

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HUTCHINSON TECHNOLOGY INC.,
HUTCHINSON TECHNOLOGY OPERATIONS (Thailand) CO., LTD.,
Petitioner,

v.

NITTO DENKO CORPORATION,
Patent Owner.

Case IPR2017-01607
Patent 8,692,126

Before MELISSA A. HAAPALA, *Acting Vice Chief Administrative Patent Judge*, and THOMAS L. GIANNETTI and CHRISTA P. ZADO, *Administrative Patent Judges*.

GIANNETTI, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73
DECISION ON MOTION TO AMEND
35 U.S.C. § 316(d) and 37 C.F.R. § 42.121

I. INTRODUCTION

Hutchinson Technology Incorporated and Hutchinson Technology Operations (Thailand) Co., Ltd. (“Petitioner”) filed a Petition requesting an *inter partes* review of claims 1–6 and 10–12 of U.S. Patent No. 8,692,126 (Ex. 1001, “the ’126 patent”). Paper 2 (“Pet.”). Nitto Denko Corporation (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”).

Applying the standard set forth in 35 U.S.C. § 314(a), which requires demonstration of a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim, we granted Petitioner’s request and instituted an *inter partes* review for challenged claims 1, 3–6, and 10–12. Paper 8 (“Institution Dec.”). We denied the Petition as to claim 2 and one ground of challenge directed to claims 1–6 and 10–12.

Following institution, we granted Petitioner’s request for rehearing of the Institution Decision and added claim 2 to the trial. Paper 12 (“Rehearing Dec.”), 7. In addition, we added the previously denied ground of challenge to claims 1–6 and 10–12. *Id.*

Following institution, Patent Owner filed a Response to the Petition (Paper 15, “PO Resp.”) and Petitioner filed a Reply (Paper 22, “Pet. Reply”). In addition, Patent Owner filed a Motion to Amend (Paper 16, “Mot. Amend”). Petitioner filed an Opposition to the Motion (Paper 23, “Mot. Amend Opp.”). Patent Owner filed a Reply (Paper 26, “Mot. Amend Reply”), and Petitioner filed a Sur-reply in Opposition (Paper 27, “Mot. Amend Sur-reply”).

An Oral Hearing was held on October 2, 2018. The Hearing Transcript (“Tr.”) is included in the record as Paper 36. Having considered the evidence of record, and for the reasons set forth below, we determine

that Petitioner has demonstrated by a preponderance of the evidence that claims 1–6 and 10–12 of the ’126 patent are unpatentable. In addition, for the reasons that follow, we grant the Motion to Amend. Finally, we order cancellation of claims 1–6 and 10–12 and replacement by new claims 13–19.

II. BACKGROUND

A. *The ’126 Patent*

The ’126 patent is titled “Wired Circuit Board and Producing Method Thereof.” The patent is directed to a wired circuit board used for a suspension board with circuit. Ex. 1001, col. 1, ll. 16–20. Such boards are typically mounted in hard disk drives after a magnetic head is positioned using a reference hole formed in a metal supporting layer. *Id.* at col. 1, ll. 27–30.

According to the ’126 patent, the terminals of magnetic heads and the terminal portions of suspension boards with circuit were configured at a finer pitch, making it necessary to increase the reliability of connections between them. *Id.* at col. 1, ll. 31–34. Therefore, it became necessary to form the reference hole used in manufacturing the boards with high accuracy, to improve the accuracy of positioning the magnetic head. *Id.* at col. 1, ll. 34–36. The circuit board configuration described and claimed in the ’126 patent is directed at addressing this need.

The circuit board of the ’126 patent has a specific three layer structure, with a “metal supporting layer,” an “insulating layer” formed on the metal supporting layer, and a “conductive layer” formed on the

insulating layer. A reference hole for positioning is formed in the metal supporting layer, and a stepped portion is formed so as to surround the reference hole on all sides. *Id.* at col. 2, ll. 22–27.

B. Challenged Claims

The '126 patent has twelve claims. Claims 1–6 and 10–12 are challenged by Petitioner. Claims 1 and 12 are the independent claims. Claims 2–6, 10, and 11 all depend from claim 1.

Claim 1 follows:

1. A wired circuit board, comprising:
 - a metal supporting layer;
 - an insulating layer formed on the metal supporting layer;
 - and
 - a conductive layer formed on the insulating layer,wherein a reference hole for positioning is formed in the metal supporting layer, and a stepped portion is formed so as to surround on all sides the reference hole; and
- wherein the stepped portion is formed in at least one of:
- a) the same layer as the insulating layer, b) the same layer as the conductive layer, or c) directly in the metal supporting layer.

