, Hong teaches that "it is not difficult to knit a spherical form in the SES 122FF flat knitting machine." Ex. 1005, 4. Hong further explains that "[b]y exploiting the capacity of this machine, it is possible to knit more types of three-dimensional knitted ***fabrics***." *Id*., 6. Indeed, as Brookstein explained, the Shima Seiki machine described in Hong produces three-dimensional shapes during

[1] Emphasis added unless otherwise noted.

the knitting process itself. Ex. 2005, 65:8-15, 67:13-19, 69:9-16, 70:5-10, 165:4-20, 166:1-8; Ex. 1002, ¶¶30, 89, 91.

Hong teaches that "[f]abrics knitted with the same knitted structure but using different loop lengths have different geometrical dimensions" (Ex. 1005, 2), indicating that three-dimensional variations are integrated during the knitting process (Ex. 2005, 61:10-17, 65:8-15). Additionally, Hong notes, "If one fabric is knitted with different loop lengths in different courses, shaping can take place" (Ex. 1005, 2), which includes three-dimensional contours. Hong also describes adjusting the number of operating needles from course to course by holding stitches on idle needles. *Id*., 2-3. This technique further enables the creation of three-dimensional structures during the knitting process. Ex. 2005, 65:8-15.

Nike asserts that the Petition erroneously relies on five aspects of Hong as teaching the formation of three-dimensional structures during the knitting process. POR, 21. However, Nike's arguments are contrary to the express teachings of Hong, inconsistent with Nike's own prior admissions, and simply not credible.

First, Nike argues that Hong's knit fabrics only assume a three-dimensional shape by processing them after knitting. *Id*., 22. For support, Nike points to Hong's use of two-dimensional patterns. *Id*., 21-22. But the two-dimensional ***patterns*** are used to program the machine, which then knits a three-dimensional fabric. Ex. 2005, 98:25-99:10, 165:4-20, 166:1-8. As the Board noted, when Hong uses a two-

dimensional pattern, it uses the pattern to merely establish the needles and courses for the flat-knitting process. ID, 8; Ex. 1005, 1-2. Hong teaches that after the machine is programmed with the pattern, it knits the three-dimensional shaped ***fabric***. Ex. 2005, 20:22-21:11, 56:6-58:2.

Nike points to portions of Hong to support its argument. POR, 22. But even those quotes confirm that Hong teaches knitting a three-dimensional fabric. Specifically, Nike argues that Hong discloses: "The fashioning operation (increasing or decreasing the number of knitting needles) is only determined according to two-dimensional patterns." *Id*., 22 (emphasis removed) (citing Ex. 1005, 3). Yet the very next line of Hong states: "***The three-dimensional shaped knitted fabrics presented in this work are all knitted by using this technique***." Ex. 1005, 3.

