IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

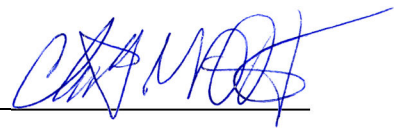
In re Patent of:	Eberhardt et al.	
U.S. Patent No.:	11,261,566	Attorney Docket No. 59054-0037IP1
Issue Date:	March 1, 2022	
Appl. Serial No.:	16/980,449	
Filing Date:	September 14, 2020	
Title:	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB	

DECLARATION OF DR. CHRISTOPHER M. PASTORE

I currently hold the opinions set expressed in this declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

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

Dated: 16 July, 2026

By: 

Christopher M. Pastore, Ph.D.

ALBANY-1053
Albany Int'l v. Voith Patent
IPR2025-01116

TABLE OF CONTENTS

I. Introduction....3

II. Sudre....5

III. Adanur....6

A. Whether Adanur's MD and CD images depict the same fabric has no bearing on my conclusion that they render obvious the claims....6

B. Whether Adanur's MD and CD images are of the same scale has no bearing on my conclusion that they render obvious the claims....10

C. Adanur's MD and CD images are structurally relevant....12

D. The Adanur images are not distorted....13

E. Further discussion of my measurement techniques....15

F. Image resolution of the Adanur files....17

G. Statistics of diameter measurements....23

IV. Lee....25

V. Penven....26

VI. Rydin....27

A. Further discussion of my measurement techniques....27

B. Image resolution of the Rydin files....30

VII. Lidar....32

VIII. I qualify as a POSITA....34

IX. CONCLUSION....34

I, Christopher M. Pastore, Ph.D., declare that:

I. INTRODUCTION

1. I have been retained on behalf of Albany International Corporation (Albany) to offer technical opinions related to U.S. Patent No. 11,261,566 ('566 Patent) (EX1001) and prior art references relating to its subject matter.

2. I am submitting this declaration (my "Second Declaration") in support of Petitioner's Reply to Patent Owner's Response ("POR") to the Petition for *inter partes* review of the '566 Patent. This Second Declaration supplements certain portions of my prior declaration in support of the Petition for this IPR Proceeding (EX1003, my "First Declaration"). In my First Declaration, I address many topics, including (but not limited to) my background and qualifications, the level of skill in art, an overview of the '566 Patent, a POSITA's background knowledge, certain legal standards explained to me by counsel, legal principles applied for the purposes of my analysis and this declaration, and a detailed analysis of the prior art against the claim elements of the '566 Patent.

3. I maintain all of my earlier analysis and continue to hold the opinions expressed in my First Declaration. This Second Declaration does not replace my First Declaration. These declarations are complementary and

should be read in tandem. Accordingly, this Second Declaration does not cover every topic addressed in my First Declaration.

4. In forming this Second Declaration, I have considered, among various documents, the following:

- Patent Owner's Response
- Dr. Brookstein's Declaration (EX2011)
- Digital Image Analysis of Petrographic Thin Sections in Conservation Research, University of Delaware (2004) (EX1056)
- U.S. Publication No. 2007/0251660 ("Walkenhaus") (EX1059)
- Additional excerpt from Sabit Adanur, Paper Machine Clothing (2d ed. 2017) (EX1061)
- U.S. Patent No. 5,023,132 ("Stanley") (EX1062)
- Definition of "fiber" from The Fairchild Books Dictionary of Textiles, eighth edition, 2014 (EX1063)
- Transcript of my deposition (EX2012)
- Transcript of Dr. Brookstein's deposition (EX1052)

5. I have no financial interest in the parties or in the outcome of this proceeding. I am being compensated for my work as an expert on an hourly basis. My compensation is not dependent on the outcome of these proceedings or the content of my opinions.

II. SUDRE

6. I have reviewed Voith's allegation that the "motivation-to-combine theory" for the Sudre-Adanur combination "rests on a single, isolated phrase from Sudre suggesting that a fabric may be produced to meet 'particular requirements.'" POR, 16.

7. First, it is not true that this phrase was the only motivation I provided for the Sudre-Adanur combination. In my First Declaration, I discussed multiple, distinct reasons why a POSITA would have been motivated to incorporate each of multiple features taught by Adanur into a fabric based on Sudre. *See* EX1003, ¶¶78-109.

8. Second, Voith's understanding of the "particular requirements" phrase from Sudre is inappropriately narrow. Voith states that Sudre's "particular requirements" phrase "refers to conventional design considerations such as fabric length and weave pattern—not to seam-loop geometry or quantitative ratios." POR, 16. I disagree with this interpretation. Sudre's "particular requirements" phrase encompasses features such as the weave pattern—which Voith itself agrees is within the scope of Sudre's "particular requirements." Different weave patterns can have different "quantitative ratios" (Voith's term), such as different thread densities. For instance, a tightly woven fabric generally has a higher thread density than a more

loosely woven fabric. This justifies my reliance on Sudre's "particular requirements" phrase as a general indication that Sudre's teachings regarding its fabrics are generic to the specific design of the fabric (e.g., specific parameters such as thread size and thread density, among other parameters). *See* EX1003, ¶¶78-80.