Claim 12 follows:

12. A wired circuit board, comprising:
 - a metal supporting layer;
 - an insulating layer formed on the metal supporting layer;
 - and
 - a conductive layer formed on the insulating layer,wherein a reference hole for positioning is formed in the metal supporting layer, and a stepped portion is formed so as to surround on all sides the reference hole; and
- wherein the stepped portion is formed in the same layer as the insulating layer and/or the conductive layer.

The two independent claims of the '126 patent call for the same three-layer structure, and require the reference hole to be formed in the metal supporting layer. The claims differ in that claim 1 requires that the stepped portion be formed in at least one of (a) the same layer as the insulating layer, (b) the same layer as the conductive layer, or (c) directly in the metal supporting layer. Claim 12 requires that the stepped portion be formed in the same layer as the insulating layer, the conducting layer, or both.

C. Real Parties in Interest

Petitioner identifies the following additional real parties in interest:

1. Magnecomp Precision Technology Public Company Limited
2. Magnecomp Corporation
3. Headway Technologies, Inc.
4. TDK Corporation
5. TDK U.S.A. Corporation
6. SAE Magnetics (Hong Kong) Limited
7. Acrathon Precision Technologies (HK) Limited
8. Acrathon Precision Technologies (Dong Guan) Co., Ltd

Pet. 2–3. Patent Owner identifies no additional real parties in interest.

Paper 3, 1.

D. Related Matters

The parties identify the following related civil action involving the '126 patent: *Nitto Denko Corporation v. Hutchinson Technology Incorporated*, C.A. No. 2:16-cv-03595-MF, pending in the United States District Court for the District of New Jersey. Pet. 3; Paper 3, 1.

E. References and Other Evidence

Petitioner relies upon the following publications and patents (Pet. 6-7):

Pan	US 7,315,435	Jan. 1, 2008	(Ex. 1003)
Yokai	US 2009/0014410	Jan. 15, 2009	(Ex. 1004)
Roen	US 6,647,621	Nov. 18, 2003	(Ex. 1007)
Mao	US 2007/0151661	July 5, 2007	(Ex. 1012)

In addition, both parties also rely on declaration testimony. Petitioner relies on first and second declarations of a technical expert, Dr. Thomas M. Coughlin (Ex. 1006, “Coughlin I Decl.,” Ex. 1027, “Coughlin II Decl.”). Patent Owner also relies on declaration testimony of a technical expert, Dr. Giora J. Tarnopolsky (Ex. 2001, “Tarnopolsky Decl.”). The record also includes deposition transcripts for these witnesses.¹

F. Grounds Asserted

Petitioner challenges the patentability of the claims of the ’126 patent on the following grounds (Pet. 8):

Claim(s)	Basis	Reference(s)
1, 4–6, and 12	§ 102(b)	Pan
1, 3–6, and 12	§ 103(a)	Pan and Mao
10 and 11	§ 103(a)	Pan and Roen
10 and 11	§ 103(a)	Pan, Roen, and Mao
1–6 and 10–12	§ 102(e)	Yokai
2	§ 103(a)	Yokai

¹ Exhibit 1020 (“Tarnopolsky Dep.”), Exhibit 2005 (“Coughlin I Dep.”), and Exhibit 2008 (“Coughlin II Dep.”).

III. ANALYSIS OF CHALLENGES

A. Claim Construction

In an *inter partes* review, the Board interprets claim terms in an unexpired patent according to the broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b) (2016)²; *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142 (2016). Under that standard, and absent any special definitions, we give claim terms their ordinary and customary meaning, as would be understood by one of ordinary skill in the art at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Additionally, any special definitions for claim terms must be set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

Petitioner has proposed a construction for several claim terms: (1) “wired circuit board”; (2) “suspension board with circuit”; and (3) “stepped portion.” Pet. 17–20. Patent Owner responded it is “of the view that these claim elements (and all the other elements not discussed) can be afforded their plain and ordinary meaning.” Prelim. Resp. 7. In our Institution Decision, we determined that these terms did not require construction at that stage. Institution Dec. 7 (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*,

² A recent amendment to this rule changing the claim construction standard does not apply here because the Petition was filed before November 13, 2018. See “Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board,” 83 Fed. Reg. 51,340 (Oct. 11, 2018).

200 F.3d 795, 803 (Fed. Cir. 1999) (Only terms which are in controversy need be construed and only to the extent necessary to resolve the controversy)). Neither party has argued post-institution that these terms need be construed. We conclude that no further construction of these terms is necessary.