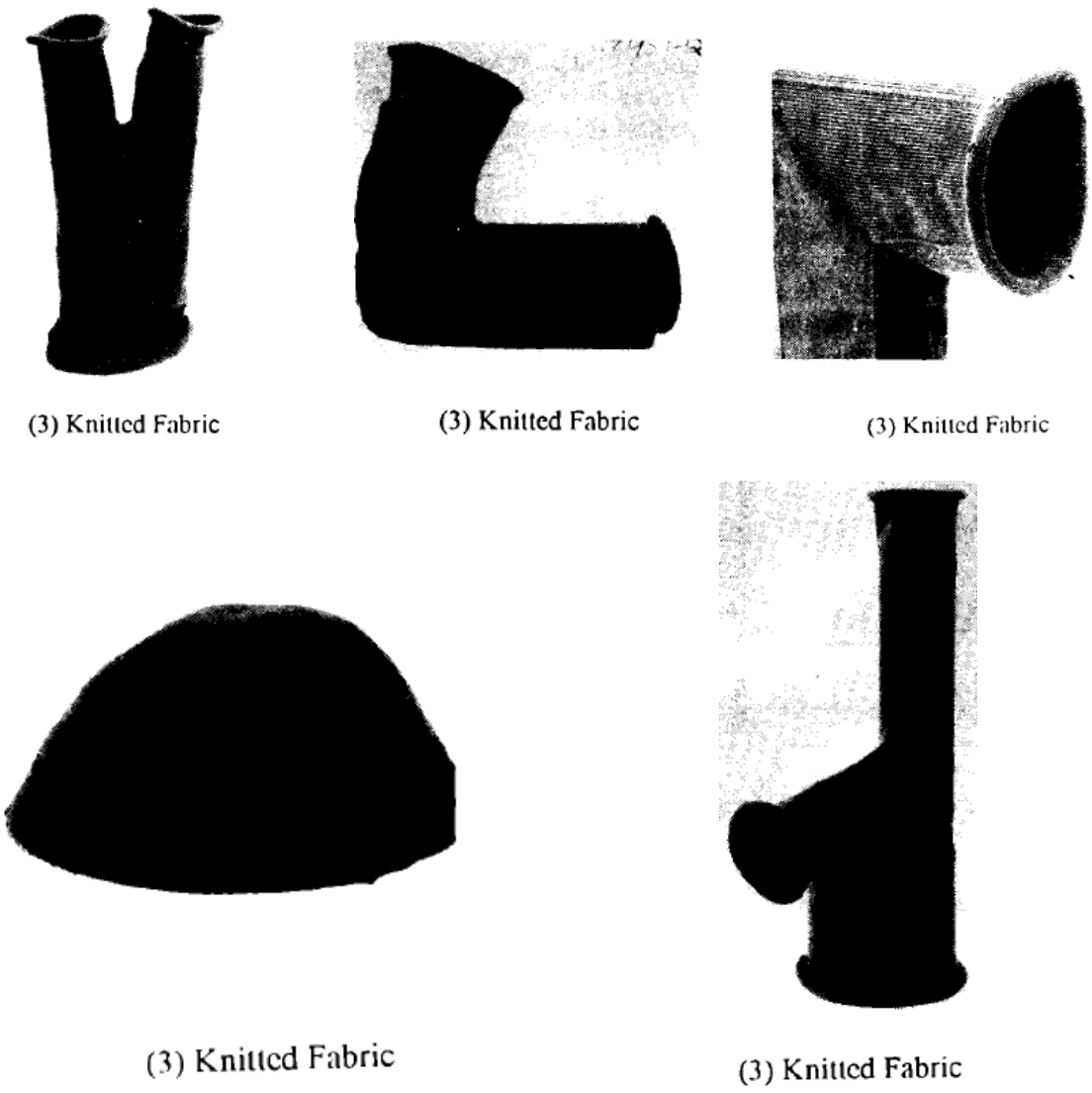
Second, Nike argues that "[t]he 'Knitted Fabrics' depicted in Figures 3(3)-9(3) would have required post-knitting processing to reach their final 'as-shown' form." POR, 23. For example, Nike insists that the three-dimensional shapes shown in Figures 3(3)-9(3) of Hong are not three-dimensional shaped knitted fabric. *Id.* However, Nike not only ignores Figure 7, which is discussed the Petition, but also mischaracterizes Figures 3(3)-9(3).

The three-dimensional shapes depicted in Figures 3(3)-9(3) are described in Hong's Section 4, under the heading "Three-Dimensional Shaped Knitted Fabrics Developed on the Shima Seiki SES 122FF Machine." Ex. 1005, 3. This heading

clearly indicates that the three-dimensional shapes are knitted. Additionally, Section 4's Subheading 4.1, "Tubular Forms," describes how to knit three-dimensional tubular forms. *Id*. If Hong were merely describing a machine that knits flat, two-dimensional sheets that could later be rolled into tubes, it would have been unremarkable in 1994. Ex. 2005, 86:21-87:23. Instead, Hong teaches how this new machine knits three-dimensional tubular forms:

> The tubular forms are knitted on both needle beds. When the number of operating needles in one bed is changed, a "knee" form is developed. The different tubular forms knitted on the SES 122FF flat knitting machine are shown in Figs 3-6.

