

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GENERAL ELECTRIC COMPANY,
Petitioner,

v.

ROLLS-ROYCE PLC,
Patent Owner.

Case IPR2016-00528
Patent 8,715,809 B2

Before HYUN J. JUNG, SCOTT A. DANIELS, and
GEORGE R. HOSKINS, *Administrative Patent Judges*.

DANIELS, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

A. *Background*

Rolls-Royce PLC (“Rolls-Royce”) is the owner of U.S. Patent No. 8,715,809 B2 (“the ’809 patent”). Ex. 1001. General Electric Company (“GE”) filed a Petition to institute an *inter partes* review of claims 1–18 of the ’809 patent. Paper 1 (“Pet.”). In a preliminary proceeding, we instituted trial because GE demonstrated a reasonable likelihood of proving the challenged claims unpatentable. Paper 8 (“Inst. Dec.”). Following institution, Rolls-Royce filed a Patent Owner Response to the Petition (Paper 17, “PO Resp.”), and Petitioner filed a Reply (Paper 21, “Pet. Reply”). Rolls-Royce also filed a contingent Motion to Amend (Paper 18), proposing to substitute claims 19 and 20 for original claims 1 and 17. GE has not opposed the Motion to Amend. Tr. 5. An oral hearing was held at the request of both parties.¹

Pursuant to our jurisdiction under 35 U.S.C. § 6 we determine that GE has not met its burden of proving, by a preponderance of the evidence, that claims 1–18 of the ’809 patent are unpatentable.

B. *Additional Proceedings*

Petitioner states that it is unaware of any other related matter involving the ’809 patent. Pet. 1; see Paper 5 (Patent Owner indicating the same).

C. *The ’809 Patent*

The ’809 patent (Ex. 1001), titled “Composite Structure,” describes a composite structure for aerofoil guide vanes in a gas turbine compressor.

¹ A transcript of the oral hearing has been entered in the record. Paper 28, “Tr.”

Ex. 1001, 1:5–8, Fig. 1. Figure 2 of the '809 patent, illustrating a cut-away view of a vane, is reproduced below.