III. ADANUR

A. Whether Adanur's MD and CD images depict the same fabric has no bearing on my conclusion that they render obvious the claims

9. I understand that Voith has argued that Adanur's MD and CD images "depict different fabrics." POR, 20.

10. First, and as detailed in the following paragraphs, whether the MD and CD images depict the same fabric or different fabrics does not change my conclusion that the claims are obvious in view of the Adanur images (in the Sudre-Adanur combination I explained in my First Declaration).

11. As I explained in my First Declaration, I measured the seam loop diameter using solely Adanur's MD image. *See* EX1003, ¶68. Regarding the MD thread diameter, I used Adanur's CD image to obtain seven MD thread diameters. *See* EX1003, ¶¶69-71. I averaged these seven MD thread diameters and used that average MD thread diameter (69 pixels) obtained

from Adanur's CD image and the seam loop diameter obtained from Adanur's MD image to calculate a LD/MDYD ratio. *See* EX1003, ¶cite.

12. I relied on the MD thread diameter from Adanur's CD image rather than an MD thread diameter from Adanur's MD image because the seven visible MD threads in the CD image provided an opportunity for more accurate statistics. I was able to combine these measurements from two different images to calculate this ratio because of my understanding that the two images share a common scale (*see* EX1003, ¶71; also discussed below in greater detail), and because the one MD thread that can be measured from Adanur's MD image has an average vertical diameter (62.1 pixels, standard deviation of 3.0 pixels) that is consistent with the average vertical diameter (61.6 pixels, standard deviation of 2.8 pixels) of the seven MD threads that can be measured from Adanur's CD image. *See* EX1003, ¶71. This consistency between measurements gave me assurance that my reliance on the average of seven MD thread measurements from Adanur's CD image would give me an LD/MDYD ratio consistent with the LD/MDYD ratio that would be obtained by using the MD thread diameter of the single MD thread from Adanur's MD image.

13. To demonstrate this, I also calculated the LD/MDYD ratio based on the MD thread diameter of the single MD thread from Adanur's MD image and the

loop diameter from that same MD image. I obtained an LD/MDYD ratio of 3.3. First, this is notable because it is consistent with the 3.0 LD/MDYD ratio that I obtained when using the average MD thread diameter from the CD image. And second, this is also notable because both the 3.0 value and the 3.3 value for the LD/MDYD ratio fall squarely within the claimed range of 2.7-3.6 for the LD/MDYD ratio. That is, fundamentally, it does not matter whether I used the MD thread diameter from the CD image or from the MD image—which means that it also does not matter whether the MD and CD images depict the same fabric or different fabrics. The result is the same: the claimed LD/MDYD ratio is obvious.

14. Regarding the MD thread density, I note that I calculated this parameter based entirely on measurements I took from Adanur's CD image. And I provided reasons why a POSITA would have been motivated to use this thread density independent from any other dimension obtained from the Adanur photographs. *See* EX1003, ¶¶88-96. This means that the incorporation of Adanur's thread density (from the CD image) into Sudre's fabric is fully independent from parameters shown in Adanur's MD image. It does not matter, for thread density, whether the MD and CD images depict the same fabric or different fabrics.

15. Second, I disagree with Voith's contention that the Adanur MD and CD images necessarily depict different fabrics. It is true that structural differences are visible between the two images. For instance, MD-oriented threads of two different diameters are visible in the CD image, while only one MD thread is visible in the MD image. But this does not imply that the photographs must be of two different fabrics. Some fabrics have different cross-sectional profiles at different locations in the fabric. For instance, Lee's fabric assembly (which I relied on to show obviousness of the claims in a separate ground) has an insert (Lee's "second fabric structure 200," yellow in Lee's FIG. 16, below) inside of a "continuous tube 300," highlighted in blue. EX1005, 30-31. But the second fabric structure does not extend all the way to the tip of the seam loops. This means that a cross-sectional cut through Lee's fabric structure at a central position will show threads from both the blue continuous tube 300 and threads from the yellow second fabric structure 200, while a cross-sectional cut at the seam loops may not show the yellow second fabric structure. This is just one example to illustrate that two images showing different cross-sectional profiles (as is the case in the Adanur MD and CD images) does not necessarily imply that those two images depict different fabrics.

B. Whether Adanur's MD and CD images are of the same scale has no bearing on my conclusion that they render obvious the claims

16. I understand that Voith has argued that my conclusion that the MD and CD images are of the same scale is "unsupported." POR, 21.

17. First, and as detailed in the following paragraphs, whether the MD and CD images are or are not of the same scale does not change my conclusion that the claims are obvious in view of the Adanur photographs.