In our Rehearing Decision, we construed the term “conductive layer formed on the insulating layer” appearing in all the challenged claims. Rehearing Dec. 4–7. Petitioner contended that the broadest reasonable construction of “formed on the insulating layer” should not require the conductive layer to be formed *directly* on the insulating layer, without any intervening layer. Paper 11, 4. In granting the rehearing request, we agreed with that construction, reversing our construction of “formed on” in the Institution Decision. Rehearing Dec. 5. We were persuaded mainly by the example (Example 1) described in the ’126 patent in which the conductive layer is formed directly on a thin metallic seed layer³ of chromium:

Then, over the metal supporting board, the insulating base layer, and the stepped base layer, a chromium thin film and a copper thin film were successively formed by a sputtering method to form a metal thin film. Thereafter, *on the surface of the metal thin film*, a plating resist was formed from a dry film resist into a pattern reverse to that of a conductive layer and a stepped conductive layer. Then, the conductive layer and the stepped conductive layer were simultaneously formed by electrolytic copper plating.

Ex. 1001, col. 15, ll. 38–46 (emphasis added). We relied also on the Federal Circuit’s decision in *AFG Indus., Inc. v. Cardinal IG Co.*, 239 F.3d 1239

³ The ’126 patent does not specifically use the term “seed layer.” However, expert testimony establishes that the ’126 patent discloses the need for sputtered chromium seed films before forming the copper conductive layers on the insulating layer. Coughlin I Decl. ¶ 174.

(Fed. Cir. 2001). There, the Federal Circuit determined that the claim term “formed on” does not mean “directly in contact with.” *Id.* at 1251. As the Court explained:

[T]he court has determined that the claim language and the specification permit the presence of interlayers between layers. Notably, the claim does not state that each layer is “formed directly on” the preceding layer. Accordingly, we determine that “formed on” does not mean “directly in contact with.”

Rehearing Dec. 6 (quoting *AFG Indus.*, 239 F.3d at 1251). As a consequence, we reconsidered our decision and instituted trial on Petitioner’s §§ 102 and 103 challenges based on Yokai. *Id.* at 7. In Yokai, as in Example 1, a seed film layer 7 separates the conductive layer from the insulating layer. *See* Ex. 1004, Fig. 8m; ¶ 191.

Patent Owner contends this construction “departs from the plain and ordinary meaning of the claims and was erroneous.” PO Resp. 23. Patent Owner proposes a construction of “formed on” that would require contact between the conductive and insulating layers. *Id.* at 24–25. For support, Patent Owner relies on a dictionary excerpt (Ex. 2002) that defines “on” as “in contact with,” and points to instances in the ’126 patent where the term “formed on” refers to layers that are in contact with no intervening layers. PO Resp. 24–27.

Patent Owner addresses Example 1 by arguing that the example “is not the only way to achieve the claimed subject matter.” *Id.* at 27–28. We are not persuaded by this argument. The fact that “other ways” may be available does not alter the fact that Patent Owner contends that Example 1, with its seed layer, is within the scope of the ’126 patent claims. *Id.* at 30; Tr. 55:4–16.

Alternatively, Patent Owner asserts that because chromium is conductive, the chromium seed layer should be identified as the claimed conductive layer. *Id.* at 30. This argument is unavailing for several reasons. First, chromium is a poor conductor; also, the purpose of the seed layer is not to conduct signals, but to assist in electroplating by promoting adhesion of the conductive layer. Coughlin I Decl. ¶¶ 173, 174; Coughlin II Decl. ¶ 7; Tarnopolsky Dep. 55:18–22; Tr. 57:19–22. Second, the '126 patent does not refer to the chromium layer as a conductive layer. The description of Example 1 distinguishes between the copper conductive layer and the chromium layer. Ex. 1001, col. 15, ll. 38–46. Moreover, we are not persuaded by Patent Owner's dictionary definition of "on." This extrinsic evidence is, at best, inconclusive,⁴ and in any event, unconvincing because it conflicts with the intrinsic record. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1322–23 (Fed. Cir. 2005) (*en banc*) ("[J]udges . . . may also rely on dictionary definitions when construing claim terms, so long as the dictionary definition does not contradict any definition found in or ascertained by a reading of the patent documents.") (citation omitted).

In summary, we are persuaded that the broadest reasonable interpretation of "conductive layer formed on the insulating layer" does not require the conductive layer to be formed directly on the insulating layer without any intervening layer.

B. Level of Ordinary Skill

Petitioner contends a person of ordinary skill at the relevant time frame (August 2009) would have had "(1) a Bachelor's degree in electrical

⁴ As Petitioner points out, among the many alternative dictionary definitions of "on" is "in close proximity." Pet. Reply 3.

engineering or computer engineering, and approximately five years of experience working in the area of circuit board design in the Hard Disk Drive (HDD) industry or (2) a Master's degree in engineering and up to two years of experience working in the area of disc drive technology, including circuit board design.” Pet. 16 (citing Coughlin I Decl. ¶ 29).

