

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALBANY INTERNATIONAL CORP.,
Petitioner,

v.

VOITH PATENT GMBH,
Patent Owner

IPR2025-01116
U.S. Patent 11,261,566

PATENT OWNER'S RESPONSE

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Patent Trial and Appeal Board
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EXHIBIT LIST

Exhibit	Description
2001	Declaration of Dr. David Brookstein
2002	CV of Dr. David Brookstein
2003	<i>Nike, Inc., v. Lululemon USA Inc.</i> (1:23-cv-00771) Order (Exclusion of Dr. Pastore Testimony) (Dec. 20, 2024)
2004	<i>Nike v. Lululemon</i> (1:23-cv-00771) Hearing Transcript (“Junk Science”) (Dec. 19, 2024)
2005	Adanur & Rydin Figures Comparison
2006	Rydin Fig. 3 Seam Loop Detail
2007	Adanur Fig. 3.15 Scale Bar Detail
2008	Adanur Fig. 3.15 Seam Loop Detail
2009	Adanur Fig. 3.15 MD Thread Detail
2010	Rydin Fig. 2 MD Thread Detail
2011	Second Declaration of Dr. David Brookstein
2012	Transcript of Dr. Christopher Pastore’s 3/23/2026 Deposition
2013	Adanur, 1st Edition (excerpts)
2014	Simal et al., “Structure of Heat-Treated Nylon 6 and 6.6 Fibers. I. The Shrinkage Mechanism”
2015	U.S. Patent No. 7,892,402 to Hawes (“Hawes”)
2016	TAPPI Press, “The Paper Machine Wet Press Manual,” Copyright 1991
2017	Matthias W. Schmitt, “Advanced Innovative Fabric Materials for Paper Machine Clothing (PMC)” TAPPI/PIMA PaperCon ’08 Conference, May 4-7 2008, Dallas, TX

Exhibit	Description
2018	U.S. Patent No. 7,207,355 to Lee (“Lee_355”)
2019	Robert Eberhardt LinkedIn Page
2020	Susanne Klaschka Press Release
2021	July 31, 2025, PTO Memorandum

I. Introduction

A review of the asserted prior art references demonstrates that the grounds in the Petition do not render the challenged claims unpatentable. The Petition mischaracterizes the substance of the prior art, missing or glossing over crucial points that show the prior art *teaches away* from the claimed combination. The Petition also fails to address that the combination could never be made in practice. Finally, the Petition is a quintessential example of impermissible hindsight.

Petitioner uses the challenged '566 Patent claims as a roadmap for its obviousness challenges, even though the cited references themselves made no such conclusions and in fact taught away from the claimed solution. Without support in the prior art, Petitioner struggles to articulate a coherent basis for its conclusory arguments and fails to identify references that disclose the claimed elements. Instead, Petitioner selectively chooses parameters from a disparate collection of technologically distinct references to assemble an LD/MDYD ratio and loop density found nowhere in the prior art—while ignoring or disregarding express teachings in those references that undermine its proposed combinations.

Ground 2 is based on Petitioner's fundamental misrepresentations of the prior art. Lee concerns an entirely different fabric construction than Sudre and Penven—one that Lee itself expressly presents as a departure from, and replacement of, flat-woven technology. As explained in more detail below, Ground

2 ignores the structural incompatibility between Lee and Sudre and relies on Petitioner’s selective misreading of Lee’s disclosures, and therefore, must fail.

Grounds 1 and 3 further rest on an unreliable pixel-based methodology. The underlying references do not disclose the attributes that Petitioners claims, and Dr. Pastore derives claim limitations from unrelated images through inaccurate assumptions—the same type of methodology previously excluded as “junk science.”

Each ground fails to disclose the claimed elements as arranged in the claims. The combinations are a hindsight reconstruction using the ’566 Patent as a roadmap, not a legally or factually sufficient motivation to combine. None of the grounds provide a basis to invalidate any of the challenged claims.

II. Background

A. Technology Background

Paper machine clothing (“PMC”), and press felts in particular, operate in one of the most demanding environments in industrial textile engineering. These fabrics must simultaneously function as load-bearing structures, fluid transport media, and precision interfaces with the paper web—at high speeds, elevated temperatures, and under repeated compressive and tensile stresses. (EX2011, ¶¶25-31.) PMCs must cope with competing requirements: efficient water removal from the web, uniform surface contact to prevent marking, and structural consistency,

given that even slight permeability variations can produce visible defects in the finished product. (EX2011, ¶¶32-48.)

These tradeoffs vary by the desired end product as well as the machines available for manufacture. PMC structures vary widely across woven, laminated, and nonwoven architectures, each with distinct geometric constraints, manufacturing methods, and performance tradeoffs. (EX2011, ¶¶49-66.) In addition, some PMCs make use of seams, which further adds complexity and tradeoffs. While improving usability, seams create structural discontinuities that must behave indistinguishably from the surrounding fabric. They must maintain mechanical strength without affecting permeability, while providing additional marking. (EX2011, ¶¶34-54.) These requirements are in tension: improving seam durability can degrade permeability uniformity and increase marking, while improving uniformity can impair seam strength.

This is why PMC and seam design are complex multi-variable engineering problems, with a variety of solutions. They are not a matter of routine parameter selection. Thread diameter and density, weave pattern, batt structure, and seam geometry and structure interact in non-linear ways, where changes to one parameter often produce cascading and counterintuitive effects on others. (EX2011, ¶¶34-66.) These tradeoffs is evident from the wide range of solutions and designs for PMCs. §VI.A.1, *infra*. Optimizing PMC and seam performance

across competing objectives cannot be resolved through simple, isolated adjustments to individual design variables.

B. The '566 Patent

Flat-woven seam clothings present a known problem: “[a]t the seam point, the properties differ from those of the remaining parts of the clothing,” including that “the permeability for water and air is frequently higher here than in the rest of the clothing,” with the result that “quality losses [can] occur as a result of markings in the paper.” (EX1001, 1:58–63.) The '566 Patent set out “to specify a clothing which can be produced and used quickly and economically and, at the same time, overcomes the quality deficiencies known from the prior art.” (EX1001, 2:3–6.)

After extensive trial and error, the '566 patent inventors eventually combined a novel set of design choices to create a clothing “with a seam which—as a result of the high loop density—has a low permeability and nevertheless—as a result of the optimal LD/MDYD ratio, can be closed easily.” EX1001, 7:14–20. Critically, no prior art identified the relationship between round MD monofilaments, the LD/MDYD ratio of 2.7–3.6, and a loop density of 64–90% as the functional optimum balancing seam strength, closure, marking, and permeability.

As Claim 1 recites, the solution has a seam felt whose machine direction (MD) threads are “monofilaments with a round cross section” forming seam loops.

Uniquely, the '566 patent requires a fabric where the seam loop diameter (LD) to MD yarn diameter (MDYD) ratio is “between 2.7 and 3.6,” and the seam has “a loop density of between 64% and 90%.” (EX1001, 3:29-31, 6:64–65, 7:1–3, 7:8–11, 9:39-41, 10:11-13.)

Unknown previously, “[t]rials by the applicant have shown that, given the LD/MDYD ratios according to the invention, the seam produced is optimal from several points of view,” including that it “has a very high strength, without which a satisfactory use, for example as a seam felt, is not possible.” (EX1001, 3:1–7.) The patent also discovered that both boundaries of the LD/MDYD range are functionally critical. If the LD/MDYD ratio becomes “too large,” “[e]xcessively large loops can firstly lead to mechanical markings in the paper in that the bends of the loops are impressed into the paper”; moreover, “large loops would also mean that the seam area itself becomes comparatively large,” introducing “the danger in the seam area of hydraulic marking of the paper because of different dewatering.” (EX1001, 3:16–27.) An LD/MDYD below the claimed range impairs closure and seam function, as the benefit of an adequate loop-to-thread ratio—facilitating pintle insertion—is lost. The range of “between 2.5 and 4, in particular between 2.7 and 3.6, has proven to be the optimum compromise here.” EX1001, 3:28–31.

The same functional balance governs loop density. A loop density “between 64% and 90%” is preferred because, while a “comparatively high seam loop

density” reduces the seam’s elevated permeability, but “[i]ncreasing the loop density above 90% can ... lead to the ability to seam the clothing simply ... being to some extent lost, since it becomes more difficult to arrange for the seam loops to interengage.” (EX1001, 6:35–50.) In a manner “similar to ... the LD/MDYD ratio, the range of the seam loop density listed here is, in a certain sense, an optimum range with two opposing requirements.” EX1001, 6:47–51.

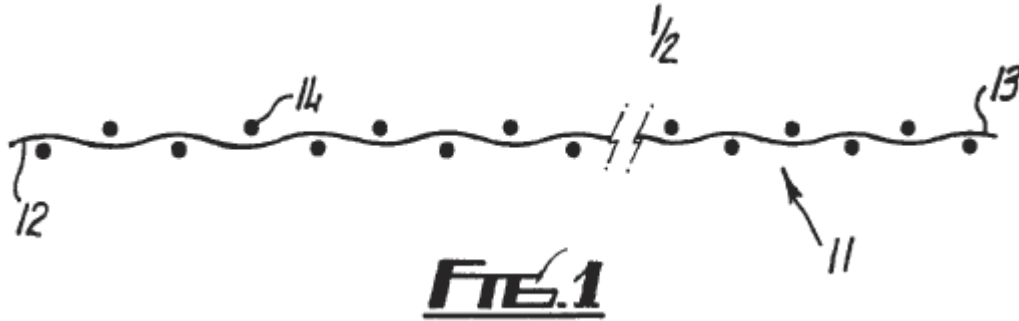
C. Prosecution History

The Examiner considered prior art directed to seam felts and flat-woven papermaking fabrics, including US 6,189,577 and US Publication No. 2009/0211722 as primary references, along with US Publication Nos. 2017/0044718 and 2009/0090425, EP0425523 (Sudre), and EP3196357, all considered by the Examiner. Applicant overcame the rejections proposing claim amendments, including the addition of specific quantitative limitations, such as loop density of 64%–90% and LD/MDYD ratio of 2.7–3.6 (EX1002, 62.)

D. Overview of the Cited Art

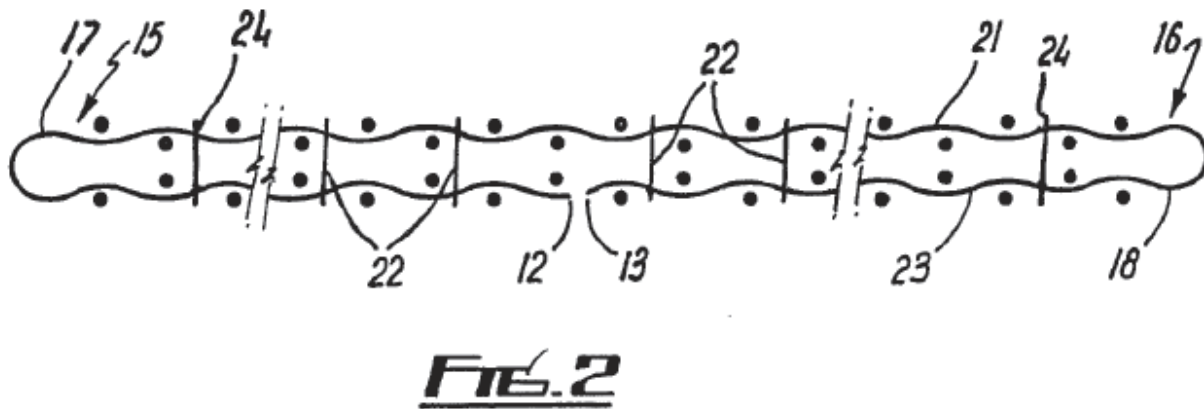
1. Sudre

Sudre discloses a seamable papermaker’s fabric formed from a **single flat-woven (or endless-woven) fabric** configured into a two-ply structure. Sudre describes forming a fabric with superimposed layers and fold regions at opposite ends, where cross-machine direction yarns are removed to create machine-direction seam loops. (Sudre, 1:25–2:4.)



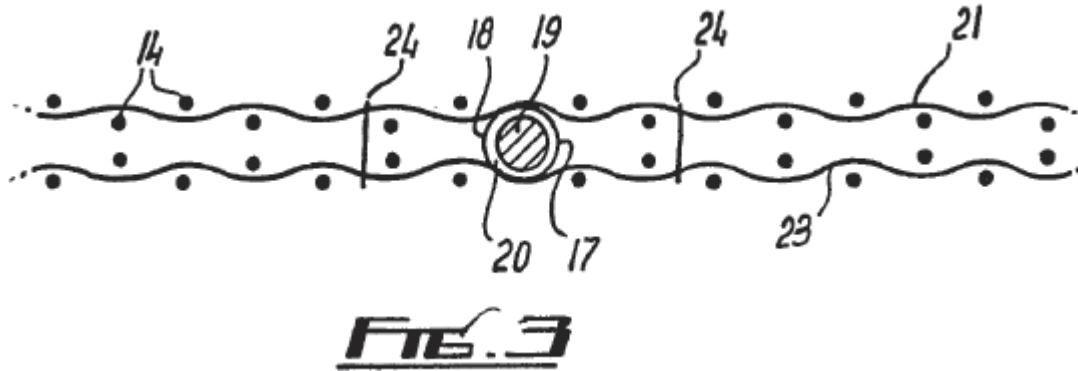
Sudre, Figure 1

Sudre's construction is based on a **single woven base fabric folded onto itself**. It does not include a separate or additional fabric structure, nor does it disclose any specific yarn diameters, loop dimensions, or seam-geometry parameters as design targets.



Sudre, Figure 2

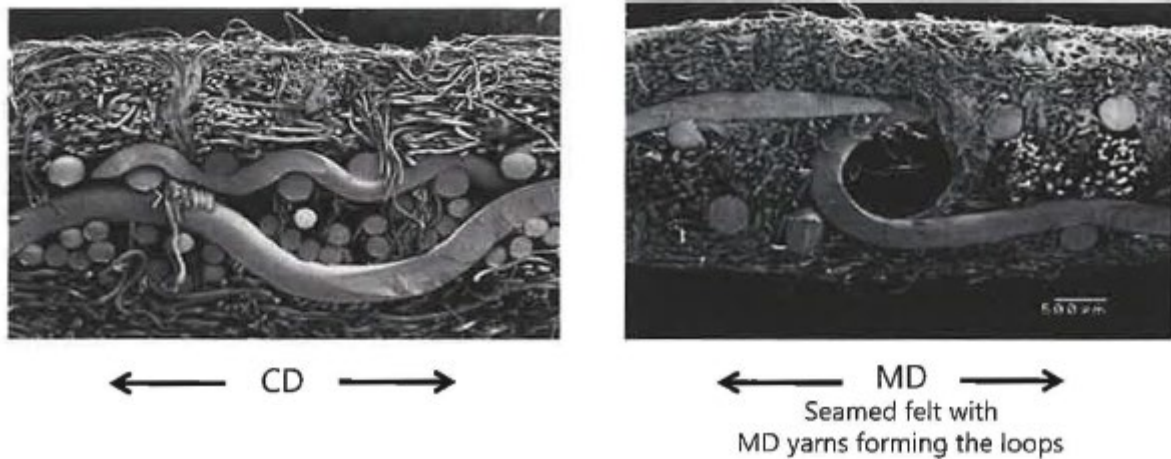
At the fold regions, CD yarns are removed to form loops, which are interdigitated and joined using a pintle to form an endless fabric.



Sudre, Figure 3 (EX2011, ¶¶83-89.)

2. Adanur

Adanur describes press fabrics made from woven and nonwoven base structures. (Adanur, 11.) Petitioner relies on Adanur's Figure 3.15 to extract dimensional parameters for a seamed press fabric. (See, Petition, 15-25.) However, Adanur's Figure 3.15 caption identifies the example as an MD "[s]eamed felt with MD yarns forming the loops," without disclosing any particular loop-diameter-to-MD-yarn-diameter ratio as a design target.