18. Regarding the LD/MDYD ratio, I noted above that the Adanur photographs render obvious the claimed range of this ratio regardless of whether the MD thread diameter is taken from the MD image or the CD image. When the MD thread diameter is taken from the MD image, and the loop diameter is also taken from the MD image, the issue of whether the MD image has the same scale as the CD image is irrelevant. The LD/MDYD ratio is dimensionless and both parameters are obtained from the same image, meaning that the relative scales of the MD and CD images have no bearing on the ratio calculation. The same is true for the thread density measurement: this is a dimensionless value that is obtained entirely from the CD image, meaning that, again, the relative scales of the MD and CD images have no bearing on the thread density calculation.

19. Second, I disagree with the premise that there is no support for the images sharing a common scale. POR, 21. There is a scale bar in the MD image. As I explained in my deposition, the presence of a scale bar in an image or set of images is a signal to a POSITA that the image or images are to scale. That is, in fact, the purpose of a scale bar.

20. In addition, as I discussed above and in my First Declaration, the average vertical diameter of the seven MD threads in Adanur's CD image (61.6 pixels, standard deviation of 2.8 pixels) is consistent with the average vertical diameter (taken at multiple locations) of the single MD thread in Adanur's MD image (62.1 pixels, standard deviation of 3.0 pixels). *See* EX1003, ¶71. This consistency in the dimensions of a common feature (the MD threads) is an indication that the scale is the same between the two images.

21. I acknowledge Voith's observation that the fabric in the MD image appears to have a different thickness than that of the fabric in the CD image. *See* POR, 22. But this does not prove that the images have different scales. As I discussed above, a single fabric can have different cross-sectional profiles at different locations.

C. Adanur's MD and CD images are structurally relevant

22. I understand that Voith takes the position that Adanur's MD image "lacks the structural features of a seam loop, e.g., paired MD yarns." POR, 22. This is an unreasonable criticism. In reality, cutting a fabric to reveal a cross-section is a destructive process. The act of cutting a fabric can easily damage or misalign a yarn that was previously aligned into a pair. That a pair of MD yarns forming the seam loop is not visible in this photograph does not necessarily imply that the pair of yarns did not exist prior to the cut.

23. I also note that there are types of press fabrics in which seam loops are not formed of paired, aligned MD threads. For instance, spiral woven fabrics (an example of which I show below) have loops, but because of the orientation of the threads forming the loops, there are not aligned pairs of yarns in this type of fabric.

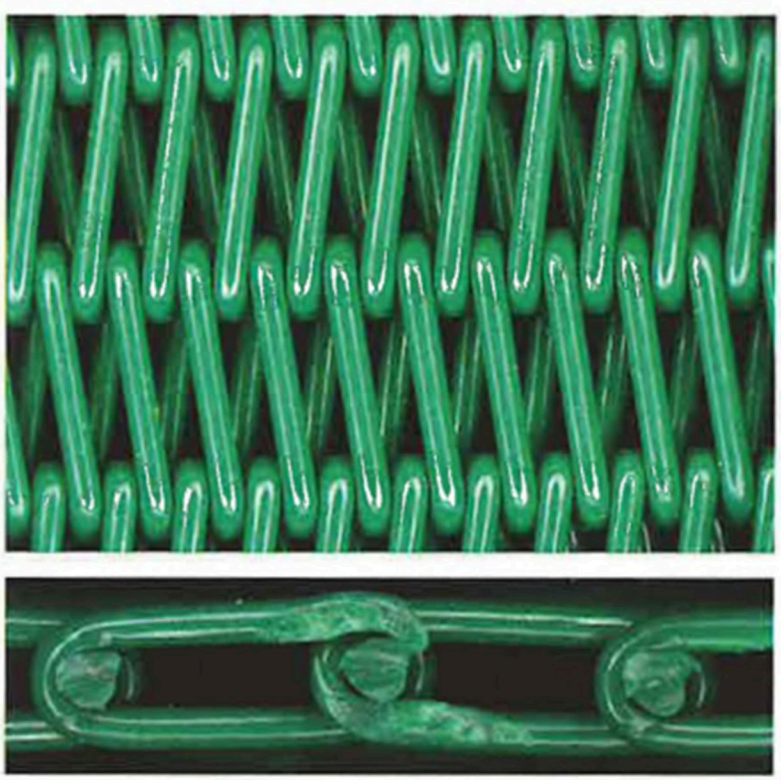


FIGURE 4.11. Spiral fabric. Coil: round PET, pintle: round PET.

Excerpt from Adanur, FIG. 4.11

D. The Adanur images are not distorted

24. I understand that Voith takes the position that the Adanur images have "distortion" such that they are "unsuitable for dimensional analysis." POR, 24.