Patent Owner does not contest this definition in its Preliminary Response or Response. Patent Owner's expert, Dr. Tarnopolsky, however, states a disagreement: “In my opinion, this definition is not precise and does not fully articulate the level of skill.” Tarnopolsky Decl. ¶ 73. According to Dr. Tarnopolsky, “the ordinarily skilled artisan in the technology field of the '126 patent would have either a Bachelor's degree in electrical engineering, chemistry, materials' science, or a similar field and three years of work experience in the disk drive industry, or a Master's degree in electrical engineering, chemistry, materials' science, or a similar field and one year of work experience in the disk drive industry.” *Id.* at ¶ 74.

For purposes of this Decision, we adopt Petitioner's formulation. However, we regard any differences with Dr. Tarnpolsky's definition as immaterial, for our decision would be the same under either definition.

C. Challenges Based on Pan alone and Pan and Mao

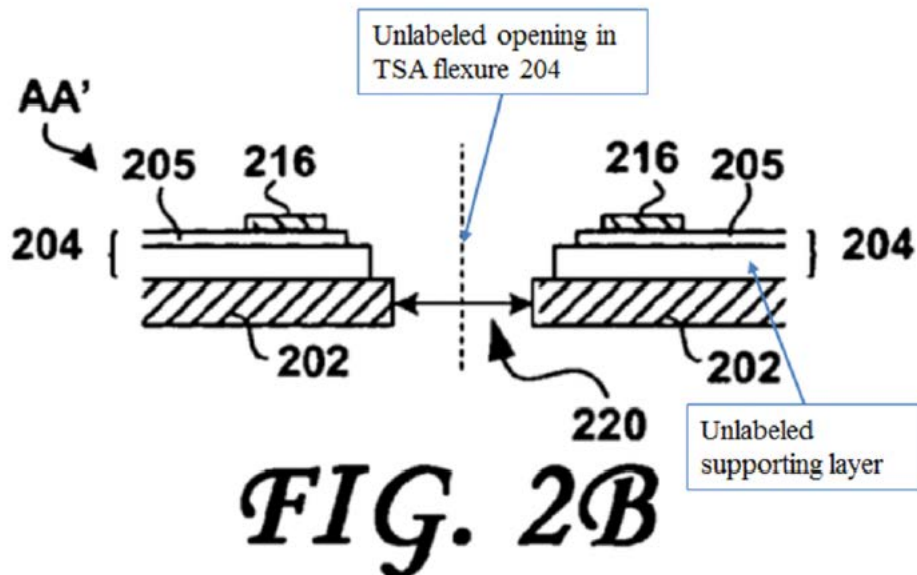
1. Overview of Pan

Pan discloses that “[a] typical hard disk drive includes a head disk assembly (HDA) and a printed circuit board assembly.” Ex. 1003, col. 1, ll. 15–16. The HDA includes at least one magnetic disk, a spindle motor for rotating the disk, and a head stack assembly (HSA) that includes a slider with at least one transducer or read/write element for reading and writing data. *Id.* at col. 1, ll. 17–20. The typical HSA includes a head gimbal

assembly (HGA) that extends from the actuator assembly and biases the slider toward the disk. *Id.* at col. 1, ll. 25–27.

The HGAs described in Pan include a trace suspension assembly (TSA) flexure 204 with a conductive layer, an insulating layer, and a supporting layer. *Id.* at Figs. 2A, 2B; col. 5, ll. 53–54; col. 6, ll. 3–35. The conductive traces on flexure 204 form a wired circuit board. *Id.* at col. 6, ll. 3–9; Coughlin I Decl. ¶70.

These features are illustrated in Figure 2B of Pan, reproduced here (as annotated by Petitioner):



Pet. 25. Figure 2B (annotated) is a cross-sectional view of a head gimbal assembly. Ex. 1003, col. 5, ll. 40–44. The HGA includes load beam 202 that attaches to an actuator arm of an HSA. *Id.* at col. 5, ll. 49–53. The TSA also includes flexure 204 that is coupled to load beam 202. *Id.* at col. 5, ll. 53–56. Insulating layer 205 may be formed of or include polyimide. *Id.* at col. 6, ll. 34–35. Pan describes conductive features 216 as follows: “[a]lso, the conductive features may be configured such that they

fully or partially surround the opening within the flexure 204.” *Id.* at col. 6, ll. 39–41.