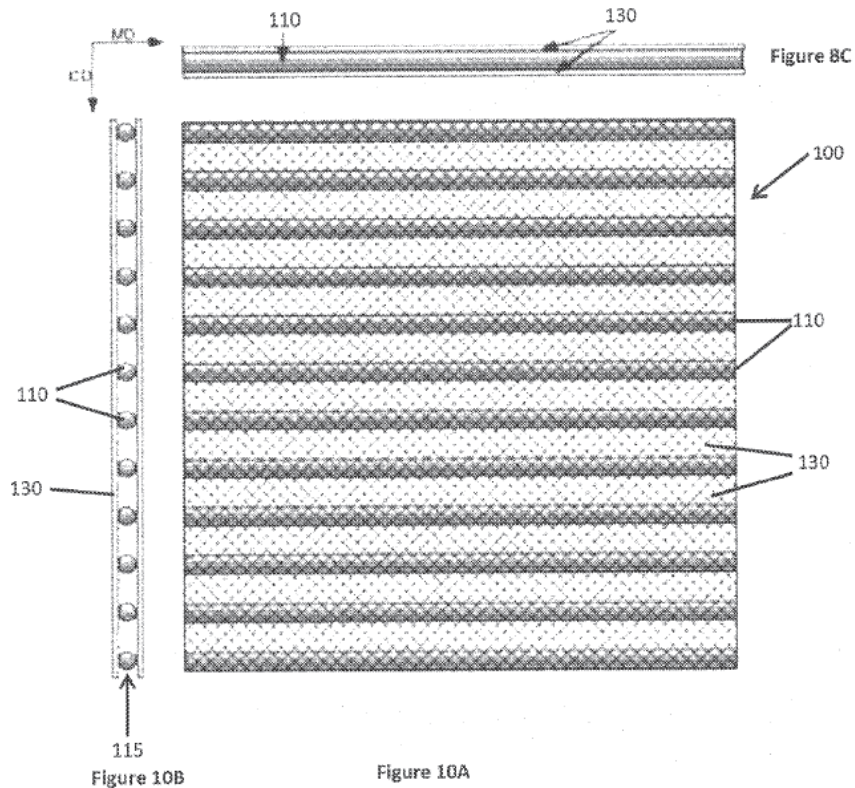
Adanur, Figure 3.15

Adanur explains that “[m]any factors influence the selection process of the fiber denier (diameter)” and that “[f]ibers with different deniers can be blended or applied in stratified layers for design performance attributes.” (Adanur, 13.)

Adanur discloses that “Figure 3.15 shows cross-sections of actual finished press fabrics.” (*Id.*) (EX2011, ¶¶90-94.)

3. Lee

Lee describes bespoke improvements for multiaxial fabrics. Petitioner relies on disclosures regarding certain press felts designs using nonwoven yarn arrays. In these designs, a first fabric structure is formed from a planar array of parallel polymeric yarns, which are spaced apart and bonded to a carrier material rather than interlaced.



Lee, Figures 10A-10C

The first structure (Figures 10A–10C) consists of machine-direction yarns arranged in a **parallel, non-interwoven array**. Lee’s yarns are not interlaced with cross-machine yarns, but instead remain discrete and regularly spaced. Lee further discloses a second structure—also a **planar yarn array**—that is inserted into the first structure, forming a two-component system (Figure 16).

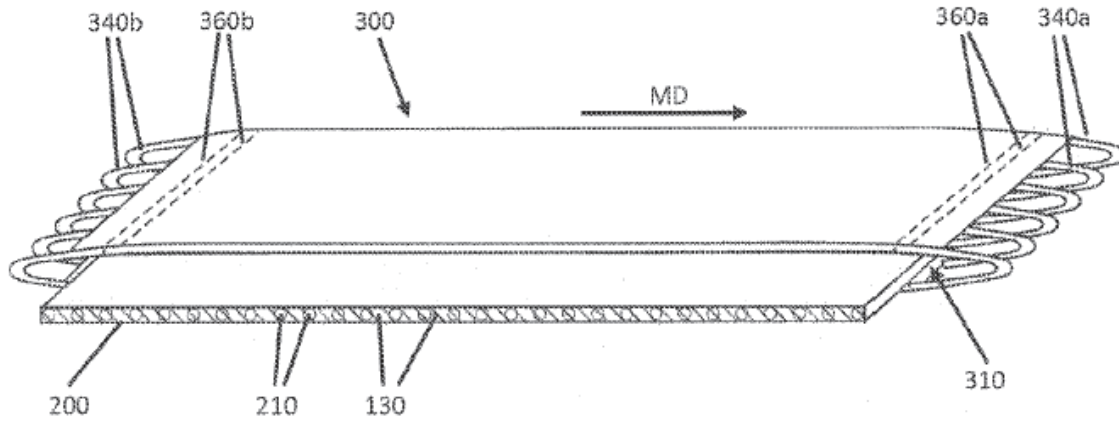


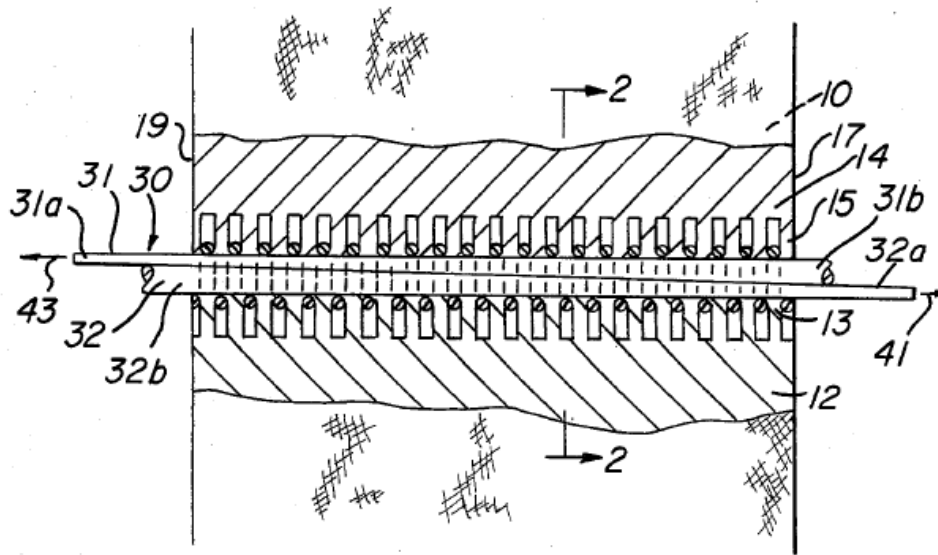
Figure 16

Lee, Figure 16 (EX2011, ¶¶95-102.)

4. Penven

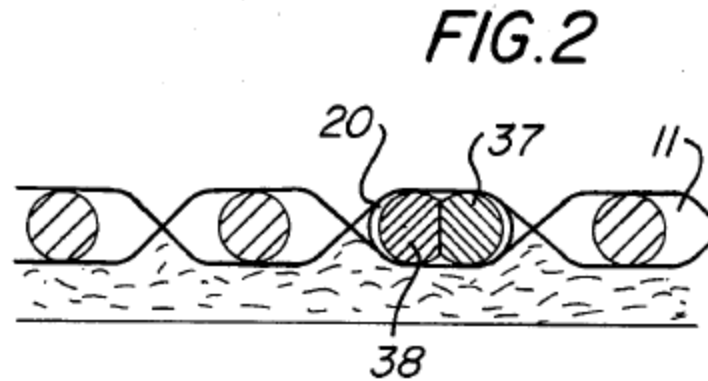
Penven relates to seaming methods for joining the ends of a flat felt into an endless belt. Seams “typically include loops or hooks on the end of the felt which are aligned in an alternating intermeshing relationship and a pintle connector which is inserted through the aligned loops or hooks to close the seam.” (Penven, 1:17-23.)

FIG. 1



Penven, Figure 1

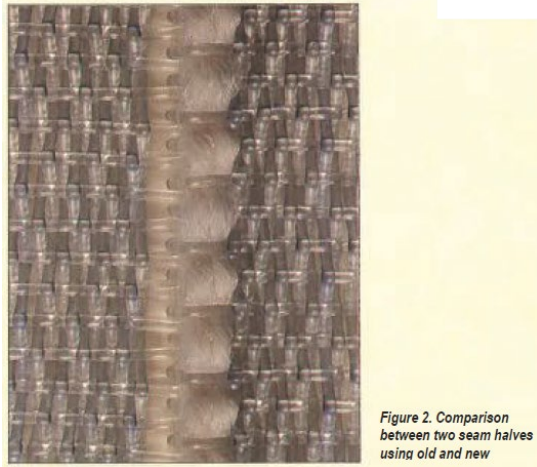
Penven discloses that “[t]he pintle units 31 and 32 are provided with a long, relatively gradual taper so that **a tight fit along the complete length of the pintle** unit can be provided. For a typical seam in a papermaker’s fabric having an **internal void diameter** of about 50 mils, a pintle unit having a taper of about 0.075 mil/inch is effective for felts up to about 300 inches in width.” (Penven, 3:60-67.) In Penven, the “internal void diameter” is a parameter describing the composite passageway formed by the collective intermeshing of loops from both fabric ends. (*See*, Figures 1, 2.)



Penven, Figure 2 (EX2011, ¶¶103-107.)

5. Rydin

Rydin is a trade article describing problems with earlier seamed press felts and improvements in a “new generation” design. It explains that prior seams with long loops led to marking, poor fiber anchoring, and increased wear, and attributes these issues to overly open seam structures. Rydin describes an improved design using a **batt-like inwoven yarn** that bridges the tops of the loops and integrates into the batt during needling, reducing marking and improving seam performance.



Rydin, Figure 2



Rydin, Figure 3

Petitioner relies on Rydin's photographs to extract dimensional parameters. However, the images contain **no scale or calibration**; neither does Rydin disclose any loop-diameter, yarn-diameter, or LD/MDYD ratio as design parameters. (EX2011, ¶¶108-112.)

III. Person Of Ordinary Skill In The Art ("POSITA")

While the parties agree on the required education level and work experience of a POSITA, Voith disputes whether education could substitute for working experience. (Petition, 4.) The technology of the '566 patent confirms that a POSITA would need to have hands-on experience in this field. Petitioner oversimplifies the technology and downplays the real-world experience needed to understand seam felt manufacture. The factors for determining a POSITA make clear that work experience is required. *See Env'tl. Designs, Ltd. v. Union Oil Co. of Cal.*, 713 F.2d 693, 696–697 (Fed. Cir. 1983) (citing *Orthopedic Equip. Co. v. All Orthopedic*

Appliances, Inc., 707 F.2d 1376, 1381–82 (Fed. Cir. 1983)). Both '566 Patent inventors had years of hands-on experience with the manufacture and use of press felts. (EX2019, EX2020.) The '566 Patent sought to address challenges related to physical construction of a press felt with certain characteristics. (EX1001, 1:20-28.) These are not academic studies, but the reality of creating press felts for large scale industrial applications. (EX1001, 1:37-40.) The '566 patent was the result of years of real-world testing and innovation concerning the various tradeoffs of press fabrics. (EX1001, 3:1-31.) Moreover, the mechanical and physical nature of the problems solved by the '566 Patent and other known art make clear that a POSITA would require real-world use and experience with press felts.

Petitioner's position regarding the requisite work experience seem to attempt to preserve its expert's credibility. Petitioner relies entirely on Dr. Pastore to fill in the gaps of the prior art, but Dr. Pastore lacks the necessary hands-on experience to opine as a POSITA and fails to acknowledge the realities of press felt manufacture. (EX2011, ¶¶330-346.)

IV. Claim Construction

The Petition does not ask the Board to construe any terms. Voith does not believe any construction is necessary to conclude that the Petition is deficient.

V. Grounds 1A-1E: Claims 1-15 are Patentable Over Sudre/Adanur and Secondary References

A. Ground 1A: Sudre/Adanur Fail to Teach or Suggest the Claimed Loop Density and LD/MDYD Ratio

Petitioner asserts that claims 1, 3, and 10–13 are obvious over Sudre in view of Adanur. (Petition, 11.) Neither Sudre nor Adanur teaches or suggests the claimed loop density or LD/MDYD ratio, and Petitioner’s theory relies on impermissible hindsight reconstruction using the ’566 Patent as a roadmap.

1. A POSITA Would Not Have Looked to Adanur to Modify Sudre

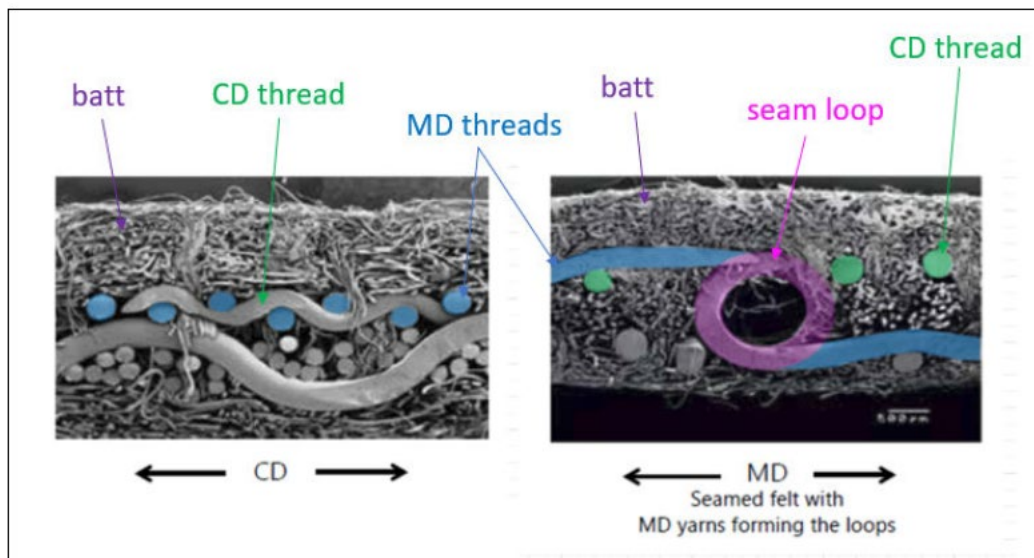
Petitioner’s motivation-to-combine theory rests on a single, isolated phrase from Sudre suggesting that a fabric may be produced to meet “particular requirements.” (Petition, 18.) That phrase does not provide any reason, let alone a technically grounded one, to consult Adanur for specific dimensional parameters such as thread diameter, loop density, or LD/MDYD ratio. (EX2011, ¶¶114-117.)

When read in context, Sudre’s discussion of “particular requirements” refers to conventional design considerations such as fabric length and weave pattern—not to seam-loop geometry or quantitative ratios. (Sudre, 6:11-17) Nothing in Sudre identifies loop density or loop diameter ratio as a design parameter, much less a problem to be solved. (EX2011, ¶¶118-119.)

Sudre merely describes a conventional seam-forming method and does not identify loop density or loop diameter ratios as design parameters. (Sudre, 3:9-4:7.) Petitioner improperly treats Sudre’s silence as an invitation to import specific

parameters — yet Sudre is equally silent on batt fiber denier, material composition, and needling parameters, none of which Petitioner imports. This selective focus on LD/MDYD and loop density confirms hindsight. (EX2011, ¶120.)

Adanur does not cure this deficiency: it does not identify loop density or LD/MDYD ratio as design parameters, nor suggest seam-loop geometry optimization. Although Dr. Pastore relies on Adanur's Figure 3.15, that section concerns batt structure—not seam design—and contains no teaching of the claimed parameters. (Adanur, 12-14.) (EX2011, ¶120.)



Adanur, Figure 3.15 (annotated by Petitioner)

Dr. Pastore's reliance on this figure to derive seam related parameters is misplaced. The MD photograph of Figure 3.15 does not appear to depict a seam like the seam formed in Sudre. As Dr. Brookstein explains, a POSITA would have

expected to find two MD threads (a top one and a bottom one) on both the left and right side of what Dr. Pastore identified as a seam in his annotated Figure 3.15 on page 39 of his declaration. (*See*, EX1003, p. 39.) (EX2011, ¶¶122-125.)