25. First, there is no indication that the images are distorted. Voith bases its conclusion that the images are distorted on the observation that the vertical diameter of the MD threads is less than the horizontal diameter of the MD threads. *See* POR, 24. But this slight mismatch in diameters is not an

indication that the photographs have been distorted. It can be explained as just the natural result of a standard post-processing step called calendaring, in which a fabric is heated and compressed, resulting in a slight deformation of the threads. For instance, threads that initially have a circular cross-sectional shape can be distorted slightly into an elliptical shape with a vertical diameter (that is, the diameter in the direction of the applied calendaring force) that is slightly less than the horizontal diameter—just what can be seen in the Adanur images, which are of "finished" fabrics (e.g., fabrics that have already been subjected to post-processing such as calendaring). EX1021, 111.

26. I note that I already discussed the role of post-processing such as calendaring as it pertains to the Adanur images in my First Declaration. *See* EX1003, ¶81. Further discussion of calendaring can be found in Nilsson, which explains that a papermaker's fabric is "processed using a device comprising at least two smooth rolls which form a pressure nip, such as a calender, such that at least some of the fabric components are permanently deformed." EX1050, [0016]. Specifically, Nilsson states that ***"the warp and weft yarns of the calendered portions are flattened*** relative to the yarns of the unprocessed fabric." EX1050, [0035].

27. Second, although Voith cites to my deposition testimony in support of its mistaken position that the Adanur images are distorted, I respectfully note that the full context of my deposition testimony makes clear that I do not view the Adanur images as being distorted. First, Voith cites to a discussion of the Rydin images, not the Adanur images. *See* POR, 24 (citing EX2012, 217:21-219:2). And second, in that discussion, I explained why the images are ***not*** distorted.

E. Further discussion of my measurement techniques

28. I understand that Voith has criticized the pixel-based measurement technique I used to obtain dimensions from the Adanur MD and CD images. *See* POR, 24. This criticism is unfounded.

29. First, I explained my technique in my First Declaration. *See* EX1003, ¶¶67-73. Nevertheless, I provide more detail here. To measure dimensions of elements shown in Adanur's images, I took a screenshot of the relevant image from the PDF file of Adanur and opened the screenshot in Illustrator.[1]

---

[1] As I discuss in the next section, I acknowledge that the pixel counts that I obtained by measuring the digital Adanur file that I analyzed for my First Declaration are different than the pixel counts that Voith claims to have obtained

To measure thread diameters and distances, I measured distances using the line tool, and for each line element, I reported the nearest integer number of pixels from one end of the line to the other. These values were recorded individually. To measure the loop diameter, I used the circle tool to draw a circle inside of the seam loop of Adanur's MD image, and expanded the size of the circle as much as possible without it encroaching on the thread forming the seam loop. The diameter (in pixels) of that largest circle corresponds to the seam loop diameter, according to the method specified by the '566 Patent. *See* EX1001, 2:46-49.

30. Although measurements in pixels would have been sufficient for many of the claimed features, I also converted my pixel measurements into millimeter dimensions using the provided scale bar. Specifically, I measured the length of the scale bar in pixels (108 pixels). EX1003, ¶68. This number of pixels corresponds to the 500 μm length of the scale bar, meaning that each pixel corresponds to a length of 4.6 μm or 0.0046 mm.

---

for the Adanur images. One possible explanation for this discrepancy may be that the operating system may have added some smoothing to the image, and the screenshot that I subsequently analyzed may have captured the smoothed image.

EX1003, ¶68. Using this scale, I was able to convert the pixel measurements into actual measurements in millimeters.

31. Second, I note that pixel-based measurement techniques were commonly used for obtaining dimensions from digital microscopy and scanning electron microscopy images (such as the Adanur CD and MD images). For instance, the University of Delaware released a research report describing "Digital Image Analysis," in which was stated: "In order to perform measurements, the image analysis tools need to know how many pixels there are in one unit length of the image. … The process of assigning the number of pixels per unit length to an image is known as calibration." EX1056, 2. This standard technique is precisely what I did to perform my measurements of the Adanur images.

F. Image resolution of the Adanur files

32. Here I respond to Voith's allegation that "Dr. Pastore's pixel counts … differ materially from an actual count of the source image pixels." POR, 24.

33. First, the parameters that are relevant to claim 1 are dimensionless ratios—e.g., thread density (the ratio of two linear dimensions, thread diameter and the length spanned by a given number of threads) and LD/MDYD (also the ratio of two linear dimensions, loop diameter and thread diameter). Thus, the absolute pixel counts do not matter: a ratio between two measured

dimensions will remain the same regardless of the absolute number of pixels in each measured dimension. For instance, if thread density (a ratio) is measured from two images, one image having a resolution that is ten times that of the other image, the absolute pixel counts of the thread diameter and the length spanned by a given number of threads will be ten times higher in the higher resolution image than in the lower resolution image. However, the ratio of the two measurements—i.e., the thread density—will be the same for both images.