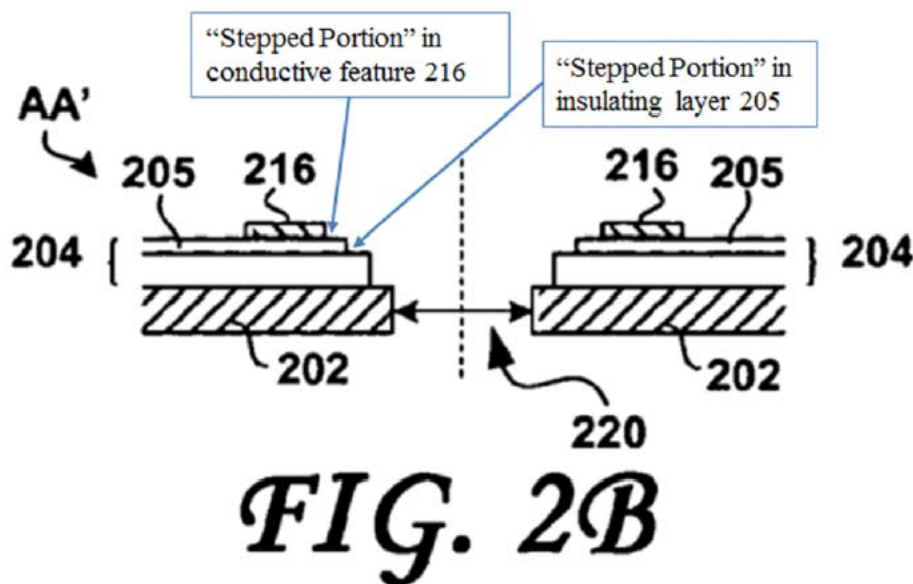
As shown in Fig. 2B, load beam 202 also includes a load beam registration feature, through hole 220, formed within the load beam. *Id.* at col. 5, ll. 57–61. The load beam registration feature serves as a positional reference. *Id.* at col. 5, ll. 63–66.

2. Anticipation of claims 1, 4–6 and 12 by Pan

Petitioner contends that claims 1, 4–6, and 12 of the ’126 patent are anticipated by Pan. Pet. 21–35. “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987). When evaluating a single prior art reference in the context of anticipation, the reference must be “considered together with the knowledge of one of ordinary skill in the pertinent art.” *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) (citing *In re Samour*, 571 F.2d 559, 562 (CCPA 1978)).

Petitioner sets forth an element-by-element analysis of these claims in relation to Pan at pages 21–35 of the Petition. Petitioner contends that Pan meets each element of these claims. For example, Petitioner relies on Pan’s Figure 2B, reproduced *supra*, as illustrating the “reference hole” and “stepped portion” recited in the claims. Pet. 27–28 (claim 1); 34 (claim 12). Petitioner also identifies the “unlabeled supporting layer” in Figure 2B as the claimed metal supporting layer. *Id.* at 25 (citing Coughlin Decl. ¶ 75).

Petitioner identifies the “stepped” portions recited in the claims with the features illustrated in following Figure 2B annotated by Petitioner:



Pet. 29. Figure 2B of Pan, annotated by Petitioner, shows “stepped” portions in insulating layer 205 and conductive feature 216.

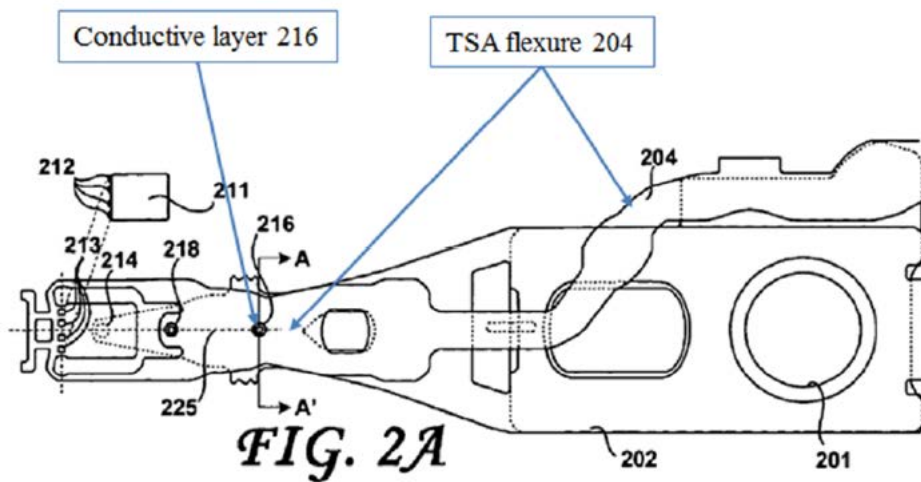
Patent Owner challenges this analysis on two grounds. First, Patent Owner argues that Pan does not disclose the “metal supporting layer” recited in the claims. PO Resp. 12–15. Next, Patent Owner asserts that Pan does not disclose a “stepped portion” that surrounds the reference hole “on all sides.” *Id.* at 15–21. We are not persuaded by either of these arguments.