As discussed below, Dr. Pastore's arguments are hindsight. (EX2011, ¶¶124-125.) Dr. Pastore undeniably used the '566 Patent as a measurement framework. He candidly admitted that the prior art does not disclose the LD/MDYD parameter and that the parameter would not have been identified without the '566 Patent. Therefore, the asserted combination is not grounded in the prior art, but instead derived from the challenged patent itself. (*Id.*)

2. Petitioner's Analysis Relies on the '566 Patent as a Roadmap

In all of his grounds, Dr. Pastore repeatedly applied definitions, formulas, and concepts drawn directly from the '566 Patent to analyze the prior art, including (1) using the '566 Patent's loop diameter definition (EX2012, 98:1-104:13), (2) applying the '566 Patent's loop density formula (EX2012, 104:22-115:17), (3) relying on the '566 Patent's thermal shrinkage discussion to reinterpret prior art structures (EX2012, 115:21-121:12), and (4) identifying the '566 Patent' as a parameter to optimize. (EX2012, 121:13-123:13; *see also*, 123:14-131:3.)

The prior art references do not disclose these definitions, formulas, or analytical frameworks. Using the '566 Patent to supply these missing elements is

classic hindsight reconstruction and cannot support an obviousness finding.¹ *In re Gorman*, 933 F.2d 982, 987 (Fed. Cir. 1991) (“It is impermissible, however, simply to engage in a hindsight reconstruction of the claimed invention, using the applicant’s structure as a template and selecting elements from references to fill the gaps.”)

3. Adanur’s Photographs Do Not Support Petitioner’s Theory

Petitioner’s dimensional analysis depends on extracting measurements from two photographs in Adanur’s Figure 3.15. That approach is fundamentally flawed.

a) The Photographs Depict Different Fabrics

Adanur expressly describes Figure 3.15 as showing “cross-sections of finished press fabrics” (plural), with no indication that the images correspond to the same fabric. Adanur describes that only one of the fabrics is a “seamed felt” (singular).

¹ *See also*, July 2025 memo stating that “AAPA, expert testimony,...and other evidence that is not ‘prior art consisting of patents or printed publications’[]” may not be used to supply a missing claim limitation.” EX2021, 1.

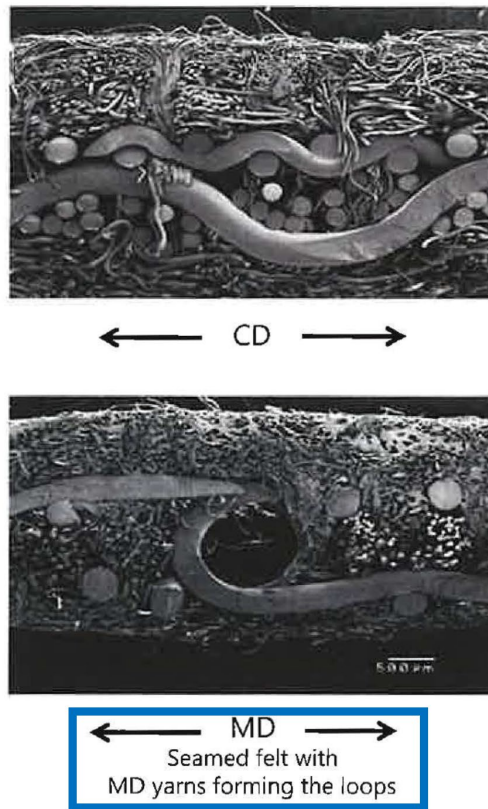
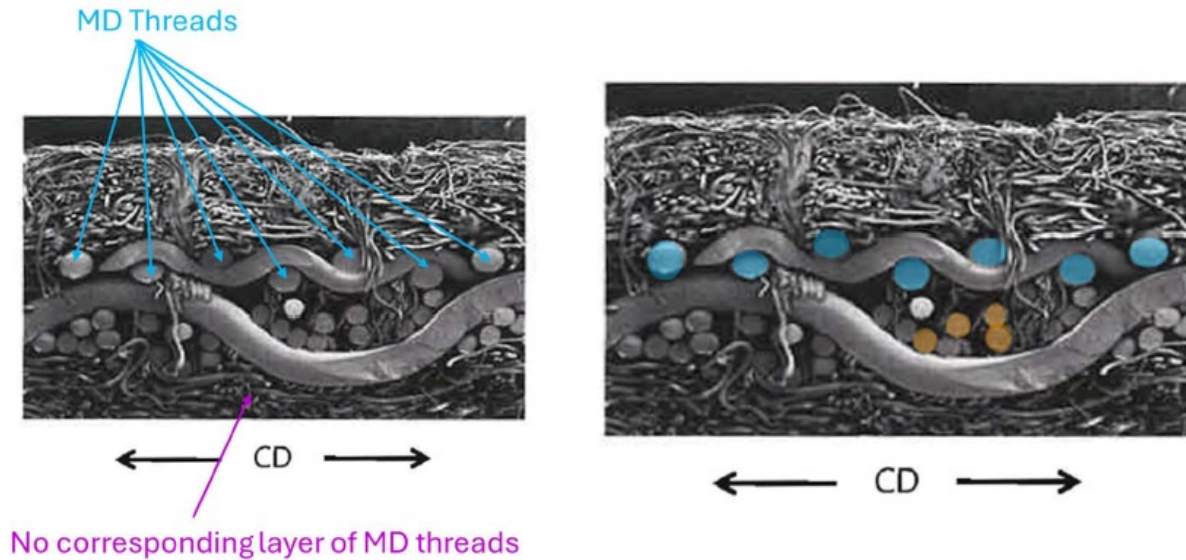


FIGURE 3.15. Cross-sections of finished press
fabrics.

Adanur, Figure 3.15

The structural differences between the images (below) confirm they depict different fabrics, including (1) absence of corresponding MD yarn layers between the two images, (2) inconsistent yarn counts and sizes, and (3) presence of features in one image that are absent in the other.



Adanur, Figure 3.15 (annotated/partially reproduced)

Because claim 1 requires measurements from the same seam, e.g., the loop density and LD/MDYD ratio correspond to the same seam, combining measurements across different fabrics cannot satisfy claim 1. (EX2011, ¶127.) Dr. Pastore failed to appreciate this claim requirement, as he testified that his analysis would not change even if the fabrics were different. (EX2012, 271:18-272:7.) (EX2011, ¶¶126-148.)

b) The Images Have Different Scales

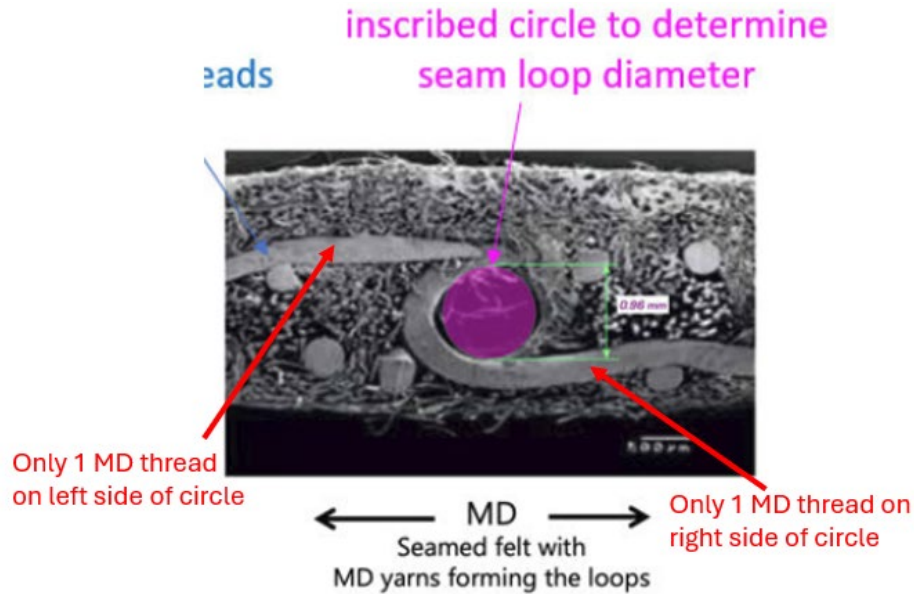
Petitioner assumes that the images in Figure 3.15 share a common scale based solely on the presence of a scale bar in one image. (EX2012, 111:5-10.) That assumption is unsupported, e.g., by appreciating the fabrics have different heights in the CD/MD pictures.

As Dr. Pastore admitted, pixel-based measurements require identical magnification and scale. (EX2012, 195:15-21.) Here, the images differ visibly in thickness suggesting different magnification, rendering Dr. Pastore's measurements unreliable, because, as Dr. Pastore admitted, measurements taken at different magnifications cannot be used to compute the claimed ratio. (EX2012, 195:15-196:4; EX2011, ¶¶146-148.)

4. The CD Image Does Not Depict a Seam

Adanur's CD Picture does not depict a seam structure. It appears in a section discussing batt application and there is no indication that the MD threads in the CD Picture form seam loops, nor is there any evidence that the illustrated fabric in the CD Picture is part of a seamed press felt. Because claim 1 requires a "**seam** having a loop density," any measurement derived from a non-seam image is irrelevant.

Similarly, the MD image lacks the structural features of a seam loop, e.g., paired MD yarns forming loop boundaries, as shown below.



EX2011, 75.

Because Petitioner's calculations are premised on these incorrect assumptions, the entirety of Ground 1A analysis collapses. (EX2011, ¶¶149-155.)

5. Petitioner's Pixel-Based Methodology Is Unreliable

Notwithstanding the structural flaws, Dr. Pastore's methodology is unreliable for other reasons.

a) No Recognized Methodology

Dr. Pastore provides no source, literature, or accepted protocol supporting pixel counting as a valid method for determining textile dimensions from uncalibrated images. (EX2012, 164:10-171:17.) He does not describe the tool or methodology he used. These suffice to reject these grounds. *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. §312(a)(3) (requiring IPR petitions to identify "with particularity...the evidence that supports

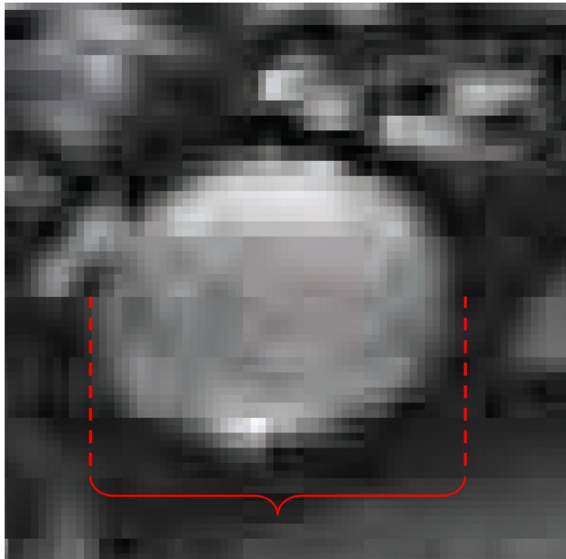
the grounds for the challenge to each claim’’)). The arbitrary and foundationless approach here resembles his “toothpick test” testimony in the *Nike, Inc., v.*

Lululemon USA Inc. (1:23-cv-00771), which was excluded because, as the SDNY judge described, it was “junk science.” (EX2003, 1; EX2004, 9; EX2012, 174:1-181:10; EX2011, ¶¶196-161.)

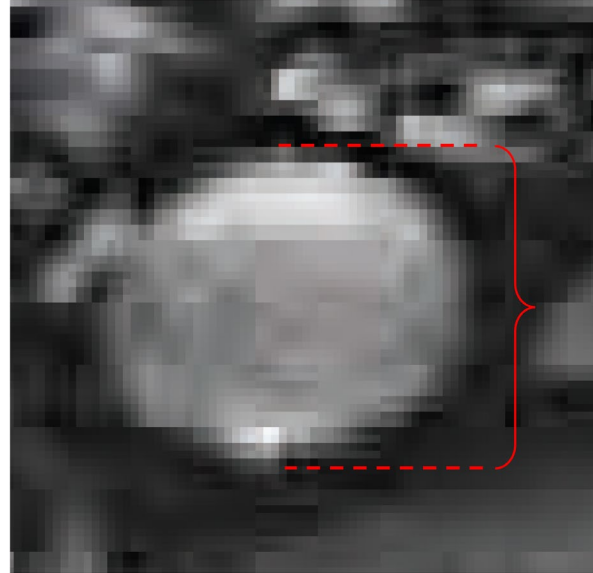
b) A POSITA Would Not Use or Credit Dr. Pastore’s Pixel Analysis

Not only could a POSITA not replicate his methodology or results, but as Dr. Brookstein, an actual POSITA, a POSITA would not have relied on such a methodology. (EX2011, ¶162.) A POSITA with experience in fabric design would not use photos to create a fabric, especially given the unreliability of these photos and the physical nature of the design in question. (EX2011, ¶¶163-170.)

Moreover, a POSITA would not use these images because of their distortion. Pastore’s measurements show significant horizontal/vertical diameter asymmetry—which, as he admitted, indicates distortion. (EX2012, 217:21-219:2.) But, a POSITA would expect circular monofilament cross-sections. So, the observed oval shapes confirm these images are unsuitable for dimensional analysis. Compounding this, Dr. Pastore's pixel counts (80/59 horizontal/vertical for one MD thread) differ materially from an actual count of the source image pixels (50/41), as shown below.



50 pixels



41 pixels

During cross-examination, Dr. Pastore attempted to explain this discrepancy by suggesting that he applied his methodology on an Adanur picture not in the record of this proceeding. (EX2012, 307:2-5.) Even accepting this explanation as true, the use of a evidence not in the record to prove a claim limitation is improper, so Petitioner's ground fails for this reason as well, and any attempt to introduce new measurements or new evidence is also improper.

Further, as Dr. Brookstein explains, Dr. Pastore improperly averages measurements from different orientations without accounting for distinct distributions. This violates basic statistical principles and produces meaningless results. (EX2011, ¶¶166-170.)

B. Ground 1A: Claims 3 and 10–13

Claims 3 and 10–13 depend from claim 1. Because Petitioner fails to establish obviousness of claim 1, these claims are likewise patentable.

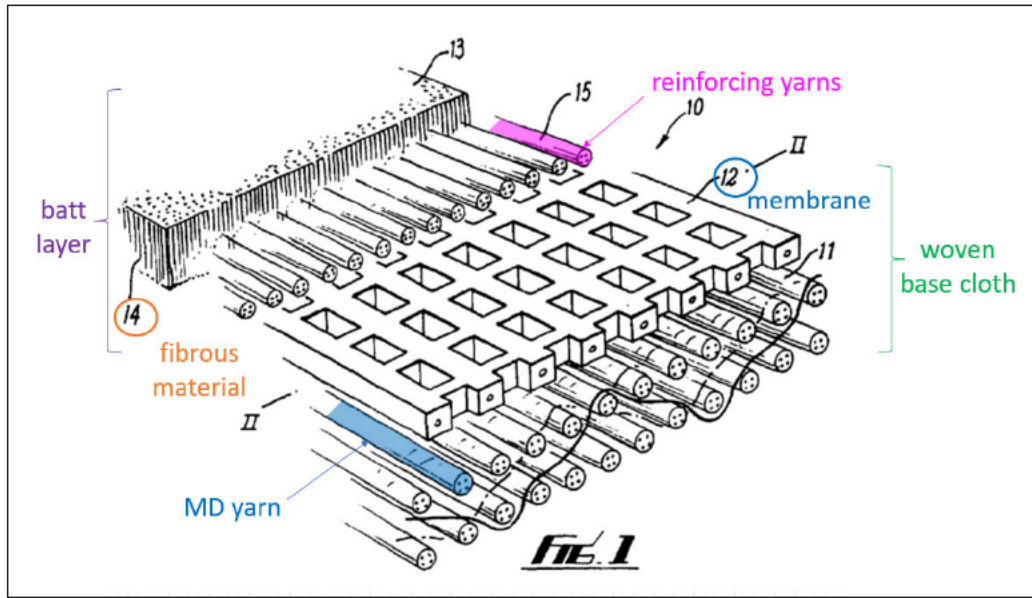
C. Grounds 1B–1E: Dependent Claims 2, 4–9, and 14–15

Claims 2, 4–9, and 14–15 depend from claim 1 and are patentable for the same reasons.