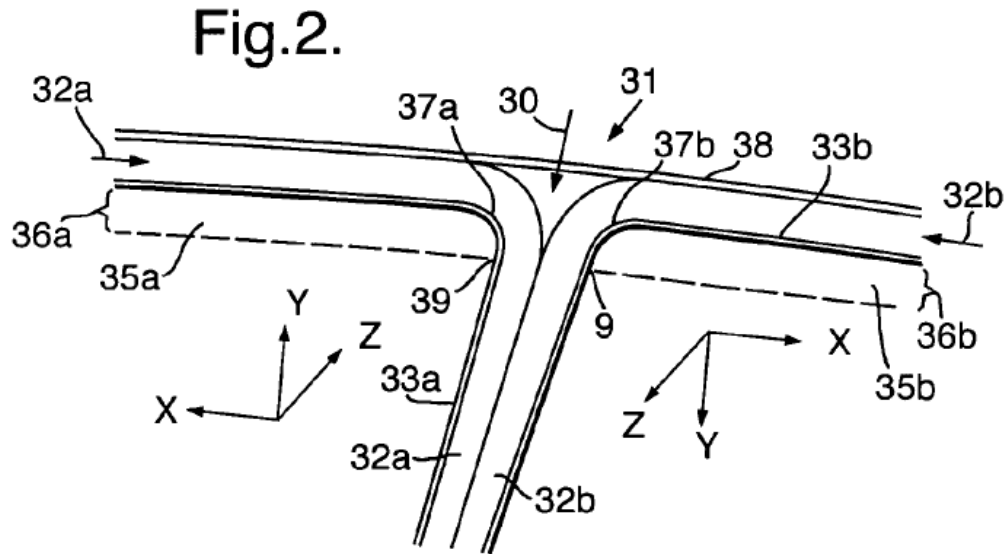


Figure 2 illustrates, diagrammatically, vane structure 31 of an aerofoil in a gas turbine engine. We point out, also, that Figure 2 is a 2-dimensional diagrammatic view of a vane in the X-Y plane. As shown, the figure does not reveal relative structure in the Z-plane so as to clearly illustrate the 3-dimensional nature of vane structure 31. See Tr. 7. Vane structure 31 includes laminar cores 32a, 32b, encased within wrap structures 38, 33a, and 33b, which provide outer surface protection for the structure. Ex. 1001, 3:36–46. Wrap structure 38 is also referred to in the specification as “platform ply 38.” *Id.* at 3:39. Laminar cores 32a, 32b, define respective bends 37a, 37b, (i.e. fillets) that are fortified by reinforcing blocks 35a, 35b.² *Id.* at 4:33–39. The '809 patent explains

² The '809 patent uses the terms “fillet” and “bend” essentially interchangeably. For example, the written description states that “[t]he general direction or principal direction of the fibres within the blocks 35a,

that typically to achieve good performance it is desirable to provide the maximum realistic fillet radius such that a high strength composite fillet in accordance with the present invention is provided by burying that fillet with reinforcing blocks 35a, 35b which extend, as indicated, ideally up to the run out position of the bend 37 in order to create the aero dynamic sharp corner 39.

Id. at 4:24–30. Another embodiment described in the '809 patent includes tapering reinforcement blocks 55a, 55b, as shown in Figure 4 reproduced below. *Id.* at 6:29–47.

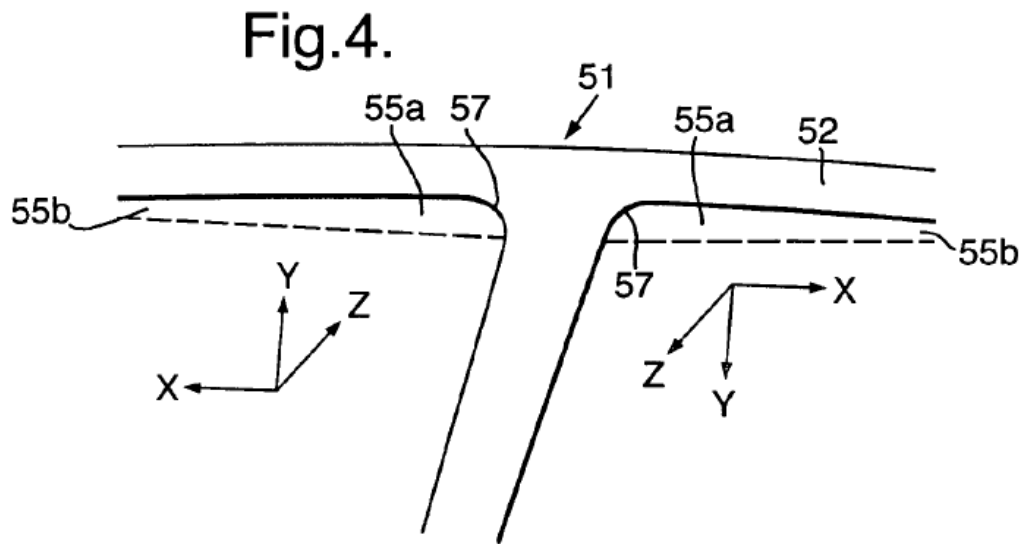


Figure 4 of the '809 patent, above, is a diagrammatic illustration of composite vane structure 51 having reinforcing blocks 55a, 55b, tapering away from bends 57 formed by the composite structure.