Ex. 1005, 3. Various three-dimensional knit fabrics "***knitted on the SES 122FF flat knitting machine***" are shown below:



Id., 3-6. Hong plainly teaches knitting three-dimensional textiles, including a domed structure with respect to Figure 7, on a flat knitting machine.

Next, Nike argues that the presence of a seam implies Hong's processes can only generate two-dimensional structures. POR, 23-24. But Nike's own '484 patent shows a seam in its domed, three-dimensional structure. In particular, Figures 10A-10B below depict the central portion 71 with a seam, directly contradicting Nike's

implication that seams are incompatible with the creation of three-dimensional structures during the knitting process (Ex. 2003, ¶52).

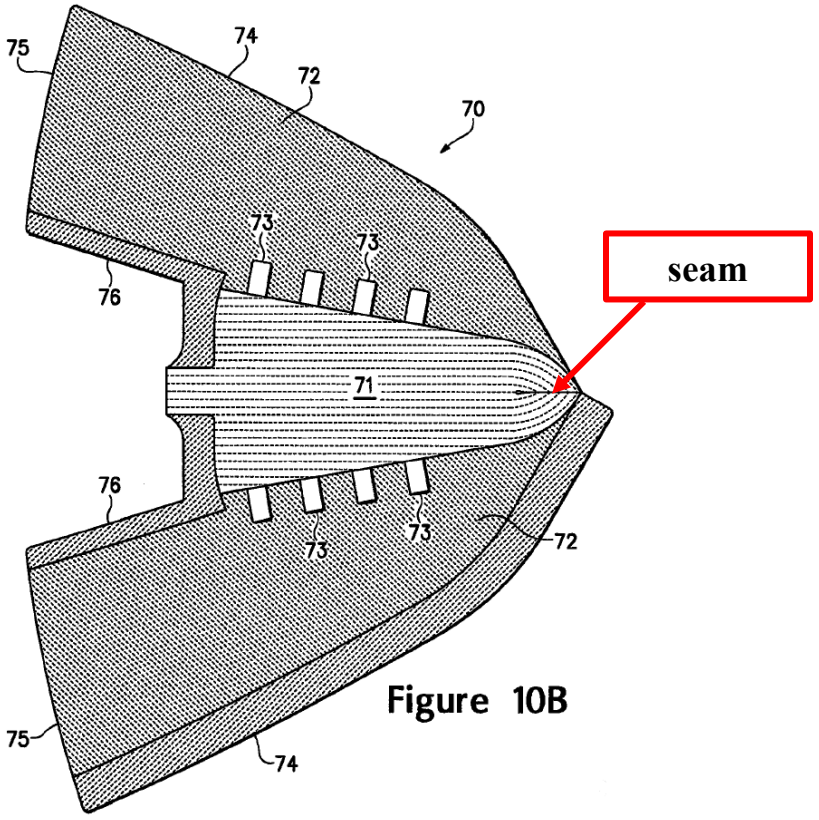


Figure 10B

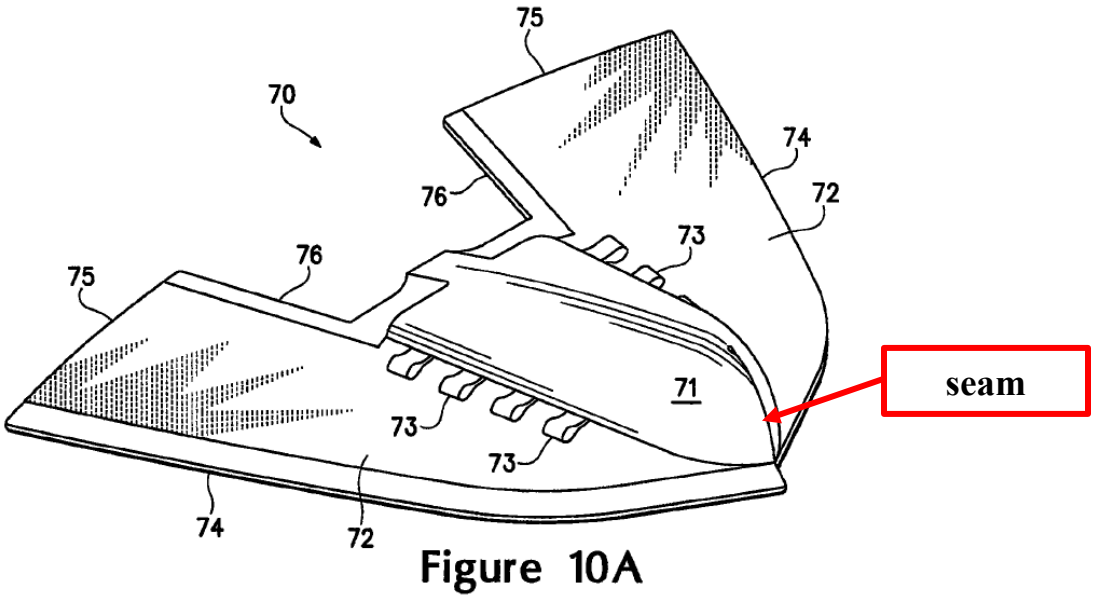


Figure 10A

Ex. 1001, Figs. 10A-10B (annotated).

Even if Nike identified seams in Figure 3 that somehow informed how that specific textile was knitted, Nike fails to point to any seams in the three-dimensional textiles shown in Figure 7 or the other figures in Hong (POR, 23-24). Nike's argument fails for this additional and independent reason.

Third, Nike contends that Hong's disclosure of "knitting to shape" refers only to the production of two-dimensional shapes during the knitting process. *Id*., 24-25. However, this interpretation is incorrect and disregards the specific processes disclosed in Hong. A POSA would have recognized that "knitting to shape" can include knitting to three-dimensional shapes. Ex. 2005, 64:15-65:15, 116:7-25; Ex. 1002, ¶¶89-91. In fact, Pastore confirmed that "knit to shape" articles can include three-dimensional structures "like this patented object with the domed three-dimensional structure." Ex. 1022, 56:21-57:13. A POSA would have understood that at least some of Hong's "knit to shape" examples specifically involve creating three-dimensional shapes through flat knitting techniques. Ex. 2005, 165:4-20, 166:1-8, 67:13-19, 69:9-16, 70:5-10; Ex. 1002, ¶¶89-91.[2]