1. Ground 1D: Claim 14 (Lidar)

Petitioner conflates two distinct structures disclosed in Lidar’s batt layer: (1) nonwoven batt fibers and (2) reinforcing yarns.

Claim 14 requires that the **nonwoven fibers themselves** include or are formed of elastomer/polyurethane. Lidar does not disclose this. Instead in Lidar elastomeric materials are associated exclusively with reinforcing yarns, and batt fibers are described separately and are not disclosed as elastomeric. (Lidar, 2:24-54.)



Lidar, Figure 1 (Petitioner Annotated)

Petitioner’s attempt to treat reinforcing yarns as “nonwoven fibers” contradicts Lidar’s own terminology and fundamental textile principles. Fibers and yarns are distinct structures. Because Lidar does not disclose elastomeric nonwoven fibers, claim 14 is not taught or suggested by the asserted combination. (EX2011, ¶¶175-189.)

**VI. Grounds 2A-2E: Claims 1-15 are Patentable Over Sudre/Lee/Penven/
Secondary References**

**A. Ground 2A: Sudre/Lee/Penven Fail to Teach or Suggest the Claimed
LD/MDYD Ratio and Loop Density**

**1. Petitioner Inappropriately Relies On Lee’s Spiral Wound Not
Woven Structure**

A central premise of Petitioner’s theory is that the Lee embodiments it relies upon concern *woven* fabrics *like Sudre and Penven*—and a POSITA would therefore combine Lee’s/Penven’s teachings to Sudre:

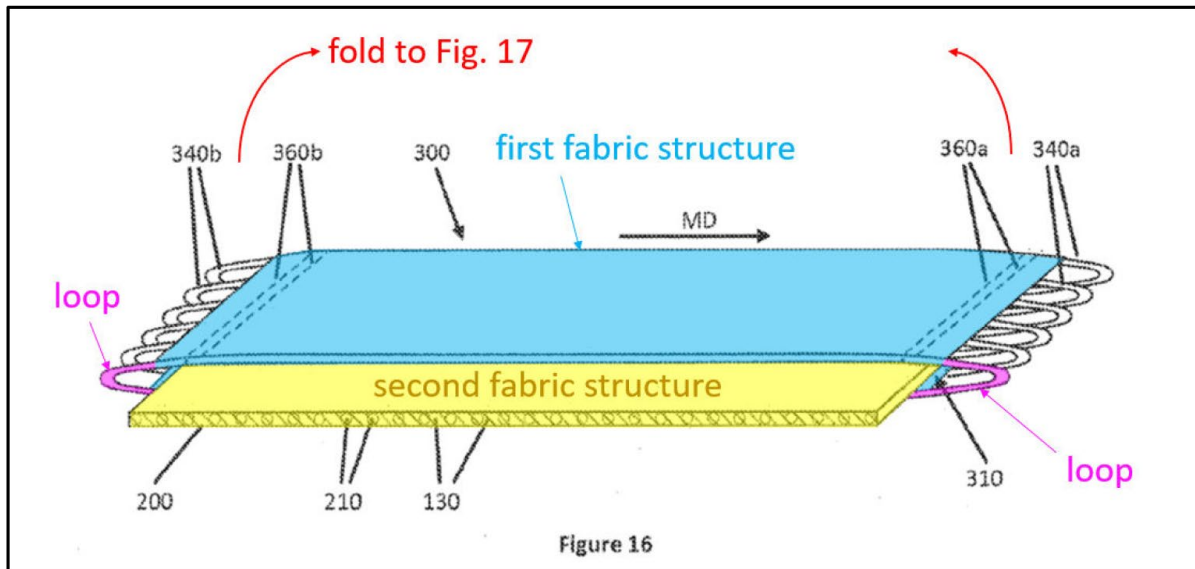
“[A]ll three of these references pertain to seamable press felts formed from flat woven base fabrics, and with this common context, it is my opinion that a POSITA would have understood *the applicability of Lee’s and Penven’s teachings* to the generic press felt disclosure of Sudre.” (EX1003, ¶249.)

During cross-examination Dr. Pastore confirmed that “a POSITA **would have applied Lee’s and Penven’s teachings to Sudre’s generic press felt because all three of these references **pertain to seamable press felts formed from flat woven base fabrics.**” (EX2012, 327:16-21.)**

However, that is not true. The relied upon Lee embodiments concern **non-woven arrays** that are **spirally wound**. *See e.g.* (Petition, 83-87 (for claim 1, citing only pages 12, 26-29, claim 28).)²

All of the cited disclosures in Lee that Petitioner relies on for dimensions/diameter/density analysis concern **arrays** where the press felt “is a **nonwoven** multiaxial press felt.” (Lee, 11; *see also*, Lee, 26-29 (describing Figures 7-9, which the patent defines as “nonwoven press felts” (Lee, 16).) Moreover, the relied upon disclosures describe a two-yarn **array** structure. Specifically, where the press fabric is made up of two separate and different fabrics where the second fabric is inserted into a gap formed by the first fabric. (Lee, 10-11; EX2011, ¶¶191-197.)

² Petitioner also cites pages 1-2, 8, 11, 30-32, Figures 15-16 in connection with Lee’s general description, (Petition, 72-75), but only relies on the prior citations to show the claimed elements.



Petition, 74 (reproducing Lee, Figure 16)

Arrays are not woven—but “refer[] to a generally planar group of mutually parallel yarns which are *not interwoven or interconnected* with one another by interlacing.” (Lee, 19.) As Dr. Brookstein explains, Lee’s non-woven array structures form a tube-and-inner-assembly architecture with a non-woven first structure, which a POSITA would not combine with Sudre’s different flat-woven, folded-single-fabric configuration to extract yarn dimensions. (EX2011, ¶¶198-202.)

a) Lee’s *Multiaxial Base* Is Structurally Incompatible with Sudre’s Conventional Woven Base

Petitioner’s proposed Sudre/Lee combination requires merging fundamentally different and incompatible base fabric architectures. Sudre is directed to conventional woven fabrics, whereas Lee relies on multiaxial laminated

structures. These are not interchangeable design choices; they are structurally distinct technologies with different formation mechanisms, yarn orientations, and seam constructions. (EX2011, ¶203.)

(1) Sudre Requires a Conventional Interwoven Base Fabric, Not Lee's Non-Woven Multiaxial Base

Sudre is directed to **flat-woven fabrics** formed by interweaving machine-direction and cross-direction yarns. In such structures the MD and CD yarns are **orthogonal and interlaced**. The fabric integrity is achieved through **mechanical interweaving** and seam loops are formed as part of the **woven structure itself**. (EX2011, ¶204.)

Conventional woven bases “have multiple layers of MD yarns with only one layer of CD yarns that are interwoven to lock the structure together.” (EX1021, 12.) Thus, Sudre’s base fabric depends on the interrelationship between MD and CD yarns, including their diameters, spacing, and weave pattern, all of which are constrained by requirements of an interwoven structure. (EX2011, ¶205.)

In contrast, Lee is directed to **multiaxial base fabrics**, which are structurally different in multiple respects. These fabrics are constructed from multiple layers that are laminated or bonded, not interwoven. (EX1021, 12.) The yarns in each layer are **angled relative to one another**, rather than orthogonal (*Id.*), and the base structure is formed first, and **seam loops are created later** by removing CD yarns. (*Id.*)

Multiaxial bases have “base layers slightly angled to one another.” (EX1021, 11.) “Multiple base layers are laminated together with each layer angled in the opposite direction from the previous layer.” (EX1021, 12.) In addition, seam loops in multiaxial fabrics “are not formed during the weaving process,” but instead are formed after bonding by removing CD yarns. Accordingly, Lee’s structure that Dr. Pastore relies on is a layered composite, not a woven grid. (EX2011, ¶¶206-207.)

These structural differences are critical because yarn diameter and density are not independent variables—they are functionally tied to the underlying fabric architecture. In Sudre’s **conventional woven fabric**, yarn diameter and spacing must accommodate over-under interweaving; yarn density governs crimp, permeability, and seam loop formation. In Lee’s multiaxial base, yarns are not interwoven, but instead arranged in angled, laminated layers, and spacing is governed by layer stacking and bonding—with no over-under geometry requirement. The same yarn diameter/density values would therefore not perform the same function, or even be physically suitable, across these two structurally distinct systems. (EX2011, ¶¶208-209.)

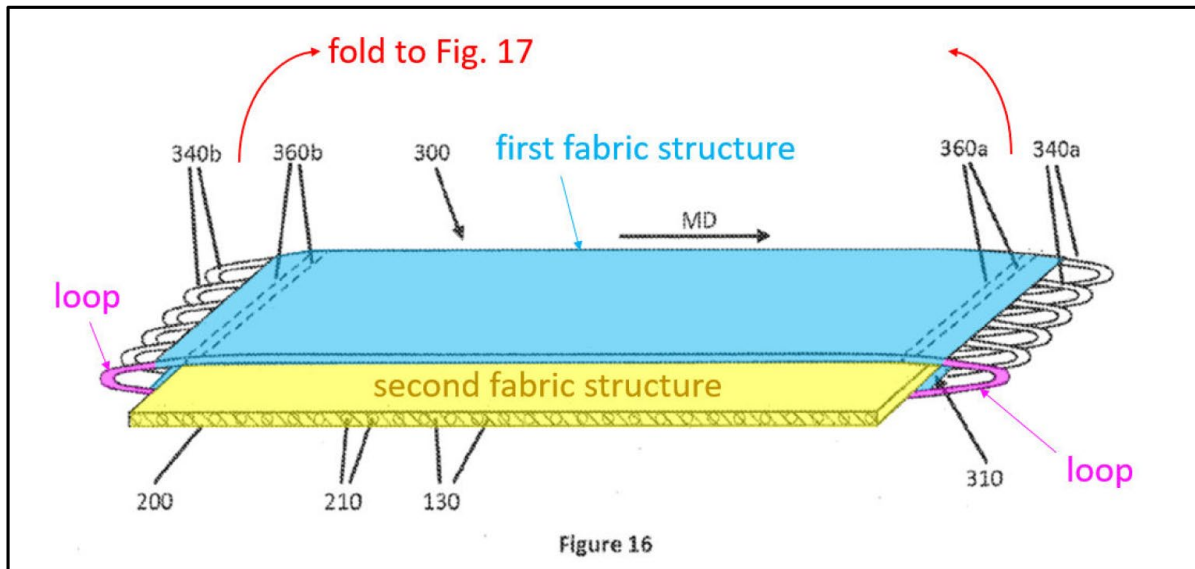
Because Lee’s yarn diameter/density values are derived from a multiaxial laminated structure, they cannot be applied to Sudre’s interwoven fabric. A POSITA would have understood that yarn diameter and density must be co-designed with the weave structure. Parameters from a non-interwoven laminate

cannot simply be transplanted into a woven system, because doing so would risk producing a fabric that cannot be woven or function as intended.

Dr. Pastore's analysis ignores these constraints, because he failed to appreciate that the embodiments he relies on for diameter/density analysis correspond to multi-axial *non-woven fabrics*. As a result, Dr. Pastore's analysis instead treats yarn parameters as abstract, transferable numbers divorced from structure. Lee's multiaxial fabric is not merely a variation of Sudre's woven base. Rather, it is a fundamentally different structural system. A POSITA would not have transferred such parameters between these incomparable systems. (EX2011, ¶¶210-211.)

b) Lee's *Multi-Component Architecture Is Structurally Incompatible with Sudre's Single Flat-Woven Fabric*

The incompatibility between Lee and Sudre runs deeper than the woven/non-woven distinction. As described in Section II.D.3, Lee discloses a complex two-layer fabric structure having two distinct first and second structures arranged such that the first structure forms the seam loops and is responsible for the mechanical integrity of the seam loops and the second fabric structure is a different "generally planar yarn assembly" that is inserted into the tube formed by the first fabric structure. (Lee, p. 16, ¶2.) Lee's two-layer fabric is illustrated in Lee's Figure 16 (below).



Petition, 74 (reproducing Lee, Figure 16 (Petitioner annotations))

Lee discloses that “the flattened tube 300 [first fabric structure (blue)] is ready for the generally planar yarn assembly that forms the second fabric structure 200 [second fabric structure (yellow)] to be inserted into the open area 310 inside the collapsed tube 300.” (Lee, p. 30, ¶2.) Lee further discloses “[y]arn loops 340a, 340b [pink] formed by the yarns 110 of the first fabric structure 100...” (Lee, 29-30.) That is, Lee discloses forming loops in the first fabric structure 300. Lee’s second fabric structure does not form loops. (EX2011, ¶¶212-214.)

Sudre, by contrast, is a single flat-woven fabric folded over itself—with no separate inner yarn assembly, no elastic carrier layer, and no internal tube. Dr. Pastore proposes extracting yarn dimensions from Lee’s two-component tube-and-inner-assembly architecture and applying them to Sudre’s single-fabric, flat-woven configuration, without explaining how those parameters translate across these

structurally incompatible systems. A POSITA would not have been motivated to combine Sudre with Lee as they are references describing structurally different fabrics. A POSITA would not have been motivated to combine them. (EX2011, ¶¶215-216.)

Not only are these fabrics substantially different in construction, but Lee explicitly distinguished and touted the benefits of spiral wound fabrics from flatwoven fabric like Sudre. (EX2011, ¶¶243-257.) As discussed in §VI.B.5, *infra*, Lee also affirmatively teaches away from Sudre-type flat-woven structures—providing an independent and additional basis on which the combination fails.

Therefore, as a starting point, Petitioner’s incorporation of Lee’s dimensions into Sudre is predicated on misrepresentation and a failure to appreciate the actual technology of Sudre and Lee. Dr. Pastore lacks the type of practical, industry-specific experience that is central to understanding how PMC fabrics are designed, manufactured, and used. (EX2011, ¶¶330-340.) This is critical, because the ’566 Patent concerns fabrics used in operational papermaking environments, where seam performance, marking, and mechanical behavior are highly context-dependent. Dr. Pastore’s complete lack of real-life exposure to such machines undermines his ability to opine on how a POSITA would evaluate or modify these fabrics. These are not minor gaps; they relate to the core qualifications required to

opine on seam structures, loop geometry, and fabric performance in papermaking environments. (EX2011, ¶¶330-346.)

2. None of the Cited References, or Their Combination, Disclose The Required LD/MDYD Ratios

Petitioner cherry-picked arguments for the LD/MDYD ratio are factually and legally incorrect. As described above, the LD/MDYD ratio is a central feature of the '566 Patent novelty. (*Supra*, §II.B.) The patent makes clear that this ratio, not the underlying variables, is the critical characteristic. (EX1001, 3:32-35.) This ratio gives the design strength while balancing ease of use with marking issues. (EX1001, 2:63-3:31.)

Despite this, Petitioner cannot find any reference that taught or suggested this ratio and its significance. Instead, Petitioner cobbles together a conclusory argument based on adding Lee's *nonwoven* fabric structure and Penven's *woven* LD to Sudre. (Petition, 86-87.) But this approach runs directly afoul of clear Federal Circuit guidance that an invention must be assessed "as whole". *Ruiz v. AB Chance Company*, 357 F.3d 1270, 1275 ("Without [the as a whole] requirement, an obviousness assessment might break an invention into its component parts (A+B+C), then find a prior art reference containing A, another containing B, and another containing C, and on that basis alone declare the invention obvious. This form of hindsight reasoning, using the invention as a roadmap to find its prior art components, would discount the value of combining

various existing features or principles in a new way to achieve a new result—often the very definition of invention.”) (EX2011, ¶¶217-257.)

Thus, obviousness here requires there be some acknowledgement in any of cited reference of the desired ratio or what it solved as well as any reason to combine these specific attributes. Petitioner provides none.

None of the cited references discloses an LD/MDYD ratio or any loop diameter. Lee—relied upon for the fabric structure—contains no teaching of this ratio or its significance. Penven and Sudre likewise lack any meaningful disclosure of fabric structures or MD thread diameters, and none of the references addresses the challenges the '566 patent sought to solve or the relevance of the ratio to flat woven fabrics. Alone or in combination, these references cannot describe or render obvious the required ratio.