D. Illustrative Claim

Of the challenged claims, claims 1 and 17 are independent. Each of dependent claims 2–16 depend directly or indirectly from structure claim 1,

35b will be towards the bend 37a, 37b, that is to say the fillets defined by the cores 32a, 32b and wraps 33a, 33b.” Ex. 1001, 4:39–42.

and claim 18 depends directly from method claim 17. Claim 1 illustrates the claimed subject matter and is reproduced below:

1. A composite vane structure comprising:
 - an aerofoil;
 - a platform ply;
 - a laminar core assembly defining a bend between the aerofoil and the platform ply, the bend having a radially inner surface defining a fillet; and
 - a reinforcement block abutting the radially inner surface, the block having a thickness, such that the block at least partly buries the fillet and the block extends only partially along the radially inner surface.

Ex. 1001, 7:27–36. Claim 17 is drawn to a “method of forming a composite vane structure” and includes similar limitations as claim 1. *Id.* at 8:30–38.

E. The Instituted Grounds

In the preliminary proceeding, we instituted on the following grounds.³

References	Basis	Claims Challenged
Vendramini ⁴	§ 102	1–10 and 15–18
Vendramini in view of the knowledge of one of ordinary skill in the art.	§ 103	12–14

³ Petitioner supports its challenge with a Declaration of Dr. Brian Flinn, Ph.D. (Ex. 1003), and Patent Owner relies on the testimony of Dr. Michael R. Wisnom, Ph.D. (Ex. 2018). *See infra*.

⁴ Ex. 1005, FR Publication No. 2625528 (Published July 7, 1989). Petitioner has provided a certified English translation. Ex. 1006.

II. CLAIM CONSTRUCTION

A. *Legal Standard*

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation standard).

Under the broadest reasonable construction standard, claims are to be given their broadest reasonable interpretation consistent with the specification, and the claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art. *In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004). Also, we must be careful not to read a particular embodiment appearing in the written description into the claim, if the claim language is broader than the embodiment. *See In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993) (“[L]imitations are not to be read into the claims from the specification.”).

B. *A laminar core assembly defining a bend between the aerofoil and the platform ply*

We determined in our Decision to Institute, based on a plain reading of the specification and the claims that the first part of this clause, “a laminar core assembly” may include either a single laminar core ply of materials or multiple plies. Inst. Dec. 6–7. Neither party disputes this portion of our construction. *See* PO Resp. 37–39, *and see* Pet. Reply 2–4. Also, we declined in the preliminary proceeding to replace the word “between” with the word “separates” as Rolls-Royce advocated. Inst. Dec. 9–10 (Rolls-Royce’s previous construction was for “a bend that *separates* the aerofoil and the platform ply.”) We determined

from a fair reading of the claim language that the plain and ordinary meaning of the word “between” as it relates to the bend (a characteristic of the laminar core), is not limited to causing separation of the laminar core assembly from the platform ply at the bend.

Id. at 10. We are persuaded, however, with the benefit of the full record now before us, to alter our claim construction.

Rolls-Royce provides a dictionary definition of “between” and advocates that the word “between” should be understood according to its ordinary meaning as “at, into, or across the space separating two objects.” PO Resp. 37 (citing Ex. 2003, 4; Ex. 2018 ¶ 112; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005)). Rolls-Royce’s declarant, Dr. Michael Wisnom, testifies that in the context of the specification and the ordinary dictionary definition of the word “between,” a person of ordinary skill in the art “understands that ‘a bend between the aerofoil and the platform ply’ indicates that the bend is positioned ‘at, into, or across the space separating’ the aerofoil and platform ply.” Ex. 2018 ¶¶ 112–113 (citing Ex. 2003, 4). Dr. Wisnom states that part of the basis for his interpretation is the embodiment of Figure 2 in the ’809 patent where it illustrates “laminar cores (32a, 32b) defining the bends (37a, 37b) which are positioned in the space separating the aerofoil from the platform ply (38).” *Id.* ¶ 114 (citing Ex. 1001, Fig. 2). Taken together, Dr. Wisnom contends, the specification and a fair reading of the claims in light of the ordinary meaning of “between” would reasonably lead one of ordinary skill in the art “to understand that ‘a laminar core assembly defining a bend between the aerofoil and the platform ply’ means ‘a laminar core assembly defining a bend at, into, or across the space separating the aerofoil and the platform ply.’” *Id.* ¶ 115.