34. This is also the case for the actual measured dimensions (e.g., in millimeters), which is relevant to certain dependent claims that recite specific dimensions (e.g., claims 5, 6, 10, and 11). That is, the actual dimensions (e.g., in millimeters) of the elements I measured from the figures will remain the same regardless of the absolute number of pixels in each measured dimension. This is because the number of pixels in (for example) a thread diameter is converted into a dimension (e.g., millimeters) by way of a ratio based on the number of pixels in the scale bar. For instance, if thread diameter is measured from two images, one image having a resolution that is ten times that of the other image, the absolute pixel counts of the thread diameter will be ten times higher in the higher resolution image than in the lower resolution image, but so will the number of pixels corresponding to

the 500 μm scale bar. This means that the thread diameter in mm—which is a ratio between the thread diameter in pixels and the number of pixels in the 500 μm scale bar—will be the same for both images.

35. Second, to demonstrate that the absolute pixel counts do not impact my conclusion, I repeated my dimensional measurements on the Adanur exhibit that was obtained from the Patent Trial and Appeal Case Tracking System (P-TACTS).[2] My new measurements are detailed below. In summary, these new measurements obtained by measuring the Adanur exhibit from the P-TACTS system confirm my original measurements showing that the thread density, LD/MDYD ratios, and thread diameters (in mm) in the Adanur images satisfy the claimed parameter ranges.

36. To perform these new measurements, I took care to ensure that I measured the image size from the original P-TACTS pdf file. I extracted page 13 from the EX1021 exhibit that Counsel informed me they had downloaded from P-TACTS using Adobe Acrobat and saved that page as a new file on my computer. I then used "pdfimages", a tool developed by Glyph & Cog, LLC

---

[2] I acknowledge that the pixel counts for the digital Adanur file that I analyzed for my First Declaration are different than the pixel counts for the Adanur file that was obtained for me from the P-TACTS system.

that runs on Linux systems. I used the "pdfimages" tool to extract the image from the pdf file, creating a JPEG image. Then, I opened the JPEG in Photoshop, turning on the pixel grid to prevent interpolation.

37. I followed the same measurement procedure that I used for my original measurements. Specifically, I measured distances using the line tool and, for each line element, reported the nearest integer number of pixels from one end to the other. These values were recorded individually. To measure the loop diameter, I used the circle tool to find the largest circle that could fit inside of the seam loop of Adanur's MD image. I also measured the length of the scale bar in pixels and used that scale (that is, the number of pixels corresponding to the 500 μm scale bar) to convert the pixel measurements to millimeters.

38. For Figure 3-15 from Adanur, I examined the top image (CD) and measured the horizontal lengths of each shown MD thread and obtained an average value of 43.0 pixels with a standard deviation of 1.21. I also measured the distance from the left side of the left-most MD thread to the left side of the right-most MD thread to get a total distance corresponding to 6 complete yarn spacings and obtained a distance of 573 pixels.

39. This resulted in the calculation of a loop density of approximately:

$$\frac{2 \times 6 \times 43.0}{573} = 0.90 = 90\%.$$

40. This value uses only the horizontal diameters of each MD thread, not the vertical diameters or equivalent diameter.

41. This is consistent with my initial measurement of the loop density as approximately 85% (EX1003, ¶130), and it still falls within the claimed loop density range of 64-90%.

42. I also measured the vertical height of each MD thread in Adanur's CD image, yielding a mean value of 33.8 pixels with a standard deviation of 2.29. I also calculated the equivalent diameter, considering the equivalent circle that has the same area as an ellipse with a major and minor axis, defining the radius of an equivalent area circle as $r_{eq} = \sqrt{r_a\, r_b}$. This yields a mean circle-equivalent diameter of 38.12 pixels with a standard deviation of 1.35.

43. The loop density using the circle-equivalent diameters results in a loop density of

$$\frac{2 \times 6 \times 38.12}{573} = 0.80 = 80\%.$$

44. Again, this is consistent with my initial measurement of the loop density as approximately 85% (EX1003, ¶130), and it still falls within the claimed loop density range of 64-90%.

45. I also looked at the bottom (MD) image of Adanur. In the file obtained from P-TACTS), the 500 μm bar has a length of 63 pixels, yielding a scale of 7.94 μm per pixel.

46. I inscribed a circle into the opening shown, and it has a diameter of 120 pixels (0.95 mm by scaling using the 7.94 μm per pixel scale determined by measuring the scale bar). I measured the thickness of the shown machine direction yarn in multiple places, resulting in a mean of 37.9 pixels (0.30 mm) with a standard deviation of 1.64 pixels. The ratio of loop diameter to machine direction yarn diameter is

$$\frac{120}{37.9} = 3.17$$

47. This is consistent with my initial measurement of the LD/MDYD ratio as approximately 3.0 (which I calculated using the average MD thread diameter from Adanur's CD image; *see* EX1003, ¶135) or approximately 3.3 (which I calculated using the average MD thread diameter from Adanur's MD image, discussed above), and it still falls within the claimed LD/MDYD range of 2.7-3.6.