In fact, the most Petitioner can muster is to say these disparate features would be combined because the attributes are conventional. (Petition, 76, 79-80.) But, as discussed below, VI.B.4, *infra*, this claim is unsupported. In essence, Petitioner provides nothing by Dr. Pastore's conclusory testimony to fill in this gap.

For example, Petitioner provides no support for its contention that the LD in Penven is conventional. (EX1003, ¶241.) Nor is it clear why the alleged LD of 1.27mm is conventional, while petitioner also relies on the alleged 0.96mm LD

diameter from Adanur, which it contends is the authority on press felts and paper making. If you were to apply Adanur's alleged conventional LD to the proposed 0.4mm MD relied upon from Lee, the ratio is 2.4. This falls outside the claimed scope. This highlights the unreliability of any analysis allowing the arbitrary selection of attributes from prior art, especially where there is no awareness of the importance of a ratio or an attempt to solve the problem claimed in the '566 patent.

Petitioner's arguments that Lee's MD thread dimensions are conventional fare no better. Rather, Lee states that first-array yarn "type, size and spacing are all important" and "must be chosen" to withstand seaming and use forces, and "for this reason" the first-array yarns are preferably larger. (Lee, 26.) This is not the language of a "conventional, routine dimensioning" choice—it the disclosures in Lee are an express functional constraint for the complex 2 layer non-woven arrays that Petitioner relies upon. Moreover, Petitioner's self-serving arguments are undermined by Petitioner's own cited art. For example, Adanur makes clear that multiaxial base fabrics—what Petitioner relies on from Lee—are different from woven fabrics like Sudre/Penven. (Adanur, 12 ("Forming the seam loops on a multiaxial base is also a different process compared to conventionally woven seamed felts.").) Specifically CD yarns are removed to create loops, and the "number of CD yarns removed is dependent upon the desired length of the loops; longer loops if faster installation is the papermaker's top priority and smaller loops

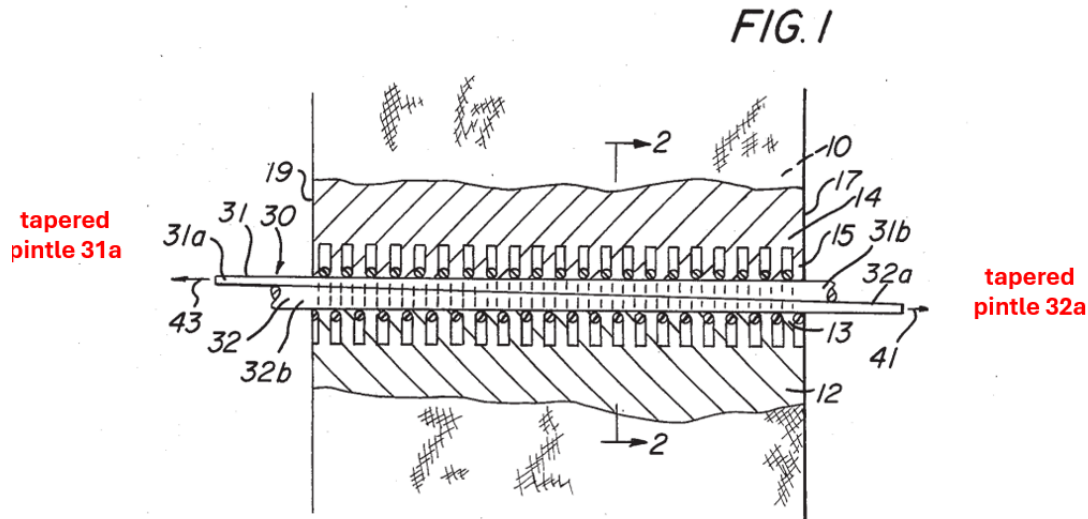
if the mark resistance is more important.” (Adanur, 12.) Nor does it follow that Penven’s woven variables would be conventional in combination with Lee’s nonwoven dimension. As Lee explains, its solution sought to replace woven solutions like Sudre/Penven. §VI.B.5, *infra*.

In any case, both of these arguments miss the point. Nothing describes or suggests that the LD/MDYD ratio was conventional or even known. Petitioner has not cited any prior art that discloses or suggests the specific LD/MDYD ratio of 2.7–3.6 **as a design target**. Instead, as discussed below, Petitioner’s ratio theory is reverse-engineered by using the disclosure of the ’566 patent to pick Lee’s 0.4mm and Penven’s 1.27mm to arithmetically hit the claimed range.

a) Penven Does Not Disclose the Claimed Loop Diameter

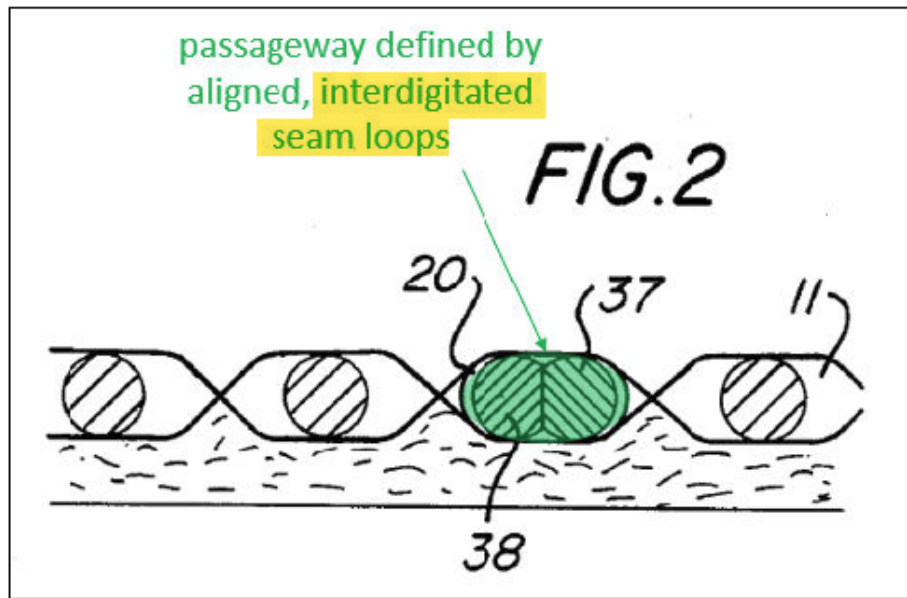
**(1) Penven’s “50-Mil Internal Void Diameter”
Describes a Composite Seam Passageway—
Not an Individual Loop Diameter**

Penven discloses “[a typical seam in a papermaker’s fabric having an internal void diameter of about 50 mils.” (Penven, 3:64-66.) This disclosure arises in the context of Penven’s core contribution—an improved pintle system. Specifically, Penven describes a pintle unit formed from two tapered elements that are inserted into the seam. (Penven, 3:56-58.)



Therefore, the “internal void diameter” is not a parameter describing loop geometry. Instead, it is a reference dimension for sizing the pintle system, i.e., a characteristic of the composite passageway formed by interdigitated loops, not of any individual loop.

Penven’s disclosure confirms that the seam passageway is created by the intermeshing of loops. (Penven, 3:14-17.) Even Petitioner’s expert acknowledged that Penven’s passageway is defined by interdigitated seam loops, rather than any single loop. (Penven, Figure 2 (below.)) Thus, the “internal void diameter” is the combined geometry of **multiple loops forming a channel**—not the diameter of an individual seam loop. These are different geometric concepts. (EX2011, ¶¶257-264.)



Excerpt from Penven, Fig. 2 (annotated)

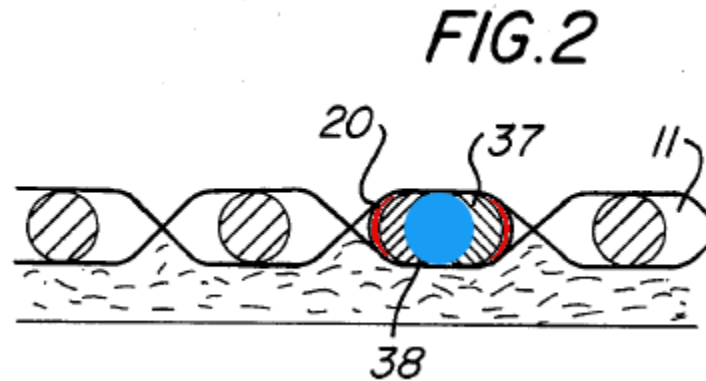
(2) The “Internal Void Diameter” Is Not the Largest Inscribed Circle of a Seam Loop

The '566 Patent defines loop diameter (LD) as the diameter of the “largest circle which can be inserted completely into the seam loop.” (EX1001, 2:46-49.)

Penven contains no such definition and does not describe any inscribed-circle measurement of individual loops. Indeed, seam loops need not be circular (EX2012, 224:11-19; 296:22-267:4), and the void defined by a loop may exceed the diameter of an inscribed circle. Thus, Penven’s “internal void diameter” cannot be equated to the claimed loop diameter.

In fact, to the extent a geometry of a seam loop can be ascertained by Penven’s drawings, Dr. Pastore relies on an embodiment where the “internal void

diameter” refers to the horizontal span of the composite passageway, not an inscribed circle within a loop.



Penven, Figure 2

As shown, the passageway is bounded vertically by loop-forming MD yarns, leaving no vertical clearance, but lateral (horizontal) space exists between the pintle and the loop sidewalls. Thus, the horizontal dimension defines the “internal void diameter,” while the vertical constraint would govern any inscribed circle.

Because these are different dimensions, the “internal void diameter” cannot correspond to the claimed loop diameter. This is confirmed by Penven: the pintle’s diameter is “less than the diameter of seam passageway 20” (Penven, 3:43) in the horizontal dimension (evidenced by the void space) and not the vertical dimension (evidenced by the lack of any void space). Accordingly, Penven’s “internal void diameter” does not correspond to the claimed “loop diameter.” (EX2011, ¶¶265-268.)

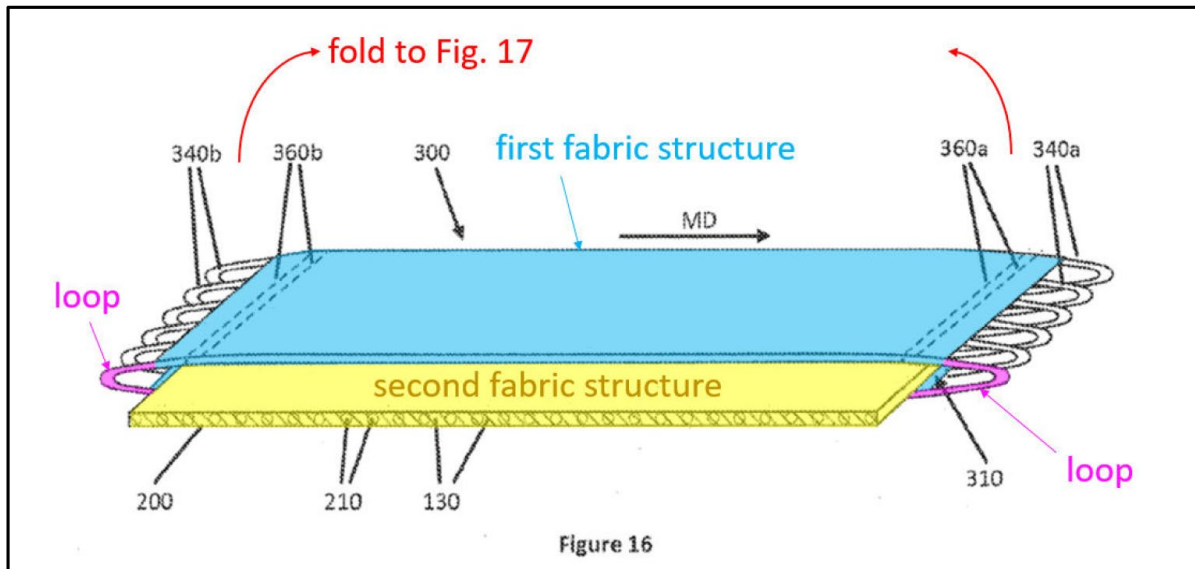
In addition, Penven's "typical seam" is not a design variable/specification.

Thus, Penven provides no teaching or suggestion of the claimed loop-diameter parameter.

b) Lee's Disclosures Concerning the Second Array Do Not Disclose '566 Patent's Claimed LD/MDYD Ratio

Petitioner's arguments concerning the diameter of the second nonwoven fabric (0.4mm) do not show the required claim elements and are contrary to the cited disclosures of Lee.

First, the 0.4mm diameter concerns the MD thread in the second array structure, not the first array structure the Petitioner relies upon. (Lee, 28.) As described above, Lee describe a complex two-array structures. II.D.3, *supra*. The first array forms the seam loops and is responsible for the mechanical integrity of the seam loops. (Lee, 26.) In contrast, the second array is a different assembly that is inserted into the tube formed by the first array structure. (Lee, 16.)



Lee, Figure 16 (annotated by Petitioner)

Because of this difference in structure and function, Lee describes the second fabric attributes as being more dense and having a smaller diameter. (Lee, 28.) Specifically, in Petitioner’s example, Lee discloses that this 0.4mm diameter is smaller than the MD thread diameter in the first array structure. (Lee, 28.) Thus, taking Lee at face value and increasing the diameter to 0.5mm, would render a ratio of 2.54, which is outside the claimed ratio. (EX2011, ¶¶224-227.)

Second, Petitioner’s reliance on a single passage (“certain applications may dictate that the yarn density and size in the second array...be equal to that in the first array”) to suggest that the first array structure has a MD thread diameter of 0.4mm runs directly afoul of the teaching of Lee. Lee specifically instructs a POSITA to the contrary—the first diameter should be larger. This is the immediately preceding sentence and aligns with Lee’s repeated teachings. (Lee,

28.) This is for good reason as Petitioner’s argument runs contrary to the express teaching of Lee’s complex two-layer array fabric structure. Lee ties first-array yarn sizing directly and explicitly to seam performance requirements—which includes to make seam loops. (Lee, 29-30.) The yarn diameter and spacing in this structure are therefore critical design parameters; they are not interchangeable details. (EX2011, ¶217-227) In contrast, the second-array yarn has no such design requirements and serves a different purpose. (Lee, 22-23.) Thus, arbitrarily transferring values from the second structure to the first would contradict Lee’s explicit instruction that these parameters must be carefully selected to ensure seam strength and durability

Third, the single line Petitioner relies upon does not actually endorse of use of a same diameter or what unspecified “certain applications” it concerns. Tellingly, Petitioner says nothing about what these certain applications are. This is because Lee is entirely silent on the subject. There is no information for a POSITA to have relied on this dimension as the MD thread for Sudre’s flat woven fabrics. In fact, a POSITA would not have even considered that these “certain applications” for a non-woven fabric apply to entirely different kinds of fabrics, i.e. Sudre’s woven fabrics. (EX2011, ¶227.) As described above, these kinds of fabrics are different in construction and different tradeoffs. (VI.A.1, *supra*; EX2011, ¶¶191-209.)

Moreover, Lee's "certain applications" necessarily involve structures with a first array **and** a second array. Petitioner ignores that their proposed modification would turn Sudre fabric's to an nonwoven array including a second fabric. (EX2011, ¶227; EX2012, 318:1-322:2.)

c) Lee's First Fabric Diameter/Density Ranges Do Not Disclose the Claimed LD/MDYD Ratio

Petitioner's argument concerning the first array's diameter/density ranges also misses the mark. It seeks to manufacture a disclosure that does not exist and runs afoul of clear case law requiring Petitioner to show more than alleged conventional ranges for obviousness.

As an initial matter, Lee contains no disclosure of the first array structure having the required LD/MDYD ratio. Lee does not even disclose any loop diameter dimensions. Clearly, the required ratio was not contemplated as part of Lee's disclosure, nor is there any explanation why a POSITA would have understood Lee to teach such a ratio. (EX2012,)

Moreover, Petitioner's attempt to extrapolate the necessary ratio from some—but not all—of yarn diameter/density ranges is not a disclosure, it is self-serving guesswork. For example, following Petitioner's logic, if a POSITA were to apply the 0.3mm diameter, the ratio would not be satisfied. Likewise, if a POSITA were apply 0.6mm, again the ratio would not be satisfied. Essentially, Petitioner's argument is that a POSITA would have guessed with that range to come across the

required 2.7-3.6 ratio. No explanation/disclosure is provided in Lee for that assumption. Nor does Petitioner rely on anything disclosed in Sudre/Penven. (Petition, 84-85.)