Petitioner identifies the “unlabeled supporting layer” shown in annotated Figure 2B of Pan, *supra*, as the metal supporting layer. Pet. 25. Petitioner asserts that a person of ordinary skill would understand that the unlabeled supporting layer is metal. *Id.* We find this argument persuasive. Among other reasons, Petitioner points to the statement in Pan that the laminate flexure is “welded onto the load beam.” *Id.* (citing Pan, Ex. 1003, col. 2, ll. 12–14). Petitioner also points out that Pan, in describing TSA flexures of the type shown in Figure 5B, states that they include a stainless steel support layer. Ex. 1003, col. 1, ll. 58–59. Petitioner supports this

conclusion with credible expert testimony. Coughlin I Decl. ¶¶ 73–76. Moreover, Patent Owner’s argument to the contrary is contradicted by the testimony of its expert, Dr. Tarnopolsky, in another proceeding (IPR2018-00955) involving similar technology and the same parties. Ex. 1034 ¶ 161. There, Dr. Tarnopolsky, testifying for Patent Owner, refers to “the routine use of spring metal as the lower, supporting layer of a flexure.” *Id.* He further testifies that “one of ordinary skill in the art would have recognized that the lower supporting layer of a hard disk drive flexure is routinely made from spring metal.” *Id.* at ¶ 156.

We are not persuaded by Patent Owner’s attempt to explain this inconsistency by arguing that “Dr. Tarnopolsky never stated that metal is the only material that can be used when forming the lower supporting layer of a flexure as would be required for anticipation.” Paper 33, 2. As noted *supra*, when evaluating a single prior art reference in the context of anticipation, the reference must be “considered together with the knowledge of one of ordinary skill in the pertinent art.” *In re Paulsen*, 30 F.3d at 1480. In consideration of the entire record, we find, by a preponderance of the evidence, that a person of ordinary skill would have understood the supporting layer in Pan is metal.

Patent Owner’s second argument relies on the fact that Pan’s Figure 2B is a cross-sectional view of a gimbal assembly shown in Figure 2A. Prelim. Resp. 15–16. Thus, according to Patent Owner, “it does not show the location of the conductive feature on *all sides* of the opening.” *Id.* at 16. We are not persuaded by this argument. Figures 2A, 3, and 4 of Pan provide a top plan view of the same part. Figure 2A (annotated by Petitioner) follows:



Pet. 30. Figure 2A of Pan, annotated by Petitioner, taken together with cross-sectional view, 2B, *supra*, shows circular conductive feature 216 surrounding the opening in flexure 204. Pet. 31. Because the conductive feature 216 surrounds the opening in TSA flexure 204 (the conductive feature 216 is illustrated in Figure. 2A by the solid-line concentric circles “216”), then the underlying insulating layer 205 must also surround the opening. Pet. 31; Coughlin I Decl. ¶ 88,

We find that by a preponderance of the evidence those figures, taken together and considered in light of the Pan specification, show the conductive feature surrounding the opening on all sides. Consistent with the figures, Pan states that the conductive features “fully or partially surround the opening.” Ex. 1003, col. 6, ll. 39–40.

We find no persuasive evidence supporting Patent Owner’s assertion that this can reasonably be read to mean that Pan’s conductive feature may be elliptical, while the opening is circular, producing a stepped portion on some but not all sides. PO Resp. 16. We are not persuaded by Patent Owner’s argument and expert testimony that “one of ordinary skill in the art would not consider Pan to foreclose” other structures. Tarnopolsky Decl. ¶

129; PO Resp. 17. Patent Owner acknowledges that inherency is not at issue. Tr. 45:1–3. See *In re Preda*, 401 F.2d 825, 826 (CCPA 1968) (noting that “in considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom”). Instead, the test is that set forth in *Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015):

[A] reference can anticipate a claim even if it “does not expressly spell out” all the limitations arranged or combined as in the claim, if a person of skill in the art, reading the reference, would “at once envisage” the claimed arrangement or combination. *In re Petering*, 49 CCPA 993, 301 F.2d 676, 681 (1962).
(alterations in original omitted).