[2] Nike's tortured interpretation of Hong is further highlighted by Nike's reference to parts of Hong's disclosure as a "claimed invention," when Hong is an article describing knitting three-dimensional fabrics with a Shima Seiki machine. POR, 25.

Fourth, Nike asserts that the benefits described in Hong are limited to "knitting to shape" two-dimensional structures. POR, 25-27. This misrepresents Hong's disclosure, which explicitly 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, 1. Dr. Brookstein, during his deposition and in his declaration, explained that the Shima Seiki machine in Hong is capable of knitting to shape both two-dimensional and three-dimensional structures. Ex. 2005, 116:7-25; Ex. 1002, ¶¶30, 89, 91.

Nike further argues that Brookstein agreed in his deposition that "the benefits articulated in Hong are simply benefits of knitting-to-shape garments vs. cut-and-sew garments." POR, 26-27. But, in the cited testimony (Ex. 2005, 114:18-115:10), Brookstein merely discussed the benefits of knitting to shape and acknowledged some benefits in Hong's approach over cut-and-sew methods. At no point did Brookstein suggest Hong's benefits are limited to knitting-to-shape two-dimensional fabrics.

Fifth, Nike asserts that Hong's reference to knitting "fully fashioned garments" is equivalent to "knitting to shape" and thus limited to knitting two-dimensional structures. POR, 27. But Nike cannot use this unsupported argument to explain away Hong's clear disclosure of flat-knitting three-dimensional "fully fashioned garments." As explained in the preceding paragraphs, Hong's use of

"knitting to shape" is not limited to two-dimensional fabrics. A POSA would also have understood Hong's reference to "knitting to shape" as describing three-dimensional knitting processes. Ex. 2005, 48:12-23, 61:3-17, 64:15-65:15.