This guesswork is insufficient to show obviousness. *See In re Kubin*, 561 F.3d 1351, 1359 (Fed. Cir. 2009) (“[W]here a defendant merely throws metaphorical darts at a board filled with combinatorial prior art possibilities, courts should not succumb to hindsight claims of obviousness.”). Rather, as the law makes clear, the claims must be read “as whole...by requiring a showing that [a POSITA] at the time of invention, confronted by the same problems as the inventor and with no knowledge of the claimed invention, would select the various elements from the prior art and combine them in the claimed manner.” *Ruiz*, 357 F.3d at 1275. Because Lee discloses so little and because its teaching is so divergent from the ’566 Patent problem and solution, Petitioner’s argument fails to show why these cherry-picked diameters would disclose the required ratio.

Petitioner’s arguments are analogous to the obviousness arguments rejected in *in re Antonie*, 559 F.2d 618 (CCPA 1977). The limitation in question in *Antonie* was also a *ratio* of two component variables, not a single absolute dimension. *Antonie*, 559 F.2d, 619. And, as Petitioner alleges here, the prior art in *Antonie* disclosed certain characteristics about the variables making up the ratio, but not the ratio itself. *Id.* Despite this, the claims in *Antonie* were initially determined obvious

because of the disclosure of conventional attributes made it “obvious to try” and discover the ratio. *Antonie*, 559 F.2d, 620. The CCPA overturned this determination because the prior art failed to teach or appreciate the relationship underlying the ratio. *Antonie*, 559 F.2d, 620. As the CCPA explained: “In delineating the invention as a whole, we look not only to the subject matter which is literally recited in the claim in question (the ratio value) but also to those properties of the subject matter which are inherent in the subject matter *and* are disclosed in the specification.” *Antonie*, 559 F.2d at 619. Critically, the prior art provided no actual suggestion to even test for this ratio or even that it was important. (EX2012, 367:5-368:19)

Applying the correct “invention as whole” framework here, the ’566 Patent’s invention comprises both the LD/MDYD range and its discovered property: the dual optimization of competing engineering requirements (simultaneously optimizing seam strength, pintle insertion ease, permeability, and minimizing marking tendency) across all seam felt configurations. (*See* II.B, *supra*.) But, as Dr. Pastore testified, neither this property nor its relationship to the ratio was disclosed in the prior art, confirming that the prior art provides no basis for the obviousness of the optimization. (EX2012, 370:9-374:4.) Rather, as in *Antonie*, the prior art is entirely silent regarding any relationship between the ratio and any performance result—whether seam strength, pintle insertion ease, seam permeability, or marking tendency—which demonstrates the ratio is *not* a results-effective variable.

Moreover, like in *Antonie*, the inventors made the non-trivial discovery that the *relative* value LD/MDYD—and not the absolute loop diameter—is the operative characteristic variable. The '566 Patent specification expressly acknowledges this insight: “it is not the absolute loop diameter...but the relative value LD/MDYD that has to be used as the characteristic variable.” (EX1001, 3:31-35.) This represents precisely the type of inventive recognition that was absent in the prior art and that *Antonie* found not obvious.

To the extent Petitioner argues that even if the LD/MDYD ratio is not expressly disclosed, a POSITA designing a seam loop would recognize the geometric relationship between loop opening and thread diameter as a relevant design parameter (which would make the ratio result-effective), Dr. Pastore’s testimony would contradict such argument (EX2012, 370:9-15), admitting that the “ratio between the loop diameter and the yarn diameter is a different parameter than either one alone.”) Moreover, as explained in *Antonie*, this type of argument, that the prior art’s teaching about contactor area made the *ratio* of tank volume to contactor area result-effective, is insufficient. *Antonie*, 559 F.2d, 620. The same is true for the ratio here. Recognition that individual component variables affect performance does not establish that their specific ratio is a recognized operative parameter.

Nor can a Petitioner rely on generalized prior art knowledge of a physical phenomenon in lieu of specific prior art recognition of the claimed parameter itself. For example, in *Sterlite*, the Board denied institution of an IPR challenging a patent claiming a specific cross-sectional area range for optical fiber cable recesses. The petitioner argued that prior art knowledge was sufficient to render the claimed range the product of routine optimization of a result-effective variable. The Board rejected this argument, holding that “it is incumbent on Petitioner to provide adequate evidence that the prior art, itself, recognizes a given parameter as a ‘result-effective variable’ ripe for optimization,” and finding the petition “devoid not only of evidence of prior art recognition of the cross-sectional area range...[but lacking] evidence of any prior art recognizing even the cross-sectional area...as a result-effective variable.” *Sterlite Technologies Inc. v. AFL Telecommunications, LLC*, IPR2025-00127, Paper 12 at 19–20 (PTAB Apr. 9, 2025) (citing *In re Antonie*, 559 F.2d 618 (CCPA 1977)).

The Petition here suffers from the same defects. As in *Sterlite*, the Petitioner here improperly seeks to bridge the gap between general prior art awareness of seam loop geometry and result-effectiveness of the specific LD/MDYD ratio. But the prior art is silent with respect to the LD/MDYD ratio as a design parameter and with respect to any recognized relationship between that ratio and any measurable property of seam felt performance. This is what *Sterlite* (consistent with *Antonie*)

holds to be fatal to a result-effective variable theory. Petitioner's reliance on alleged (but unsupported) general engineering knowledge about loop and thread dimensions cannot substitute for the specific prior art recognition that the doctrine requires.

Moreover, unexpected results (VIII.C, *supra*) also support a non-obviousness finding.

3. None of the Cited References, or Their Combination, Disclose The Required Loop Density

a) Petitioner's 75.6% Loop Density Arguments Misconstrue Lee

Like its LD/MDYD ratio arguments, Petitioner improperly relies on Lee's disclosures concerning the second array structure to manufacture the claimed loop density. (Petition, 83.) This is contrary to Lee's teaching.

First, The second array does not have or provide seam loops—those are provided by the first array. *See* (Lee, Figure 16.) And because the second array creates no loops, there is no loop density to rely upon. Moreover, Petitioner ignores that Lee's relied upon embodiment explicitly recites other attributes for the first array—0.5mm yard diameter/7.1 yarn density—which yield a loop density that falls outside the claimed scope. Despite this, Petitioner's primary argument inexplicably relies exclusively on second array attributes to show loop density. (Petition, 83.)

Second, for the reasons discussed in §VI.A.2(b), Petitioner’s reliance on the Lee’s single “certain applications” passage to equate second array dimensions with first array dimensions for loop density purposes is contrary to Lee’s preferred teaching. Lee makes clear that the first array in the relied-upon embodiment has lower density but greater diameter than the second array. Petitioner’s arguments abandon that teaching, with no explanation of what “certain applications” means, let alone why Sudre’s flat-woven architecture constitutes one. (EX2011, ¶¶212-216.)

b) Lee’s Selectively Use of Ranges Do Not Disclose the Required Loop Density

Aware of the speculative nature of its primary argument, Petitioner resorts to Lee’s generic diameters/density disclosures for the first array to argue an alternative grounds to the claimed loop density. But this argument fares no better; instead simply highlights the arbitrary and speculative nature of its assessment.

As established above, see §VI.A.2, *supra*, obviousness requires that a POSITA would have selected and combined these elements without knowledge of the claimed invention. *Ruiz*, 357 F.3d 1275. The patent makes clear that the loop density was specifically claimed to complement the other characteristics of the fabric. Specifically, creating a fabric with low permeability, while still allowing it to be easily closed. (EX1001, 7:15-22.) These two design consideration were in tension

and the '566 patent's solution was a unique solution. (EX1001, 6:8-11; EX2011, ¶¶68-76.)

As established in §VI.A.2, *supra*, no prior art reference recognized the LD/MDYD ratio as a design parameter or identified any relationship between the ratio and seam performance—a deficiency that applies equally to Petitioner's loop density alternative theory, which similarly fails to account for any integrated relationship between the two claimed parameters.

Petitioner's conclusory arguments relying on the first array confirm this. First, Petitioner relies on two separate ranges from Lee's first array and provides no assessment of which portions of those ranges a POSITA would select or why. More fundamentally, Petitioner treats the two variables as purely independent, when in reality the selection of either variable would have affected the other, and Petitioner provides no analysis of this interdependence or any reason a POSITA would navigate those interactions to land within the claimed range. (*See* §VI.B.3, *supra*. EX2011, ¶¶228-229, 232.)

Second, Petitioner casually dismisses the absurdity of their analysis. Applying Lee's full ranges described in Lee, the density ranges from 35%-**188%** (EX1003, ¶295), a number the Petition fails to mention, let alone address. A density of 188% is impossible, but yet Petitioner's POSITA would have considered that a possibility following the rudimentary (and unsupported) analysis Petitioner

proposes. In any case, even narrowed to 100%, according to Petitioner, Lee's range is from 35% to 100%. This wide range is not insightful to a POSITA and would not be an attribute that a POSITA would use to design Sudre's fabric. (EX2011, ¶¶230-234.) Petitioner's theories are the definition of guesswork, fall far below the required disclosure needed to find the '566 Patent obvious. "Obviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention." See *Virtek Vision*, 97 F.4th at 886 (cleaned up); *InTouch Techs., Inc. v. VGO Commc'ns, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014).

c) All of Petitioner's Density Arguments Fail to Adjust for Thermal Treatment and Thus Fail

Both of Petitioner's loop density arguments also suffer from a common and fatal flaw: they are based on Lee's pre-treatment attributes, while the claimed loop density ranges correspond to the density of finished clothing. (EX1001, 6:30–40.) Lee incorporates a thermoplastic adhesive activated by heat to strengthen the overall structure. (Lee, p. 27.) A POSITA would understand that Lee's recited attributes—the yarn densities/diameters Petitioner relies upon—reflect designed values before thermal treatment and before any shrinkage. Petitioner makes no adjustment whatsoever for this pre-treatment condition. Instead, Petitioner borrows the '566 Patent's own disclosure to fill the gap, without providing any basis for assuming that Lee's and Sudre's materially different structures would

shrink at rates comparable to those of the '566 Patent's structures. (EX2011, 235-242.)

B. Ground 2A: There Is No Motivation to Combine Sudre/Lee/Penven to Arrive at the Claimed Invention

1. Petitioner Provides No Plausible Motivation to Combine Sudre/Lee/Penven

Petitioner relies on the same Ground 1 speculation and hindsight. Petitioner's only arguments regarding the motivation to combine Sudre/Lee/Penven—a single line from Sudre and conventionality claims—are conclusory and quickly dispelled. Moreover, even taken at face value, Petitioner's arguments are explicitly based on hindsight—specifically using the attributes of the '566 patent as a roadmap for an obviousness combination. This is legally improper and is grounds alone to deny the Petition.

Specifically, Petitioner's sole argument is that a POSITA would have reviewed Sudre, ascertained that it lacked parameters, and looked for parameters in other prior art, and decided to use both Lee and Penven for those parameters. (Petition, 79.) To support these claims, Petitioner cites three lines from Sudre, a single paragraph from Dr. Pastore, and unsubstantiated claims of conventionality. (Petition, 79.) The Petition provides nothing more explaining the various random logical leaps that this combination requires. This is plainly insufficient. “To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory

statements.” *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016)

From Sudre, Petitioner relies on a boilerplate recitation that “fabric meeting the particular requirements of its intended end use...can be produced from that base fabric.” (Petition, 79.) Neither Petitioner nor Dr. Pastore explain why a POSITA would pick Lee and Penven from the multitude of fabric types and disclosure. Nor does it address the fundamental differences between Lee’s non-woven arrays and the Sudre’s woven fabrics. In fact, in the next paragraph of his declaration, he asserts that all three references concern **flat woven based fabrics**. (EX1003, ¶248.) But he does not rely on any flatwoven fabrics from Lee. These deficiencies highlight the lack of motivation to combine these reference and raise serious questions about Dr. Pastore’s qualifications given his lack of knowledge and assessment of the issues. *See InfoBionic, Inc. v. Braemar Manufacturing, LLC*, IPR2015-01704, Paper 11 at 6 (PTAB Feb. 16, 2016) (denying institution because expert testimony “offer[ed] little or no elaboration” to support Petitioner’s arguments). (EX2011, ¶¶270-278.)

2. Petitioner’s Combination Structurally Makes No Sense

Petitioner’s combination is directly at odds with the teachings of both Sudre and Lee, which concern structurally different and incompatible fabric architectures. As established in Section VI.A.1, *supra*, the Lee embodiments Petitioner relies upon concern nonwoven, multiaxial, spiral-wound array structures—not the flat-

woven, single-fabric construction that Sudre represents. A POSITA would have immediately recognized this incompatibility and would not have considered combining these architecturally distinct references to extract dimensional parameters.

This fundamental structural incompatibility is confirmed by Sudre's own text. The sole sentence Petitioner relies upon from Sudre for a motivation to combine expressly begins by acknowledging that it relates to flat-woven fabrics: "in the case of a flat-woven structure, requisite lengths of the base fabric woven in any desired weave pattern may be cut from a stock supply thereof." (Sudre, 6:11–14.) And yet, Petitioner uses dimensions from Lee's nonwoven two-array structure. A POSITA reading Sudre's invitation to look elsewhere for parameters would have understood that invitation to apply to flat-woven sources—not to Lee's architecturally distinct, nonwoven, spiral-wound construction.

Moreover, taking Sudre's text at face value, a POSITA would understand that Lee's "intended end use" was a complex structure involving "multi-layer press felts which include a nonwoven yarn array bonded to an elastic carrier"—not the "typical seam" geometry described in Penven that Petitioner now contends. This disconnect demonstrates that Petitioner's combination is the product of hindsight reconstruction rather than a technically coherent engineering rationale.

3. Petitioner Must and Cannot Articulate Why a POSITA Would Select *These Specific Parameters* and Combine Them—Not Merely That Parameters Exist Somewhere in the Prior Art

Even if there were a conceptual reason to combine these different structures—which there is not—Petitioner also fails to provide any motivation as to why a POSITA would select certain attributes from one reference and others from another. As discussed earlier, Petitioner selectively relies on piecemeal combinations of those attributes in an effort to manufacture a disclosure that does not exist. VI.B, *supra*. But, fatally, Petitioner provides no explanation for this—beyond the hindsight needed to craft a combination to meet the claim limitations.

First, a POSITA would not have been motivated to combine isolated values from two unrelated references, Lee and Penven. On one hand, Penven’s 50-mil value is presented as a general approximation for “conventional” seam constructions. (Petition, 86.) In contrast, the atypical seam in Lee is formed at the ends of a complex, multi-layered structure that includes an internal “second fabric.” Like the distinctions between Lee and Sudre, Lee’s configuration is highly atypical and differs substantially from the conventional seam geometry described in Penven.

Second, by piecing together Sudre, Lee, and Penven, Petitioner has treated the loop density and the LD/MDYD ratio as purely numerical figures without addressing the technical relationship and the resulting technical advantages achieved by the combination of these parameters. The ’566 patent carefully crafted a fabric that

addressed the seaming issues with a unique LD/MDYD ratio and on top of that, a set loop density. (EX1001, 2:63-3:35; 6:7-14.) Each element was carefully calibrated and was not known in current thinking. (EX1001, 2:63-3:35; 6:7:14.) In addition, neither issue nor solution was even contemplated in Sudre. Moreover, the combination of this elements was a further advantage given it navigated between competing concerns about permeability and ease of installation. (EX1001, 7:15-20.) Petitioner makes no effort to explain if a POSITA would have appreciated similar concerns with Sudre, why, and critically, why a POSITA would have elected to reach the elements recited in the '566 patent. (EX2011, ¶¶231-234.)

Yet again a POSITA requires much more to have had a motivation to combine these references. *See William Wesley*, IPR2019-00133, Paper 10 at 17 (holding Petitioner's obviousness argument based on references being in the same field and directed toward the same objective and process was insufficient; rather, "an articulated reasoning with rationale underpinning sufficient to support a motivation to modify the prior art teachings" was required).