48. Regarding the actual dimensions of the threads: as I mentioned previously, in the Adanur file obtained from P-TACTS, the scale (as determined based on the scale bar) is 7.94 μm per pixel. With this scale, the horizontal diameter of the MD threads (average 43.0 pixels) corresponds to an MD

thread diameter of 0.34 mm—satisfying the MD thread diameters stated in dependent claims 10 and 11. And the vertical diameter of the MD threads (average 33.8 pixels) corresponds to an MD thread diameter of 0.27 mm—satisfying the MD thread diameter stated in dependent claim 10.

G. Statistics of diameter measurements

49. I understand that Voith has argued that my averaging of "measurements from different orientations" "violates basic statistical principles." POR, 25. This is not true, and it indicates to me that Voith does not understand the geometry and relevant statistics of threads. The vertical and horizontal diameters of a thread are not independent from one another. For instance, a thread that is to be formed, e.g., by extruding a material, the vertical and horizontal diameters are dependent in that the more material that is used for the horizontal dimension of the thread, the less material is available for the vertical dimension (and vice versa). For an existing thread that is compressed, e.g., from a circle into an ellipse (e.g., as is the case for the Adanur threads), the same is true: a compression in the vertical dimension induces an increase in the horizontal diameter. Because of this relationship, it is appropriate to treat these diameters as non-independent and to collectively average them together.

50. One way to handle ellipses is by calculating their equivalent diameter ($d_{eq} = 2\sqrt{r_a\, r_b}$). This would not have changed my conclusion, as shown in the table below.

	Yarn widths (pixels)				
	width	height	equiv	avg	Different between width and equivalent diameter
	44	37	40.3	40.5	0.15
	44	31	36.9	37.5	0.57
	42	31	36.1	36.5	0.42
	44	34	38.7	39	0.32
	43	34	38.2	38.5	0.26
	41	36	38.4	38.5	0.08
	44	33	38.1	38.5	0.39
average	**43.00**	**33.83**	**38.12**	**38.42**	**0.30**
st. dev.	**1.21**	**2.29**	**1.35**	**1.24**	

51. This shows that by simply averaging the width (horizontal) and height (vertical) diameters, I obtain an average diameter of 43 pixels. Using the equivalent circle method, I obtain a 38.12 pixel diameter. The error is less than 1%.

52. However, I note that once again, it does not matter. Even if I had calculated Adanur's LD/MDYD using only the vertical thread diameters from the MD image, I obtain a ratio (3.17) that falls within the claimed 2.7-3.6 range. Likewise, calculating Adanur's LD/MDYD ratio using only the horizontal

thread diameters from the CD image gives a ratio (2.79) that also falls within the claimed 2.7-3.6 range.

IV. LEE

53. I understand that Voith has argued that Lee's parameter values "would therefore not … even be physically suitable" in Sudre's system. POR, 32.

54. Regarding Lee's thread diameters of 0.3-0.6 mm (*see* EX1005, 12 (1st paragraph)), I previously presented other references confirming that these thread diameters are conventional. For instance, Xu describes a thread diameter of 0.4 mm in the context of woven press felts. *See* EX1016, Abstract, 6:59-64. Goetemann describes a thread diameter of 0.15-0.81 mm, also in the context of woven paper-making belts. *See* EX1024, 2:1-2.

55. Regarding thread density, I previously observed that Lee's thread density is generally consistent with the thread density I calculated for Adanur, which provides confirmation that these values are conventional. *See* my First Declaration, ¶259. I discuss here further corroboration that Lee's thread density values (5.9-15.7 yarns/cm) are conventional. *See* EX1005, 12 (1st paragraph). For instance, Xu describes a warp yarn density of 8 yarns/cm. *See* EX1016, 9:4-9. Walkenhaus, also describing press felts, describes a warp yarn density between 5-60 yarns/cm, and "most preferably" 10-15 yarns/cm. EX1059, [0166] ();

V. PENVEN

56. As an initial matter, I would like to reiterate that my reliance on Penven, in the Sudre-Lee-Penven combination, was based on my understanding of Penven as describing dimensions of a "typical seam." EX1006, 3:64-66; *see* EX1003, ¶242. I did not rely on the specific geometry of Penven's pintle system or the shape of the passageway created by this pintle system. Nevertheless, I note that Voith has asserted two technically incorrect characterizations of Penven that I would like to address.

57. First, Voith claims that Penven's void diameter refers to "the combined geometry of multiple loops" rather than an individual seam loop. POR, 40. This is a misrepresentation of seam geometry. A seam channel is formed by aligned seam loops. *See* EX1006, 1:19-23. The continuous "void diameter" visible along the length of the channel is necessarily dictated by the smallest individual loop. I note that Dr. Brookstein confirmed this structure in his deposition. *See* EX1052, 41:8-42:1. Thus, a POSITA would have understood Penven's void diameter to correspond to the diameter of that limiting smallest seam loop.