We have, moreover, considered Patent Owner’s additional arguments as to the “stepped portion” limitation and find them unconvincing. PO Resp. 18. For example, we find Patent Owner’s argument (PO Resp. 18–20) and Dr. Tarnopolsky’s testimony (Tarnopolsky Decl. ¶¶ 133–135) based on the appearance of the concentric rings in opening 220 in Figure 2A unconvincing because it looks at a small feature in that figure in isolation from the other figures in Pan (including Figure 2B) and the descriptions of those figures in the specification. Because it is more consistent with the specification and figures of Pan, taken as a whole, we credit Dr. Coughlin’s testimony that Pan describes a stepped portion that surrounds the reference hole on all sides. Coughlin I Decl. ¶¶ 85–89.

Patent Owner presents no arguments directed to Petitioner’s analysis of other claim elements of the ’126 patent. Nor does Patent Owner

separately argue independent claim 12 or any of the dependent claims (claims 4–6) included in this challenge.

Accordingly, after reviewing the entire record, and for the foregoing reasons and those in Petitioner’s analysis (Pet. 32–35), we find that Pan meets the other elements of the challenged claims. We therefore find that Petitioner has demonstrated by a preponderance of the evidence that claims 1, 4–6, and 12 are anticipated by Pan.

3. Obviousness of claims 1, 3–6, and 12 over Pan and Mao

Petitioner contends that claims 1, 3–6, and 12 of the ’126 patent would have been obvious over Pan and Mao. Pet. 35–36. A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, so-called secondary considerations, including commercial success, long-felt but unsolved needs, failure of others, and unexpected results. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966) (the Graham factors).⁵

⁵ Patent Owner did not present evidence on the fourth *Graham* factor. We therefore do not consider that factor in this decision.

Petitioner presents this challenge as an alternative to its anticipation challenge based on Pan alone. *Id.* at 35. Specifically, this challenge is provided “[i]f the Board does not find the ‘metal supporting layer’ recited in claim 1 is found in the TSA flexure 204 of the [Pan] for purposes of anticipation.” *Id.* According to Petitioner, a person of ordinary skill “would look to combine the stainless steel material of the supporting layer of the TSA flexure in [Mao] with the unlabeled supporting layer of the TSA flexure 204 in [Pan].” *Id.* at 39 (citing Coughlin I Decl. ¶ 112).

Petitioner provides an element-by-element analysis showing where each claim element is present in the combination of Pan and Mao. *Id.* at 36–46. Petitioner also provides an explanation of the rationale for combining the teachings of the references. *Id.* at 39–41.

Patent Owner contends that Petitioner’s obviousness analysis fails to address all limitations of the claims. PO Resp. 21. Patent Owner repeats its argument, discussed *supra*, that Pan does not disclose a “stepped portion” that surrounds a “hole” in a circuit board on “all sides.” *Id.* Patent Owner contends that Petitioner relies on Mao only for its alleged teaching of a “metal supporting layer.” *Id.* Thus, according to Patent Owner, “Petitioner has failed to point to disclosure of all the required claim limitations in the prior art.” *Id.* For the reasons discussed *supra*, we are not persuaded by these arguments. We have found after reviewing the record that Petitioner has demonstrated by a preponderance of the evidence that Pan meets these elements of the claims. *See* discussion *supra*. In discussing Petitioner’s anticipation challenge based on Pan, we determined that Pan meets the limitations regarding the metal supporting layer and the stepped portion surrounding the reference hole on all sides. *See supra*. We are also

persuaded, for the reasons given, by Petitioner’s argument that Mao describes a stainless steel supporting layer, and that a person of ordinary skill would have combined this teaching with Pan. Pet. 39–40. Patent Owner does not challenge this. Tr. 36:11–15 (“[W]e agreed that it would be obvious to use metal in -- for the unmarked white layer in 204 and Pan.”).

Patent Owner argues further that “the petition makes no attempt to explain why it would have been obvious to use a ‘stepped portion’ that surrounds a ‘hole’ in a circuit board on ‘all sides’ when making Pan’s suspension.” PO Resp. 21–22. According to Patent Owner, this “evidentiary deficiency” cannot be remedied by production of additional evidence because Pan fails to mention or “attribute any significance to such a step.” *Id.* at 22.

We are not persuaded by this argument for several reasons. First, in our discussion of anticipation, *supra*, we find that Pan discloses a “stepped portion . . . formed so as to surround on all sides the reference hole.” Thus, Patent Owner’s argument that because Pan does not disclose such a feature, Petitioner has not carried its burden for failure to “point to disclosure of all the required claim limitations in the prior art,” is unavailing. *See id.* at 21. For the same reason, we disagree with Patent Owner that this is an “evidentiary deficiency” in the Petition. *Id.* at 22. Finally, in light of the foregoing, we regard the alleged failure of Pan “to even mention or attribute any significance to such a step” as not convincing.