Nike and its expert seem to be applying an overly narrow construction of the claims, requiring that the domed three-dimensional structure must exist in its three-dimensional shape while still within the flat knitting machine. Pastore testified that, according to the '484 patent, "the sides are planar but the domed three-dimensional structure is a domed three-dimensional structure while it's still inside the knitting machine." Ex. 1022, 41:14-42:18. Pastore also confirmed his opinion that the claims require the "domed three-dimensional structure exists in its three-dimensional shape within the flat knitting machine." *Id.* Pastore relies on this restrictive interpretation to opine that Hong fails to teach forming three-dimensional structures during the knitting process. Ex. 2003, ¶¶50-53. But nothing in the '484 patent or its claims requires that the three-dimensional structure must exist in its three-dimensional form within the knitting machine. In fact, the '484 patent does not describe any specific flat knitting machine or process that creates a formed three-dimensional structure within the knitting machine. But even under this narrow construction, Hong discloses such a machine and processes. Ex. 1005, 1, 4, 6. Nothing in Hong limits the knitting of three-dimensional structures to occurring only

outside the knitting machine. Therefore, Nike's attempt to narrow the claims to avoid the prior art should be rejected.

In sum, Nike's previous statements in Europe correctly acknowledged Hong's unambiguous teachings on flat knitting three-dimensional structures during the knitting process. Nike's new attempt to rewrite Hong and distance itself from its own prior admissions lacks merit.

C. The '484 Patent's Lack of Disclosure Further Undermines Nike's Arguments

Nike's argument that Hong does not teach flat-knitting a three-dimensional structure lacks merit for the independent reason that Nike's own '484 patent fails to disclose any processes for flat knitting a three-dimensional structure. The '484 patent provides no description of how to flat knit the claimed three-dimensional structures. Instead, it treats such flat knitting as conventional, merely stating that an unspecified flat-knitting process can form a three-dimensional structure shaped to extend over a foot. Ex. 1001, 10:36-38. The '484 patent does not identify or describe any specific flat knitting machine capable of producing the disclosed domed structure.

During prosecution of the European counterpart to the '484 patent, Nike was required to defend the lack of disclosure regarding how to flat knit a domed, three-dimensional structure. Instead of pointing to any disclosure within the '484 patent, Nike relied solely on prior art–namely Hong–to argue that "achieving three-

dimensional knitted textiles may generally be obtained through flat knitting." Ex. 1017, 8. The European examiner correctly determined that the specification lacks enabling disclosure, and Nike was unable to point to any such support in the '484 patent for claiming a domed, three-dimensional structure that is flat knit. This absence of enabling disclosure shows that flat knitting three-dimensional structures must have been within the skill of the art. *Abbott Labs. v. Andrx Pharms., Inc.*, 452 F.3d 1331, 1341 (Fed. Cir. 2006) (explaining that the patent demonstrates that alleged invention was within scope of the ordinary skill in the art, "and it does so not by what [the patent] discloses but by what it *does not* disclose.") (emphasis in original); *In re Epstein*, 32 F.3d 1559, 1568 (Fed. Cir. 1994); *Smith & Nephew, Inc. v. Rea*, 721 F.3d 1371, 1381 (Fed. Cir. 2013).