58. Second, Voith claims that Penven's void diameter "does not correspond" to the claimed loop diameter. POR, 42. This reads a small excerpt of Penven out of context. Voith asserts that in Penven, "lateral (horizontal) space

exists between the pintle and the loop sidewalls." POR, 42 (citing Penven, 3:43). But Penven makes clear that this space is just a temporary state used during assembly to facilitate pintle insertion via a larger-diameter swedge. *See* EX1006, 3:35-45, FIG. 1. This temporary swedge-assisted installation step does not dictate the geometry of the finished seam. Instead, once Penven's pintle has been inserted, the seam provides "a tight fit between the pintle unit and the loops 13 and 15 along the full length of the sea[m]." EX1006, 3:60-64.

VI. RYDIN

A. Further discussion of my measurement techniques

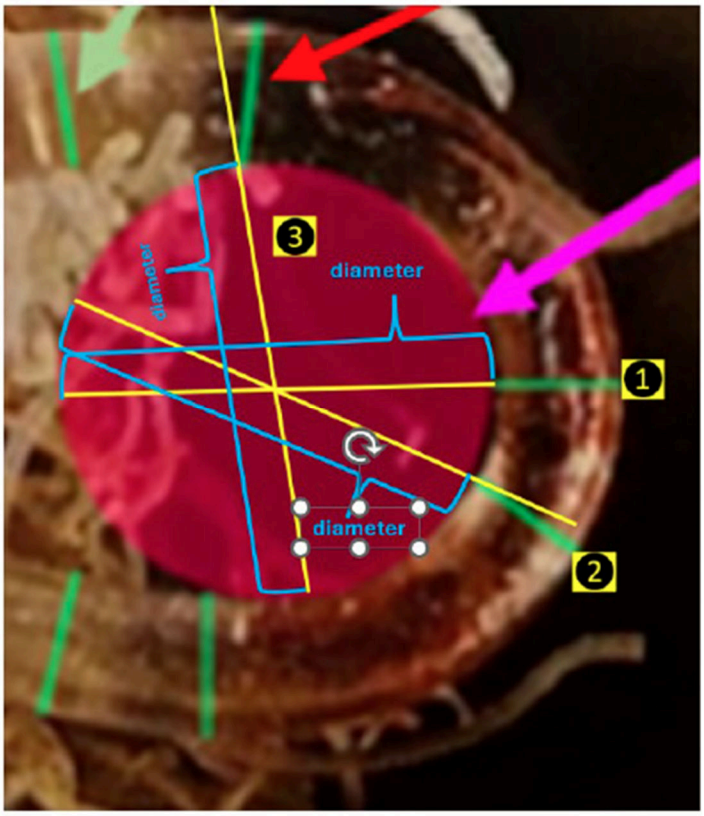
59. I applied the same, standard measurement techniques for the Rydin images as I did for the Adanur images. I discussed these techniques in more detail above in Section III.F.

60. Regarding the MD thread diameter in Rydin, I understand that Voith has proposed measuring the diameters of Rydin's MD thread by measuring lines that are "aligned with the diameter lines" of the inscribed circle. POR, 70. This is not the correct approach. A physical seam loop is not a perfect circle, so the circle inscribed into the seam loop is merely a construct. It is not dispositive of the orientation or dimension of the MD thread forming the loop. That is, the diameter of the physical thread forming a seam loop has

no fixed directional relationship to a purely imaginary circle that is inscribed inside that (non-circular) loop. Voith's approach proposes to link the MD thread diameter to the diameter of that imaginary circle, which is a non-physical approach that makes no sense.

61. The proper way to measure the thread diameter is to find the shortest line that connects the top edge and the bottom edge of the thread in the image. This is what I did when determining the diameters of Rydin's loop-forming MD thread. Using a line that is not the shortest connection between the two edges will overestimate the diameter.

62. To demonstrate that my approach is correct, I looked at the image on page 70 of the POR (Rydin Fig 3), which included some annotations to my original drawing based on Rydin. I have reproduced Voith's annotated POR image below for ease of reference.



Voith's annotated Rydin image from POR, page 70

63. There are three locations indicated in the drawing, labeled as 1, 2, and 3. These are showing the location of some of the yarn diameters I had previously measured (the green lines) near to yellow lines (added by Voith) that are extended from the center of the inscribed circle outward. At each location I measured the diameter (in pixels) I had originally drawn in the downloaded PDF file resolution (that is, the length of the green lines), and I also measured the length of the yellow line that Voith extended from the center of the inscribed circle, starting at the first point it touches the loop yarn and ending at the last point it touches the loop yarn.

64. At Position 1, both the green and the yellow lines had lengths of 106 pixels. At Position 2, both the green line had a length of 106 pixels and the yellow line had a length of 107 pixels. This means that for these two positions, the difference between my measurement and Voith's measurement is negligible. For Position 3, my original (green) line had a length of 116 pixels and Voith's proposed alternative diameter (yellow) has a length of 118 pixels. This means that my measurement is closer to a true diameter than Voith's, because mine is the smaller measurement. Of course, this makes sense since Voith's measurement is based on the imaginary inscribed circle, not on the physical thread itself.