Rolls-Royce argues further that the prosecution history of the '809 patent supports their claim construction because “Patent Owner specifically amended Claim 1 to recite a bend relative to the platform *ply* rather than a bend relative to the platform *generally*.” PO Resp. 60 (citing Ex. 1002, 28). Rolls-Royce explains that an amendment done in response to the Examiner’s asserted prior art “specifically narrowed the scope of Claim 1 in a manner that precludes Petitioner’s broad reading of this claim term.” *Id.* at 61.

GE does not expressly dispute Rolls-Royce’s claim construction, and states in its Reply that if the Board were to adopt Rolls-Royce’s construction then “Petitioner concedes that Vendramini does not disclose ‘a laminar core assembly defining a bend between the aerofoil and the platform ply.’” Pet. Reply 2–4. When questioned during the final oral hearing in this proceeding regarding their position on Rolls-Royce’s proposed claim construction, GE’s counsel, Mr. Anish Desai, explained that they did not oppose this claim construction because it was consistent with the prosecution history and Rolls-Royce’s apparent disavowal of a broader interpretation:

JUDGE HOSKINS: Mr. Desai, . . . it sounds like what you were saying just a few minutes ago, now you would say that you actually agree with the claim construction being proposed by Patent Owner based on the prosecution history. Is that correct or incorrect?

MR. DESAI: Well, I think our position in our Reply Brief was that based on the statements that Patent Owner has made in their Response, that expresses a disavowal of claim scope from the prosecution history and we don’t -- we agree that that would be the construction under that disavowal.

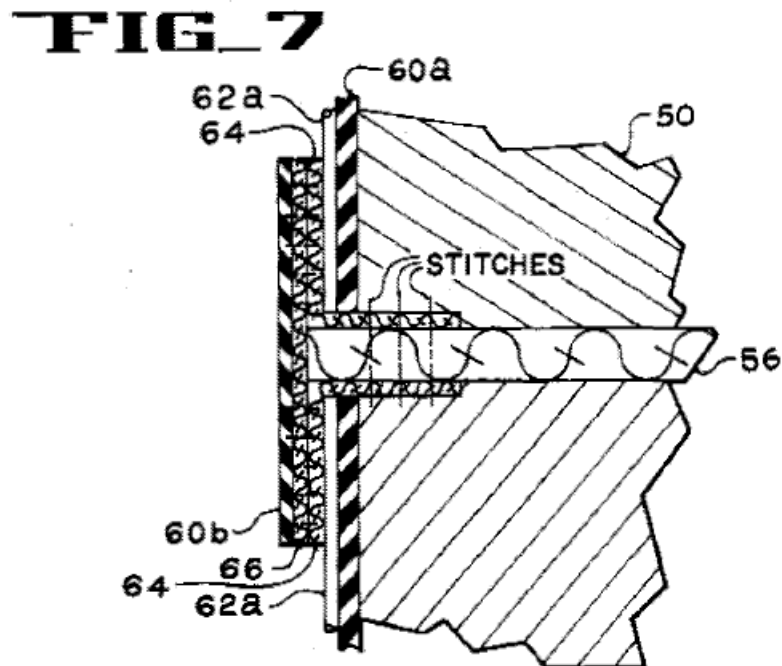
Tr. 12.

The Federal Circuit has addressed the issue of determining whether a claim has been narrowed in the related context of prosecution history estoppel.

In order to give due deference to public notice considerations under the *Warner–Jenkinson* framework, a patent holder seeking to establish the reason for an amendment must base his arguments solely upon the public record of the patent’s prosecution, i.e., the patent’s prosecution history. To hold otherwise—that is, to allow a patent holder to rely on evidence not in the public record to establish a reason for an amendment—would undermine the public notice function of the patent record.

Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 234 F.3d 558, 586 (Fed. Cir. 2000), *vacated on other grounds*, 535 U.S. 722 (2002).

During prosecution of the application that became the ’809 patent the Examiner cited U.S. Patent No. 5,725,709 to Jensen (“Jensen” or “Jensen ’709”) asserting that this reference, as shown below in Figure 7, anticipated claim 1 including the limitation “a laminar core assembly defining a bend between the aerofoil and the platform.”



Ex. 1002, 69–71; Ex. 2013. Claims 1 and 17 were thereafter amended to specify that the bend occurred “between the aerofoil and the ~~platform~~ platform ply.” Ex. 1002, 28–29. The Examiner allowed the claims with this amendment, stating in the Notice of Allowability that the closest prior art, Jensen, “fails to teach or suggest a composite vane structure and method of forming comprising: . . . a laminar core assembly defining a bend between the aerofoil and the platform ply.” Ex. 1002, 8; *see also id.* at 60 (applicant’s arguments distinguishing claim 1 from Jensen).

We note, observing Jensen’s Figure 7, above, that there is no space between laminar 64 and the underlying laminar 66, as similarly there is no space between the aerofoil and platform ply in Vendramini. *See* Ex. 1005, Fig. 3. Shown below, by way of comparison, is Figure 2 of the ’809 patent as annotated by Rolls-Royce in their Response. *See* PO Resp. 38.

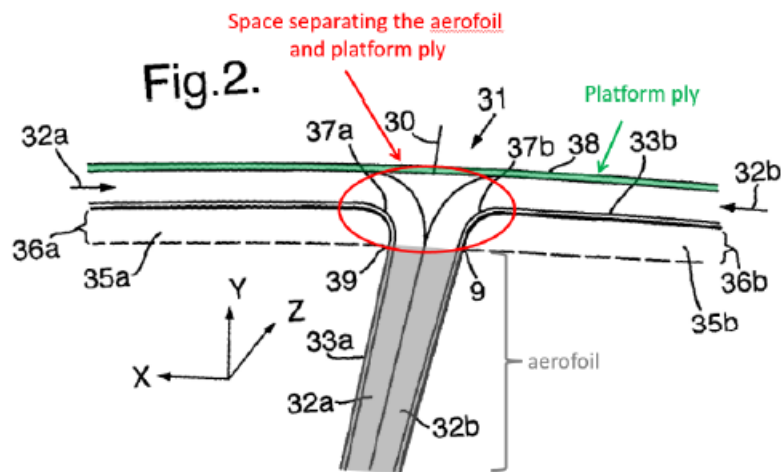


Figure 2 of the '809 patent, above, as annotated by Rolls Royce, emphasizes and expressly calls out the “space separating the aerofoil and platform ply.”

There is no dispute that a plain and ordinary meaning of “between” is “at, into, or across the space separating.” *Compare* PO Resp. 37–38 (citing Ex. 2003, 4; Ex. 2018 ¶ 112), *with* Pet. Reply 2–3. Rolls-Royce successfully overcame Jensen ’709 during prosecution by amending the claims to recite a relative bend between the aerofoil and the platform ply. Ex. 1002, 28–29, 60. Jensen does not disclose a space separating the laminates. It is reasonable to understand from a review of the prosecution history that the applicant amended claims 1 and 17 to make this distinction clear by reciting the relative bend between the aerofoil and the platform ply. *Id.* at 60 (applicant argued to the Examiner based on this amendment, that “Jensen fails to disclose a laminar core assembly defining a bend between the aerofoil and the platform, as required in claim 1”). These amendments were made in view of the Examiner’s advice in a preceding office action:

Applicant is advised to consider amending the claims to more precisely claim the invention. The claims are broad. Claim 1 is generic. There are probably a large number of prior art references that teach claim 1. Claim 1 does not state any specific materials or any specific structure.

Id. at 74.