Accordingly, the '484 patent did not solve any problems associated with flat knitting three-dimensional structures, but instead confirms that such flat knitting was already within the skill of the art. *Abbott Labs.*, 452 F.3d at 1341; *Epstein*, 32 F.3d at 1568; *Smith & Nephew*, 721 F.3d at 1381. A POSA would have had a reasonable expectation of success using prior art processes and machines to form a domed, three-dimensional structure during a flat-knitting process. Ex. 1002, ¶95. Nike cannot insist on exceptionally detailed disclosures from prior art to demonstrate knowledge of such flat-knitting processes when the '484 patent itself lacks any such teaching and relies solely on the knowledge of a POSA. *Epstein*, 32 F.3d at 1568

("[T]he Board's observation that appellant did not provide the type of detail in his specification that he now argues is necessary in prior art references supports the Board's finding that one skilled in the art would have known how to implement the features of the references and would have concluded that the reference disclosures would have been enabling."). Moreover, Nike's own expert, Dr. Pastore, admitted that the machines described in Hong were familiar to a POSA and had the "capabilities to flat knit three-dimensional structures." Ex. 1022, 26:2-27:15.

Accordingly, Nike's arguments that Hong lacks sufficient disclosure for flat-knitting three-dimensional structures are undermined by Nike's own statements in Europe and the fact that Nike could only point to Hong for such flat-knitting processes.

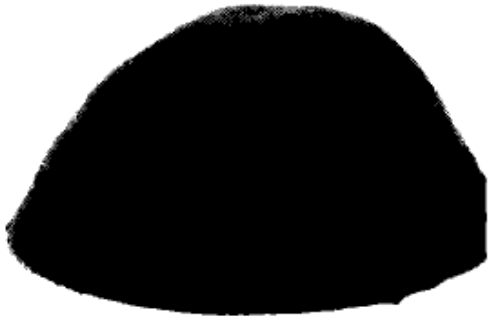
D. A POSA Would Have had a Reasonable Expectation of Success

Nike argues that a POSA would not have reasonably expected success in knitting a three-dimensional structure based on Hong. POR, 28-29. Nike specifically asserts that Hong fails to teach how to create three-dimensional structures during the knitting process. *Id*., 28. However, as explained in Sections IV.B-C, these arguments fail. Nike's analysis mischaracterizes Hong's disclosure and focuses on select examples rather than Hong's full teachings. In fact, Nike's arguments rely on Pastore's analysis of Figure 3, which is significantly different from the Figure 7 example Brookstein cited. Moreover, Pastore confirmed that the

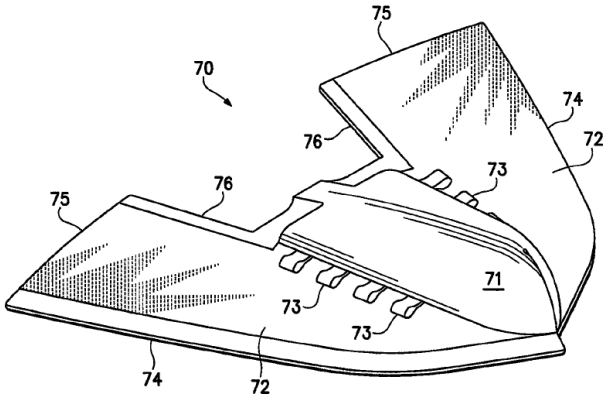
machines described in Hong had the "capabilities to flat knit three-dimensional structures." Ex. 1022, 26:2-27:15.

Hong not only discusses specific processes for flat knitting three-dimensional structures, but also emphasizes the advantages of these processes, such as overcoming fabric waste and diminishing labor cost. Ex. 1005, 5. As Brookstein explained, Hong discloses several ways of producing three-dimensional shapes during the flat-knitting process, including using different loop lengths and adjusting the number of operating needles. Ex. 2005, 65:8-15, 67:13-19, 69:9-16, 70:5-10; Ex. 1002, ¶89; Ex. 1005, 2-3. Additionally, Hong provides an example of flat knitting a spherical structure (Ex. 1005, 4-5), underscoring the feasibility of flat knitting a three-dimensional structure like the one resulting from the combination of Dua, Hong, and Lockwood. Ex. 1002, ¶¶89, 92-95.

Despite Hong's clear disclosure of flat-knitting three-dimensional structures, Nike argues that "[i]t 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)" of Hong. POR, 21 (citing Ex. 2003, ¶¶49-51). Among these figures is Figure 7(3), shown below left, which was also cited in the Petition (Pet., 39-40).