4. Petitioner's Claims About Conventionality Are Unsupported and Internally Inconsistent

Petitioner repeatedly asserts that all warp size threads, density values, and seam loop sizes were "conventional." (Petition, 79–80.) The Petition provides no evidence for this conclusion, and Dr. Pastore's unsupported repetition of it does not make it so.

First, Petitioner’s MD thread diameter/density values come from Lee’s two-array nonwoven fabrics. (Petition, 79–80.) A POSITA would not understand Lee’s complex fabric architecture to disclose conventional parameters for flat-woven fabrics—particularly after Lee repeatedly explains that its solution was developed as an alternative to flat-woven technology. (See §VI.B.5, *infra*.) Petitioner’s own evidence confirms: Adanur expressly distinguishes multiaxial base fabrics—the type Petitioner relies upon from Lee—from conventional woven fabrics. (Adanur, 12 (“Forming the seam loops on a multiaxial base is also a different process compared to conventional woven seamed felts.”).) Lee’s specifications are bespoke design parameters for a defined nonwoven, spiral-wound, two-component system—not interchangeable values for any press felt seam. There is no basis for characterizing them as conventional in the context of Sudre’s flat-woven architecture.

Second, Petitioner’s claim that Penven’s seam loop dimensions reflect conventional parameters is both unsupported and internally contradicted. Petitioner asserts that Adanur describes conventional loop diameters, yet asserts the conventional LD from Adanur is 0.96mm—not the 1.27mm value it derives from Penven. (Petition, 80; Pastore ¶264.) Thus, Penven’s value is not the conventional diameter. If Petitioner were to apply Adanur’s alleged conventional LD of 0.96mm to the 0.4mm MD thread it relies upon from Lee, the resulting ratio

is 2.4—outside the claimed 2.7–3.6 range. This internal inconsistency reveals the arbitrary nature of Petitioner’s attribute selection and confirms that its combination is driven by hindsight rather than principled engineering analysis.

In reality, as the prior art demonstrates, fabric attributes varied extensively based on application and design tradeoffs—which is precisely why so many different fabric types, weave patterns, and manufacturing options existed. Far from a substitution of conventional elements, the ’566 Patent addressed genuinely conflicting design requirements. (EX1001, 7:15–22.) Even if Petitioner’s conventionality claims were accurate—which they are not—they would be legally insufficient to establish a motivation to combine. *See Virtek Vision*, 97 F.4th, 886.

5. Lee Teaches Away from Sudre-Type Flat-Woven Structures

Petitioner’s proposed combination fails for an additional and independent reason: Lee affirmatively teaches away from Sudre-type flat-woven constructions in two distinct respects.

a) Lee Criticizes Flat-Woven Fabrics as Time-Consuming and Capital-Intensive

Sudre’s defining characteristic is a full-width flat-woven base fabric—precisely the manufacturing approach that Lee targets for criticism and replacement. Lee’s background section identifies full-width flat-woven constructions as requiring that “the base fabric be woven to the full width and length of the machine,” characterizing this as “a time-consuming process”

requiring “high capital investment in wide industrial looms.” (Lee, p. 2.) Lee frames this as the problem motivating its invention, then proposes multiaxial spiral-wound fabrics as the solution “to reduce manufacturing time and costs.” (*Id.*) Every dimensional parameter Lee discloses—including the thread diameters and densities Petitioner seeks to import into Sudre—is disclosed in the context of that multiaxial, spiral-wound construction. A POSITA reading Lee would have understood Lee as teaching the art to move away from Sudre-like structures—not toward their dimensional refinement. Petitioner offers no explanation for why a POSITA would disregard Lee’s explicit criticism and extract its parameters for application to the very architecture Lee discredits. (EX2011, ¶¶244-250.)

b) Lee Distinguishes Its Two-Fabric Reservoir Structure from Single-Structure Fabrics

Lee draws a second structural distinction equally fatal to Petitioner’s combination. Lee identifies the press felt’s primary function as acting as a “reservoir to transport water expressed from the paper sheet” and explicitly contrasts two approaches to achieving adequate void volume: first, void space “provided...by the weave structure of the base fabric”; and second, inclusion of “at least one additional fabric structure.” (Lee, 3–4.) Lee does not present these as equivalent options—it identifies the single-structure woven approach and then distinguishes its own invention as a superior alternative, implementing that distinction as the core of its inventive contribution through a “generally planar yarn

assembly” bonded to an “elastic carrier material” and inserted inside the tube formed by the first fabric structure. (Lee, 8–9; EX2011, ¶¶251-255.)

Sudre discloses precisely the single-structure flat-woven fabric that Lee distinguishes. Lee’s dimensional parameters are specifications for a defined two-component system whose performance depends on the interaction between both fabric structures and the elastic carrier not general values applicable to any press felt seam. A POSITA would have recognized that applying Lee’s two-fabric parameters to Sudre’s single-structure architecture would neither replicate Lee’s functional advantages nor constitute a technically coherent design choice. Lee’s teaching-away effect is thus both structural and functional, and would have given a POSITA affirmative reason not to consult Lee for Sudre’s dimensional specifications. (EX2011, ¶¶255-257.) This teaching-away evidence, combined with the foundational hindsight defect established in §V.A.2, *supra*, confirms that Petitioner’s motivation-to-combine theory fails on every dimension.

C. Ground 2A: No Reasonable Expectation of Success in Combining Sudre’s Flatwoven Technology with Lee’s Non-Woven Spiral-wound Array Fabric

Petitioner’s reasonable expectation of success argument rests on the same flawed premise as its motivation-to-combine theory: that Lee’s relied-upon embodiments concern flat-woven base fabrics comparable to Sudre, and that the dimensional parameters drawn from Lee/Penven are conventional and readily

transferable. (Petition, 76–81.) Both premises fail for the reasons established in Section VI.A.1, *supra*. For the structural incompatibility reasons established in §VI.A.1 and §VI.B.2, *supra*, a POSITA cannot have had a reasonable expectation of success.

Beyond that foundational deficiency, Petitioner’s theory requires a POSITA to perform a sequence of increasingly speculative steps: to read a single line from Sudre about flat-woven fabrics as an invitation to consult a nonwoven reference; to disregard Lee’s explicit teaching against flat-woven constructions; to selectively extract just the right attributes from Lee’s disclosure; and then to treat Penven’s “typical seam” approximation as a design specification for loop diameter. (Petition, 79–81.) No POSITA could have been reasonably expected to navigate this sequence and arrive at the specific claimed ratio and density. (EX2011, ¶¶282–284.)

Critically, Petitioner makes no effort to account for the engineering consequences of converting Lee’s nonwoven array architecture into the flat-woven structure of Sudre. Such a conversion would alter the yarn density numbers Petitioner relies upon, because the density considerations governing planar nonwoven arrays differ materially from those governing flat-woven fabrics. (EX2011, 284.) Petitioner’s failure to address these consequences renders its reasonable expectation of success argument legally insufficient. *See In re*

Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig., 676 F.3d

1063, 1070–71 (Fed. Cir. 2012) (reasonable expectation of success is a distinct, fact-based requirement not satisfied by generalized motivation or hindsight reconstruction).

D. Ground 2A: Claims 3 and 10–13

Claims 3 and 10–13 depend from claim 1. Accordingly, these claims are likewise patentable.

E. Grounds 2B–2E: Dependent Claims 2, 4–9, and 14–15

Claims 2, 4–9, and 14–15 depend from claim 1 and incorporate its limitations. Accordingly, these claims are likewise patentable.

Moreover, for the reasons discussed in §V.C.1 in connection with Lidar, the Sudre/Lee/Penven/Lidar combination does not render obvious claim 14.

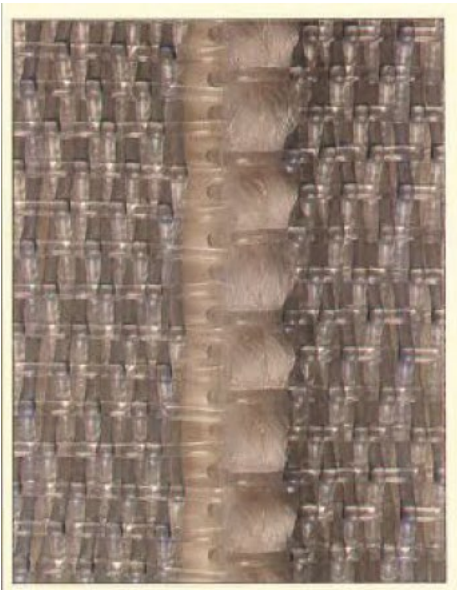
VII. Grounds 3A–3E: Claims 1–9 and 12–15 are Patentable Over Sudre/Rydin/Secondary References

A. Ground 3A: Sudre/Rydin Fail to Teach or Suggest the claimed Loop Density and LD/MDYD Ratio

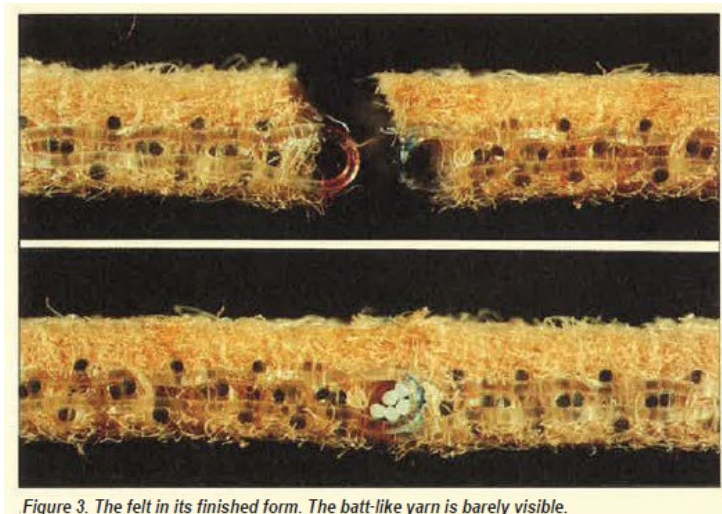
Petitioner asserts that claims 1, 3, and 12–13 are rendered obvious over Sudre in view of Rydin, relying on Rydin as purportedly disclosing loop density and LD/MDYD ratio values within the claimed ranges. (Petition, 97–99.) This theory fails. The asserted combination is unsupported by the prior art and rests on fundamentally flawed measurement techniques, improper mixing of unrelated figures, and hindsight reconstruction using the '566 Patent as a roadmap.

1. Petitioner Improperly Combines Measurements from Different Figures Depicting Different Fabrics

Petitioner's analysis depends on combining measurements from two different figures in Rydin, (Figures 2 and 3) to derive loop density and LD/MDYD ratio values. This approach is scientifically and technically invalid, because as shown below Figure 2 depicts **a raw woven base fabric**, while **Figure 3** depicts a finished, needled press felt with batt layers incorporated. (EX2011, ¶¶289-294.)



Rydin, Figure 2.



Rydin, Figure 3.

These figures represent **different structures and different stages of fabrication**. The needling process fundamentally alters geometry, including, yarn spacing, loop configuration, and fabric thickness. A POSITA would recognize that dimensional measurements from these two figures **cannot be combined** to derive a meaningful ratio. (EX2011, ¶¶295-299.)

Moreover, Rydin provides no indication that the figures depict the same fabric, or the images are intended for dimensional analysis. Accordingly, Petitioner's cross-figure combination is speculative and unreliable.

2. Petitioner's Mapping Fails to Satisfy Claim Requirements Requiring a Single Seam

Claim 1 requires that both loop density and loop diameter correspond to **the same seam**. (EX1001, claim 1.) But Petitioner's analysis violates this requirement by deriving loop density and loop diameter from different seams. Thus, Petitioner's mapping **improperly combines different seams**. Dr. Pastore admitted that it was not necessary for his analysis that the figures correspond to the same seam. (EX2012, 190:1-6.) That admission confirms the analysis does not satisfy the claim language. (EX2011, ¶¶300-304.)

3. Petitioner's Measurement Methodology Is Statistically Unsound and Unreliable

Even setting aside the cross-figure defect, the measurement methodology itself is unreliable.

a) No Recognized Methodology

Petitioner again relies on pixel-based measurements from photographs but provides no standard protocol/published methodology. This is improper for the same reasons discussed in relation to Grounds 1. §V.A.5 *supra*. A POSITA likewise would require a validated measurement method here. (EX2011, ¶¶305-307.) None is provided.

Highlighting the arbitrary nature of this assessment, Petitioner applies inconsistent measurement approaches across different grounds. In Ground 1A, Dr. Pastore takes measurements for the thread diameter and loop diameter from different images, while in Ground 3A he takes measurements from the same image. (EX2011, ¶309.) This inconsistency reflects a results-driven methodology rather than a scientifically grounded one.

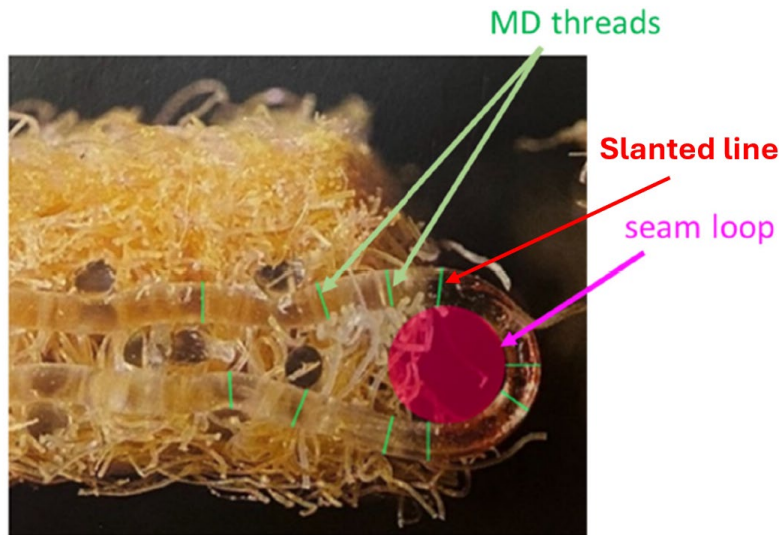
b) Unreliability and Inaccuracy of Dr. Pastore’s Loop Diameter Measurements

First, Petitioner relies on photographs with unknown resolution and may contain distortion. Despite this, Petitioner reports highly precise values (e.g., “0.0091 threads/pixel” (Petition, 99-101)) without error margins, uncertainty analysis, or repeatability testing. This renders the conclusions unreliable.

Second, Petitioner measures loop diameter from Figure 3 using a **single measurement**, even though Dr. Pastore explained that—in connection with the thread diameter measurements—he performed multiple measurements to calculate a value. But a single measurement is insufficient, because it offers no averaging, no statistical validation, or no reproducibility, compounding on the fact that Rydin’s Figure 3 would not allow Dr. Pastore to properly insert the circle within a seam. (EX2012, 229:13-232:21.) A POSITA would not rely on a single measurement from an uncalibrated image. (EX2011, ¶¶308-310.)

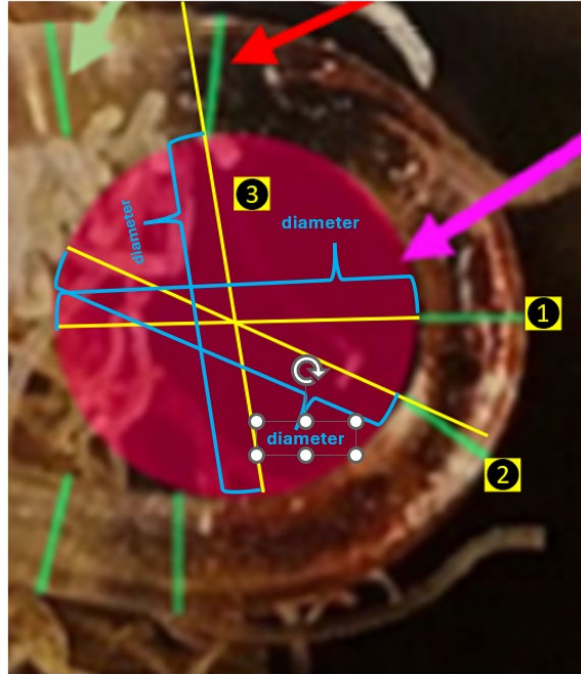
c) Geometrically Incorrect Diameter Measurements

Third, Petitioner's measurements of thread diameter are also flawed. The measurement lines are slanted or misaligned, do not represent true diameters, and measure chords rather than diameters. (EX2011, ¶311.)