We have considered also the testimony of Dr. Wisnom and are persuaded based on our review of the prosecution history and the narrowing amendments made by the applicant during prosecution, along with a reasonable reading of the claim in light of the ordinary meaning of the word “between,” that the correct claim construction for “a laminar core assembly defining a bend between the aerofoil and the platform ply,” is “a laminar core assembly defining a bend *at, into, or across the space separating* the aerofoil and the platform ply.” Disavowal of claim scope during prosecution is clear. The applicant manifested a clear intention in the prosecution

history to limit the scope of the claims to a meaning that is consistent with the plain and ordinary meaning of the word “between” as understood by one of ordinary skill in the art. Ex. 1002, 28–29, 60; PO Resp. 37–39.

Accordingly, we determine that the proper claim construction articulated above does not reasonably encompass a bend without a space separating the aerofoil laminar core assembly and the platform ply.

C. Platform ply, wrap surface, and abutting

We determined in the preliminary proceeding that the terms “platform ply” and “wrap surface” can be the same element, even though dependent claim 6 recites the term “wrap surface” as an apparently different element from “platform ply.” Inst. Dec. 6, *and see* Pet. 15–16. We also determined that the word “abutting” should be accorded its ordinary and customary meaning, namely “that the reinforcement block is arranged so as to be touching the radially inner surface [of the bend] in a laminar core assembly.” Inst. Dec. 7.

Neither party substantively disputes these interpretations. PO Resp. 35–36; *see also* Pet. Reply 4–6 (GE objecting to Rolls-Royce’s additional contention that “abutting” requires the reinforcement block to touch the laminar core). In view of our construction, above, of “a laminar core assembly defining a bend between the aerofoil and the platform ply,” and in conjunction with our anticipation analysis below, no further elucidation of these terms is necessary for our determination of whether the asserted claims are unpatentable. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (only those terms which are in controversy need to be construed, and only to the extent necessary to resolve the controversy).

III. ANALYSIS

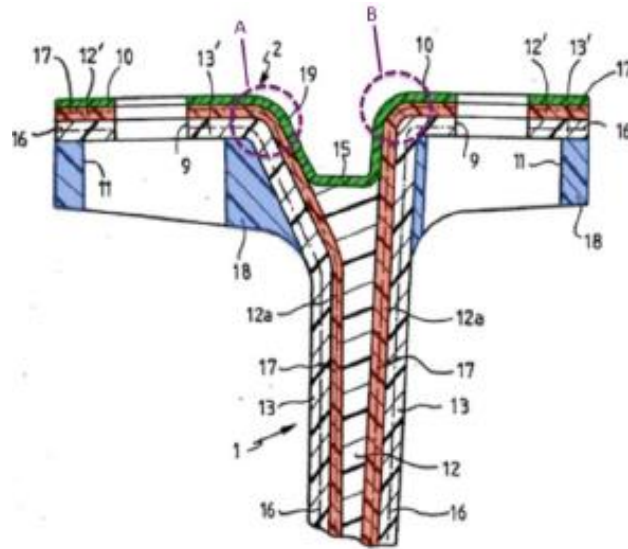
A. Claims 1–10 and 15–18 — Anticipation by Vendramini

GE asserts that claims 1–10 and 15–18 are anticipated by Vendramini. Pet. 19. “Because the hallmark of anticipation is prior invention, the prior art reference—in order to anticipate under 35 U.S.C. § 102—must not only disclose all elements of the claim within the four corners of the document, but must also disclose those elements arranged as in the claim.” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008) (internal quotation marks omitted). Accordingly, an anticipatory reference must show all of the limitations of the claims “arranged or combined in the same way as recited in the claims.” *Id.* at 1370; *see Finisar Corp. v. DirecTV Grp., Inc.*, 523 F.3d 1323, 1334–37 (Fed. Cir. 2008); *Ecolochem, Inc. v. S. Cal. Edison Co.*, 227 F.3d 1361 (Fed. Cir. 2000).