Hong Figure 7(3)



’484 Patent Figure 10A

Ex. 1005, Fig. 7(3); Ex. 1001, Fig. 10A. The spherical structure in Figure 7(3) is described by Hong as “not difficult to knit” using the Shima Seiki machine (Ex. 1005, 4), directly contradicting Nike’s assertion that such a structure was impossible for a flat-knitting machine to output in 1994 or even 2006. Nike’s assertion is even more unreasonable considering the ’484 patent’s lack of disclosure on flat-knitting processes, much less on how to form the dome and lace loops in the ’484 patent’s Figure 10A (above right) during the knitting process.

Nike also repeats its argument that the presence of seams in the knitted structure implies that the three-dimensional structure cannot be formed during the knitting process. POR, 28. But as explained above, this assumption is unfounded. *See supra,* Section IV.B. In fact, the domed, three-dimensional structure shown in the ’484 patent includes a seam, directly contradicting Nike’s argument.

E. A POSA Would Have Known to Knit a Three-Dimensional Structure "Shaped to Extend Above the Plane of the First Side Portion and the Second Side Portion"

Nike asserts that Hong fails to disclose forming a flat-knitted element with a three-dimensional structure that extends above side portions when in a flattened configuration. POR, 29. According to Nike, Hong only describes closed-periphery three-dimensional structures without any flattened portions. *Id*. This argument disregards key aspects of Hong's disclosure. For example, Hong's disclosure describes flat knitting three-dimensional structures by changing the loop length or the number of operating needles during the knitting process. Ex. 1005, 2-3; Ex. 2005, 65:8-15. These adjustments enable integration of two-dimensional and three-dimensional elements within the same knitted structure, allowing for knitting of a three-dimensional structure which extends above the plane of flat side portions. Ex. 2005, 65:8-15, 116:7-25.

Moreover, Nike's arguments disregard the teachings of Dua and Lockwood. When Hong is considered in combination with Lockwood and Dua, the collective teachings support the feasibility and desirability of constructing a flat-knitted element with the claimed three-dimensional structure. Lockwood discloses a domed, three-dimensional structure shaped to extend above the plane of side portions. Ex. 1003, Fig. 35, 1:60-64; Ex. 1002, ¶¶93, 95. A POSA would have been motivated to include such a domed, three-dimensional structure in the central portion

of an upper similar to Dua's to "simplify[] the assembly of uppers by a technique of preshaping the upper forepart component," as disclosed in Lockwood. Ex. 1003, 1:60-64; Ex. 1002, ¶¶92-95. And a POSA would have been motivated to use a flat-knitting process, like those described in Hong, to flat knit a domed, three-dimensional structure in an upper like Dua's. Ex. 1002, ¶¶92-95.

F. Claims 2, 10, 18: The Claimed Flat-Knitted Element with First and Second Layers Would Have Been Obvious

Regarding independent claim 10, Nike argues that neither Dua nor Hong teaches or suggests the claimed flat-knitted element with first and second layers, where the second layer is flat-knitted with the first layer at opposite ends of the second layer to form an overlapped loop. POR, 30-35. Specifically, Nike argues that Dua's disclosure of a textile element with laces and unitary construction is insufficient because it is unclear that "any components on Dua's upper must have been knitted together." *Id*., 30-32. However, the Petition showed that Dua's upper and loops for laces are knit together and did not need to establish that ***all*** other components are also knitted together. Pet., 56-57, 66.

Nike incorrectly focuses on non-knitted components shown in Figure 12 of Dua to support its arguments. POR, 31-32. The Petition, however, specifically relied on Figure 13 (Pet., 56-57), which discloses lace loops. Therefore, Nike's reliance on Figure 12 is misplaced.