EX1003, p. 198

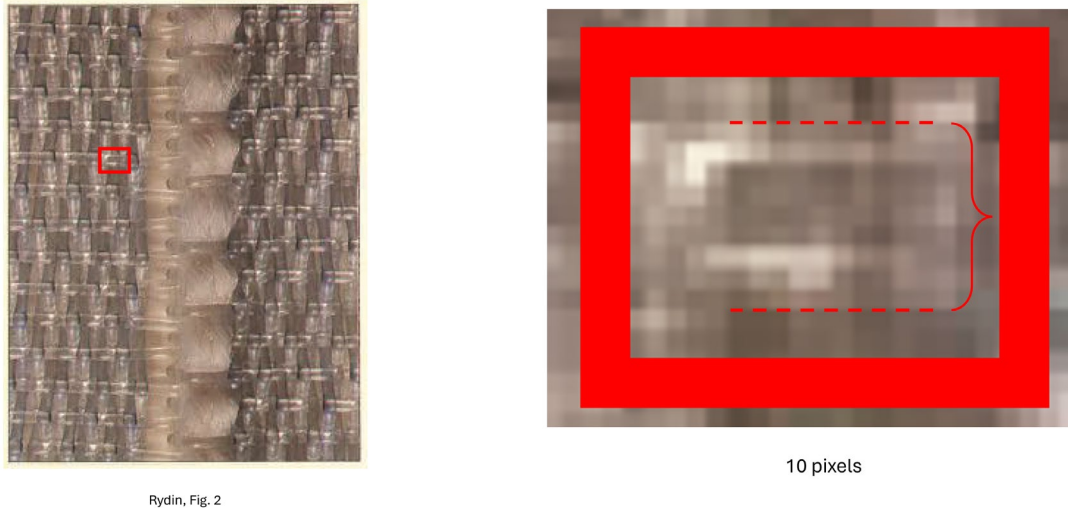
Dr. Brookstein's annotations (below) illustrate the problems with Dr. Pastore's measurements.



The yellow lines represent the diameters of the inscribed circle. A POSITA would have observed that 3 of the green lines that Dr. Pastore drew are not aligned with the diameter lines. This suggests that Dr. Pastore did not draw the green lines to properly correspond to the diameters of the MD thread lines. This systematically distorts the MD thread diameter, thereby distorting the LD/MDYD ratio. (EX2011, ¶¶311-318.)

Fourth, even assuming, arguendo, that a pixel-based measurement methodology could be appropriate for determining thread dimensions—and further assuming that all necessary conditions for such an analysis were satisfied (e.g., consistent magnification, absence of distortion, and known resolution)—Dr. Pastore’s reported measurements do not correspond to what a POSITA would obtain from the actual source image.

Specifically, Dr. Pastore reports that the MD thread diameter in Rydin's Figure 2 is approximately 42.6 pixels. However, a direct pixel count from the source image yields a different value.



Rydin, Figure 2 (and detail)

As shown above, when the same region is examined and the pixels are counted directly, the MD thread diameter is approximately **10 pixels**, not 42.6 pixels. This discrepancy is not minor, rather it represents a discrepancy by a factor of more than four.

This discrepancy has three implications. *First*, Dr. Pastore's results are not reproducible—a fundamental requirement of any scientific methodology. *Second*, the magnitude of the discrepancy (10 versus 42.6 pixels) confirms he did not measure actual pixel dimensions but applied an undefined and unexplained scaling approach. *Third*, the inconsistency confirms these images are not suitable for dimensional analysis: if thread diameter cannot be reliably extracted, the image

cannot serve as a quantitative source. These flaws collectively confirm that Dr.

Pastore's pixel-based measurements are not grounded in any reliable methodology and cannot support a finding that Rydin discloses the claimed limitations.

4. A POSITA Would Not Look to Rydin to Modify Sudre

Notwithstanding the measurement defects, there is no motivation to combine Sudre and Rydin. Sudre and Rydin address different technical problems. Sudre is directed to methods of forming seamable fabrics and structural formation of loops. (Sudre, 1:2-9.) It does not address loop density optimization or loop diameter ratios. On the other hand, Rydin addresses a different technical problem. Rydin focuses on reducing marking, improving batt anchoring, and integrating batt-like yarns. (Rydin, 1.) Rydin does not disclose loop density as a design parameter, LD/MDYD ratio, or any dimensional optimization. (EX2011, ¶¶319-321.)

Petitioner argues that Rydin provides “parameters.” (Petition, 98-101.) But Rydin does not present dimensional data. Instead, Rydin's images are qualitative, not quantitative, and there is no reference in Rydin that suggests extracting dimensions from photographs. Thus, Petitioner offered no articulated reason a POSITA would turn to Rydin, and extract pixel-based measurements to modify Sudre. Accordingly, a POSITA would not have been motivated to combine Sudre and Rydin. (EX2011, ¶¶322-325.) Moreover, as discussed in §V.A.2, Petitioner

repeatedly applies definitions and formulas from the '566 Patent to analyze the prior art.

B. Ground 3A: Claims 3 and 12–13

Claims 3 and 12–13 depend from claim 1. Accordingly, these claims are likewise patentable.

C. Grounds 3B–3E: Dependent Claims 2, 4–9, and 14–15

Claims 2, 4–9, and 14–15 depend from claim 1. Accordingly, these claims are likewise patentable.

Moreover, for the reasons discussed in §V.C.1 in connection with Lidar, the combination of Sudre/Rydin/Lidar does not render obvious claim 14.

VIII. Secondary Considerations Support a Finding of Non-Obviousness

A. The Prior Art Taught Away from the '566 Patent Technology and its Improvements

“A reference may be said to teach away when a person of ordinary skill, upon reading the reference...would be led in a direction divergent from the path that was taken by the applicant.” *Millennium Pharms., Inc. v. Sandoz Inc.*, 862 F.3d 1356, 1366 (Fed. Cir. 2017). As established in §VI.B.5, *supra*, Lee expressly criticizes flat-woven base fabrics as time-consuming and capital-intensive, and affirmatively directs the POSITA toward spiral-wound multiaxial constructions as the superior alternative. That teaching-away effect independently defeats Petitioner’s motivation-to-combine theory. It also constitutes objective evidence of

non-obviousness: a POSITA reading Lee at the priority date would have been affirmatively directed away from the flat-woven technology that the '566 Patent sought to improve. (EX2011, ¶¶347-348.)

The broader commercial and industry history confirms and reinforces this directional teaching. The basic flat-woven fabric technology was developed in the late 1980s. (Adanur, 11-12; Sudre, 1; EP0425523, 1; Penven, 1.) By the 2010s, the industry had shifted its focus toward multiaxial fabrics precisely because, as Adanur explains, “the product quality and production rates [of multiaxial fabrics] are far superior to that of a conventional weaving loom.” (Adanur, 12.) Industry participants and researchers were directing their efforts toward new constructions for spiral-wound fabrics—not toward optimizing or improving flat-woven solutions like those claimed in the '566 Patent. *See Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1569 (Fed. Cir. 1987) (recognizing “movement of the skilled in a different direction” as objective evidence of non-obviousness). A reference expressly teaches away when it “criticize[s], discredit[s], or otherwise discourage[s] investigation into the invention claimed.” *Galderma Lab'ys, L.P. v. Tolmar, Inc.*, 737 F.3d 731, 738 (Fed. Cir. 2013).

B. There were long-felt, unmet needs to develop a durable and improved flat woven solution

“Evidence of a long felt but unresolved need tends to show non-obviousness because it is reasonable to infer that the need would have not persisted had the

solution been obvious.” *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1332 (Fed. Cir. 2016). This is the case here. The well-known—yet unaddressed—disadvantages and limitations of flat-woven designs were not addressed or improved until the ’566 Patent. (EX1001, 1:41-8:10.) Following some initial development of flat-woven endless fabrics in the late 1980s (Sudre), the industry broadly moved toward multiaxial fabrics, perceiving flat-woven solutions as commercially infeasible. The seam remained the critical weakness: its permeability differed from the rest of the fabric, causing marking and quality defects (EX1001, 1:57-64); the optimal method of joining the two fabric ends remained unsettled (EX1001, 1:65-2:4); and the structural requirements for maintaining strength while balancing competing seam considerations were unknown (EX1001, 3:4-35; 5:11-22; 6:7-7:22). (EX2011, ¶¶349-350.)

These issues were long known but the solution of the ’566 patent—using an LD/MDYD ratio and certain loop density—was not known. Instead, others sought to implement alternatives to like the adding flow-resistant material adjacent or over the seam (Yook, 3:65-4:2). Others sought to use light absorbing junctions and lasers to strengthen the connections at the seams (Straub, 1, 5-6).

C. Unexpected Results

The claimed LD/MDYD ratio—and in particular the 2.7–3.6 range—produces unexpected results that the prior art neither taught nor predicted.

1. The Claimed Invention Reflects a Non-Obvious Identification of the Controlling Variable

The invention reflects a non-obvious discovery of the governing parameter itself: that seam performance is controlled by the *ratio* LD/MDYD, rather than by absolute dimensions. (EX2011, ¶¶352-358.) The '566 Patent expressly identifies this breakthrough, stating that “it is not the absolute loop diameter...but the relative value LD/MDYD that has to be used as the characteristic variable.” (EX1001, 3:32-35.) As established in §V.A.2, *supra*, Dr. Pastore admitted that the LD/MDYD parameter would not have been identified without the '566 Patent—confirming the claimed ratio is not a previously known variable ripe for optimization, but a previously unrecognized relationship. *See In re Antonie*, 559 F.2d 618, 620 (C.C.P.A. 1977); *E.I. DuPont de Nemours & Co. v. Synvina C.V.*, 904 F.3d 996, 1008 (Fed. Cir. 2018).

2. The Claimed Range Achieves a Non-Predictable Balance of Competing Objectives

The claimed range yields a non-predictable balance of multiple competing performance objectives—seam strength, ease of pintle insertion, permeability control, and avoidance of marking. (EX1001, 3:1-35.) Smaller loops hinder seam closure; larger loops increase marking and permeability defects; and the claimed range “has proven to be the optimum compromise.” (*Id.*) Dr. Pastore confirmed that seam performance depends on multiple variables and that no prior art isolates

the effect of the ratio. (EX2012, 364:11-368:8, 369:4-14.) Achieving a balance among competing properties within a specific range is strong evidence of unexpected results. *See In re Applied Materials*, 692 F.3d 1289, 1297 (Fed. Cir. 2012); *Allergan, Inc. v. Sandoz Inc.*, 769 F.3d 1293, 1307 (Fed. Cir. 2015). No prior art teaches that a single ratio window could simultaneously satisfy all of these competing objectives. (EX2011, ¶¶359-362.)

3. The Results Were Not Predictable

Dr. Pastore admitted that he used the '566 Patent's methodology to measure loop diameter, applied the '566 Patent's formulas to calculate loop density, and had not previously focused on seam loop diameter. He further admitted that no prior art teaches the claimed range, and that the 2.7–3.6 range appears only in the '566 Patent. (EX2012, 123:7-13.) The claimed results were thus not predictable from the prior art and were only reconstructed using the patent itself. (EX2011, ¶363.)

4. Nexus

There is a direct nexus between the unexpected results and the claimed invention. The LD/MDYD ratio within 2.7–3.6 is explicitly recited in the claims, identified in the specification as the governing variable, and directly tied to performance improvements. The improved results flow directly from the claimed

ratio and its range, and are not attributable to unclaimed features. *See WBIP, LLC v. Kohler Co.*, 829 F.3d at 1329–30.

IX. Petitioner Failed to Meet Its Burden To Show That Adanur/Rydin Are Printed Publications

Petitioner merely assumes that Adanur/Rydin qualify as printed publications without providing any basis. The Petition contains only the bare allegations that Adanur/Rydin were publicly available in 2017/1992, respectively, citing two Mumford Declarations without explanation and raising none of the arguments from those declarations in the Petition itself. (Petition, 3.) These allegations are insufficient to establish that Adanur/Rydin are printed publications. Grounds 1/3 therefore fail on this basis alone.

First, Petitioner’s incorporating two declarations without explanation is improper, violates the PTAB rules, and circumvents the word count. *See* 37 C.F.R. § 42.6(a)(3); 37 C.F.R. §42.24. While Petitioner seeks to style the references to the Mumford Declarations as “citations,” the Petition speaks for itself. (Petition, 3.) There is no explanation or argument provided in the Petition—just a single 20-word line with Petitioner’s alleged dates. This is plainly an incorporation in full; none of the allegations in these declarations are found in the petition. *See Cisco Systems, Inc. v. C-Cation Technologies, LLC*, IPR2014-00454, Paper 12, 8 (Aug 29, 2014). The PTAB has rejected similar kinds of conclusory incorporation by reference arguments to non-petition declarations because they unfairly benefit the Petitioner.

See Medivis, Inc. v. Novarad Corp., IPR2023-00042, Paper 37, 10. The same outcome is necessary here, where the petition is just 56 words under the word count, (*See*, Petition Certification), so Petitioner’s incorporation by reference of 913 and 832 word declarations circumvents the word count limits and unduly prejudices Voith.

Second, the cited declarations fail to demonstrate that Adanur/Rydin were publicly available. To do so, Petitioner must show that a “document has been disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art[,] exercising reasonable diligence, can locate it.” *SRI Int’l, Inc. v. Internet Sec. Sys., Inc.*, 511 F.3d 1186, 1194 (Fed. Cir. 2008). But Petitioner provides no evidence of actual dissemination and or that a POSITA could locate the references with reasonable diligence while searching for specific clothing design parameters.

Both Mumford declarations merely describe catalog record creation processes and the declarants' opinions as to receipt dates—they do not demonstrate that a POSITA exercising reasonable diligence could have located the references. Technical accessibility is not public accessibility. Decision Denying Institution of Inter Partes Review, *Guardian Alliance Technologies, Inc. v. Tyler Miller*, IPR2020-00031, Paper 23, *8 (PTAB Mar. 26, 2020) (“Public accessibility requires more than technical accessibility.”) (citing *Samsung Elecs. Co. v.*

Infobridge Pte. Ltd., 929 F.3d 1363, 1369 (Fed. Cir. 2019) and *Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 774 (Fed. Cir. 2018)); *see also MHL Custom, Inc. v. Waydoo USA, Inc.*, No. CV 21-0091-RGA, 2023 WL 5748755, at *4 (D. Del. Sept. 6, 2023) (explaining that indexing/technical accessibility, by itself, is “not sufficient to prove public accessibility”). Rather, Petitioner must provide “a sufficiently definite roadmap” leading a POSITA to the reference. *See Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1350–51 (Fed. Cir. 2016); *see also* (citing *Acceleration Bay*, 908 F.3d at 773). As a result, the allegations in the Mumford Declarations fall short of what is required to show that either reference was publicly available before the filing date of the ’566 patent.

X. Conclusion

Voith respectfully request that Board reject Petitioner’s arguments and affirm the patentability of the challenged claims.

Date: March 30, 2026

Respectfully submitted,

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CERTIFICATE OF WORD COUNT UNDER 37 CFR §42.24(d)

Pursuant to 37 C.F.R. §42.24(b), Patent Owner hereby certifies that this Response complies with the type-volume limits of 37 C.F.R. § 42.24(b)(1) because it contains 13,980 words, excluding the parts that are exempted by 37 C.F.R. § 42.24(a), according to the word processing system used in preparation of this Response. This word count was prepared using Microsoft Word.

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR § 42.6(e)(4), the undersigned certifies that on March 30, 2026, a complete copy of the foregoing Patent Owner's Response was served on Lead and Back-up Counsel for Petitioner at the service address provided in Petitioner's Mandatory Notices:

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