B. Image resolution of the Rydin files

65. Here I respond to Voith's allegation that "Dr. Pastore's reported measurements do not correspond to what a POSITA would obtain from the actual source image." POR, 70.

66. First, similar to my discussion above for the Adanur ground, the parameters that are relevant to claim 1 are dimensionless ratios, and thus the absolute pixel counts do not matter. The ratios (e.g., thread density and LD/MDYD) will remain the same regardless of the absolute number of pixels in each measured dimension.

67. Second, to demonstrate that the absolute pixel counts do not impact my conclusion, I repeated my dimensional measurements on the Rydin exhibit that was obtained from P-TACTS.[3] My new measurements are detailed below. In summary, these new measurements obtained by measuring the Rydin exhibit from the P-TACTS system confirm my original measurements showing that the thread density and LD/MDYD ratios in the Rydin images satisfy the claimed parameter ranges.

69. For thread density, I took a measurement of 13 yarns from Figure 2 of the Rydin provided to me from the P-TACTS system. The average yarn width was 15.7 pixels with a standard deviation of 0.8 pixels. The distance to cover 10 complete yarn-yarn spacings was 419 pixels. This results in a loop density of approximately 75%:

$$\frac{2 \times 10 \times 15.7}{419} = 0.75 = 75\%.$$

70. This is consistent with my initial measurement of the loop density as approximately 78% (EX1003, ¶377), and it still falls within the claimed loop density range of 64-90%.

---

[3] I acknowledge that the pixel counts for the digital Rydin file that I analyzed for my First Declaration are different than the pixel counts for the Rydin file that was obtained for me from the P-TACTS system.

71. To calculate the LD/MDYD ratio, I used the Figure 3 image from the POR, which is a zoom in on Figure 3. I measured the machine direction yarn as having a mean diameter of 109.3 pixels (using my original measurements), or a mean diameter of 110.3 pixels (using Voith's incorrect proposed inscribed-circle-diameter-extension method). The diameter of the inscribed circle drawn in the POR is 355 pixels. This gives a LD/MDYD ratio of 3.2 using either mean diameter:

$$\frac{355}{109.3} = 3.2.$$

72. This is consistent with my initial measurement of the LD/MDYD ratio as approximately 3.2. See EX1003, ¶381.

VII. LIDAR

73. I understand that Voith argues that Lidar's reinforcing yarns are not fibers. I note that in the textile field, a fiber is a general term that refers simply to a single cylinder of material that is a building block of textiles. This definition is supported by EX1063: a fiber is defined simply as the "fundamental component that is used in the assembly of textile yarns and fabrics." EX1063, 3. A yarn can be a single fiber, known as a monofilament, or a yarn can be a bundle of multiple fibers, known as a multifilament. *See* EX1062, 2:2-9 ("Many different weave patterns have been employed in the production of both single layer and multilayer fabrics utilizing natural and

synthetic yarns and blends. Synthetic yarns such as polyesters, polyamides, polypropylenes and the like, have been employed in monofilament, multifilament, spun yarn and piled monofilament form for both warp and shute ends"). Either way, a yarn (such as Lidar's reinforcing yarn) is a fiber, or includes fibers.

74. For instance, Adanur describes that "[b]y the mid-1970s, 75% of all paper machine clothing was made from monofilament or multifilament yarns," and specifically refers to a "polyester monofilament" yarn for a forming fabric as a "fiber" in FIG. 2.15. *See* EX1061, 9-11):

The typical structure of a polyester monofilament is depicted in Figure 2.15.

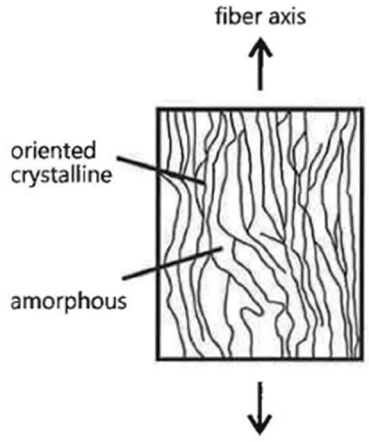


FIGURE 2.15. The internal structure of polyester.

Adanur, FIG. 2.15.

VIII. I QUALIFY AS A POSITA

75. I understand that Voith believes that I lack "hands-on experience" that disqualifies me as a POSITA. *See* POR, 14. I disagree with this characterization. In my role as an academic and a textile engineer, one of the tasks that I often perform is to develop designs for fabrics that allow those fabrics to satisfy certain performance objectives, such as strength, permeability, flatness, etc. In performing these design tasks, I often consider fabric parameters such as thread size, thread density, and other aspects of weave patterns in order to produce a fabric that achieves the target objectives. This experience has provided me with a thorough understanding of how fabric parameters impact fabric performance—the exact quality Voith claims that I lack.

IX. CONCLUSION

76. I reserve the right to supplement my opinions to address any information obtained, or positions taken, based on any new information introduced throughout this proceeding.

77. I declare under penalty of perjury that the foregoing is true and accurate to the best of my ability.