Nike argues that it is unclear whether the illustrated loops in Figure 13 are lace loops. POR, 32-33. Although these loops are not labeled as "lace loops," a POSA would identify them as such based on their configuration and placement. Ex. 2005, 136-25:138-9; Ex. 1002, ¶111. Nike also argues that it is unclear to which layer of the upper these loops are attached. POR, 32-33. But Nike's emphasis on the specific layer overlooks the teachings of the combined references. The Petition demonstrated that it would have been obvious to use a flat-knitting process to incorporate lace loops into an upper like Dua's, as confirmed by Hong's teachings. Pet., 57.

Nike further argues that Dua does not disclose the claimed flat-knitted element with the first and second layers because it does not describe loops knitted with Dua's textile element 40. POR, 33. But this argument fails to consider that Dua teaches its textile element may form the exterior surface of the upper 30 (Ex. 1004, [0037]), where loops would be connected.

Nike also tries to rely on Brookstein's misidentification of a specific layer in Figure 13 during deposition. POR, 32-33. But Brookstein's confusion between the "second layer" claim terminology and Nike's counsel's reference to first, second, and third layers (interior, intermediate, exterior) in Figure 13 does not substantiate Nike's argument. Ex. 2005, 144:10-145:5. Nike's argument fails to address the

Petition's showing that flat knitting lace loops in an upper like Dua's would have been obvious. Pet., 57.

Moreover, Nike's argument that Dua's Figure 13 is unclear is undermined by the ambiguity in the '484 patent's description of lace loops. The '484 patent shows a domed, three-dimensional structure in only three figures (Figures 10A-10C), with minimal explanation (Ex. 1001, 10:18-46). These disclosures do not specify how the lace loops 73 were formed or whether they were integrated with the upper 70 as a unitary construction. The '484 patent merely states that the upper 70 is flat knit and includes the lace loops 73. Ex. 1001, 10:18-46.

Nike also asserts that Hong fails to disclose knitting the claimed overlapped loop with the first layer. POR, 33. But the Petition showed that Dua discloses such a loop can be part of Dua's flat-knitted upper. Pet., 56-57, 66. Hong was cited as additional support, showing that constructing an overlapped loop with the first layer through flat knitting would have been obvious. *Id*. Nike's focus on the term "loop" as referring to a stitch (POR, 33-35) ignores Hong's discussions on "knit[ting] 3D structures" and "knit[ting] fully fashioned garments" (Ex. 1005, 1), which clearly involve techniques applicable to flat knitting lace loops together with an upper like Dua's.

Thus, claim 10 would have been obvious. For these reasons, Dua and Hong also render obvious dependent claims 2 and 18, and Nike's arguments fail.

G. Ground 4: It Would Have Been Obvious to Add a Unitary Loop to the Flat-Knitted Element Further in View of Voughlohn

As further evidence that the claimed unitary loop features would have been obvious, Ground 4 introduces Voughlohn. Voughlohn discloses a lace receiver loop attached to or integrated into an upper. Ex. 1006, [0377]-[0379]. The Petition explained that it would have been obvious to a POSA to incorporate such a loop into an upper like Dua's using a flat-knitting process. Pet., 75-79 (citing Ex. 1002, ¶¶149-158).

Nike argues that Voughlohn does not disclose a loop of unitary construction with an upper and that bodily incorporating Voughlohn's loop lace-receiver into Dua would not result in a unitary flat-knitted element. POR, 36-37. This, however, mischaracterizes the Petition. The Petition showed that "[a] POSA would have been motivated to incorporate Voughlohn's fabric rings in Dua's upper (or a similar upper)," and that "Dua discloses its upper components are desirably formed of a unitary construction." Pet., 75-76. The Petition neither required nor suggested the bodily incorporation of Voughlohn's lace receivers into Dua's upper. Instead, the Petition demonstrated that "[a] POSA would have reasonably expected success in integrating Voughlohn's lace receivers (loops for laces) in an upper such as Dua's." *Id*., 76.

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that this **PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE** contains 5,584 words according to the word-processing program used to prepare this paper. The foregoing word count complies with the 5,600-word type-volume limit specified by 37 C.F.R. § 42.24(c)(1).

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