GE states that if the Board adopts Rolls-Royce’s interpretation as to the meaning of “a laminar core assembly defining a bend between the aerofoil and the platform ply,” then “Petitioner concedes that Vendramini does not disclose” the “between” limitation. Pet. Reply 3, *and see* Tr. 9–12 (GE’s counsel, Mr. Desai, argued consistently during the final oral hearing “that bend is where there must be separation between the platform ply and the laminar core and that’s not disclosed in Vendramini, we agree.”). Rolls-Royce also argues persuasively that under the above interpretation Vendramini does not anticipate for the same reason. *See* PO Resp. 58–61.

We agree with the parties that under the proper claim construction Vendramini does not disclose “a laminar core assembly defining a bend between the aerofoil and the platform ply,” because, as shown in GE’s annotated Figure 3 from Vendramini, below, there is no separation of the

platform ply and the laminar core assembly at the bends referenced by dashed circles A and B.



Pet. 26. Annotated Figure 3 of Vendramini is shown, above, with reference letters A-B directed to bends that do not disclose a space separating the laminar core assembly and the platform ply.

Under the proper claim construction, Vendramini is little different from Jensen '709, where Jensen was overcome by amendment of the independent claims during prosecution. *See* Ex. 1002, 27–28. Neither prior art reference discloses a bend in the laminar core causing relative separation between the laminar core assembly and the platform ply. *Compare* Ex. 1002, 70, Fig. 7, *with* Ex. 1005, Fig. 3. Therefore, Vendramini does not disclose all the limitations of independent claims 1 and 17, and claims 2–10, 15, 16 and 18 which depend therefrom are also not anticipated by Vendramini. *See Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383 (Fed. Cir. 2001) (“To establish anticipation, every element and

limitation of the claimed invention must be found in a single prior art reference, arranged as in the claim.”)

B. Claims 12–14 — Obviousness

Claims 12–14 depend directly or indirectly from claim 1. Because we find that claim 1 is not anticipated by Vendramini, and no obviousness ground is asserted for claim 1, these dependent claims which incorporate the subject matter of claim 1 are not shown to be obvious.

C. Rolls-Royce’s Motion to Exclude

Rolls-Royce moves to exclude the entirety of Dr. Flinn’s declaration (Ex. 1003) in this proceeding, and at the very least, paragraphs 52, 67, 68, 70, and 93 of Dr. Flinn’s declaration. Patent Owner Motion to Exclude, 1, 14 (Paper 24). We do not rely on any of Dr. Flinn’s testimony in this Decision, so we dismiss Petitioners’ Motion to Exclude as moot.

D. Rolls-Royce’s Contingent Motion to Amend

Rolls-Royce moves to substitute claim 1 with a proposed claim 19, “[i]f the Board finds that Claim 1 is anticipated by Vendramini.” Patent Owner Motion to Amend, 1–2, 23 (Paper 18). Rolls-Royce also moves to substitute claim 17 with a proposed claim 20, if anticipation is found. *Id.* at 3, 23. We do not find any claim to be anticipated by Vendramini, so we dismiss Rolls-Royce’s Motion to Amend as moot.

IV. CONCLUSION

For the foregoing reasons, we determine that the information presented in the Petition fails to show by a preponderance of the evidence that claims 1–10 and 15–18 of the ’809 patent are unpatentable under 35 U.S.C. § 102(b) as anticipated by Vendramini and that claims 12–14 are unpatentable as obvious under 35 U.S.C. § 103(a).

V. ORDER

For the reasons given, it is ORDERED that

Claims 1–10 and 15–18 of U.S. Patent No. 8,715,809 B2 have not been shown to be unpatentable as anticipated by Vendramini; and

Claims 12–14 of U.S. Patent No. 8,715,809 B2 have not been shown to be unpatentable as obvious over Vendramini.

Rolls-Royce’s Motion to Exclude is dismissed as moot.

Rolls-Royce’s Motion to Amend is dismissed as moot.

This is a final decision. Parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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