Patent Owner presents no arguments directed to Petitioner’s analysis of other claim elements of the ’126 patent, nor does Patent Owner challenge the motivation for combining Pan and Mao. Patent Owner does not

separately argue independent claim 12 or any the dependent claims (claims 4–6) included in this challenge.

Accordingly, after reviewing the entire record, and for the foregoing reasons and those in Petitioner’s analysis and motivation to combine the references (Pet. 36–46), we determine that Pan and Mao meet the other elements of the challenged claims for the reasons advanced by Petitioner and that a person of ordinary skill would have combined their teachings. We therefore determine that Petitioner has demonstrated by a preponderance of the evidence that claim 1, 4–6, and 12 would have been obvious over Pan and Mao.

D. Challenges to Claims 10 and 11 Based on Pan and Roen, and Pan, Roen, and Mao

1. Overview

Similar to the obviousness challenge to claims 1, 3–6, and 12 based on Pan and Mao, Petitioner presents these challenges to claims 10 and 11 as alternatives. As discussed previously, Petitioner relies on Mao, as an alternative to Pan, for its disclosure of a metal support layer. As Petitioner explains, if the Board fails to find the metal supporting layer recited in claim 1 “is expressly or inherently found in the TSA flexure 204” of Pan, Petitioner alleges “that the use of ‘metal’ for the unlabeled supporting layer [in Pan] would be obvious . . . by further using [Mao] with [Pan] and [Roen].” Pet. 53–54.

2. Obviousness of claims 10 and 11 over Pan and Roen, or Pan, Roen, and Mao

Claim 10 depends from claim 1 and requires that the claimed reference hole be circular. Petitioner contends that Figure 2 of Roen discloses a circular alignment hole:

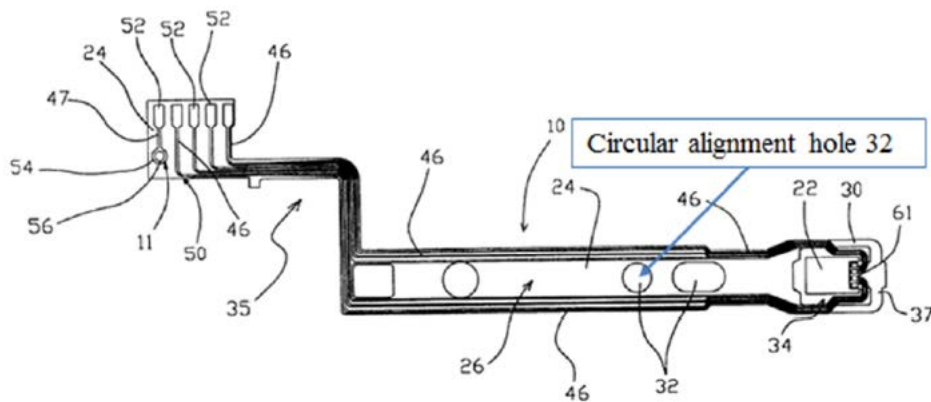


FIG 2

Pet. 50. Figure 2 of Roen (annotated by Petitioner) illustrates a flexure component of an integrated lead suspension. Ex. 1007, col 2, ll. 10–11. The flexure includes alignment holes 32 (including a circular alignment hole) in base region 26 that are used to accurately position flexure 10 during assembly. *Id.* col. 2, ll. 38–40.

Petitioner contends it would have been obvious to a person of ordinary skill to modify flexure 204 of Pan to include circular alignment hole 32 formed in the supporting layer of Roen. Pet. 50 (citing Coughlin I Decl. ¶149). Petitioner further contends that a person of ordinary skill would have understood that the shape of the openings for each layer of the flexure 204 would also be circular in shape and the stepped portions would form an annular circular shape. *Id.* at 51. In addition, circular conductive feature 216 would surround the circular etched opening in the supporting layer. *Id.* at 52. Thus, Petitioner asserts it would have been obvious to form a circular opening in the unlabeled supporting layer of Pan and have the stepped portions (conductive feature 216 and insulating layer 205) be circular and concentrically surrounding the circular reference opening. *Id.* at 52–53.

Claim 11 depends from claim 10 and requires that the claimed circular stepped portion include “a first stepped portion having a generally annular shape” and “concentrically surrounding the circular reference hole.”

Petitioner contends that it would have been obvious to a person of ordinary skill to combine Pan and Roen to have stepped portions in at least one of the conductive feature 216 and the insulating layer 205 in Pan that are circular and that concentrically surround the circular reference opening as recited in claim 11. Pet. 53 (citing Coughlin I Decl. ¶159.). Petitioner asserts further that conductive feature 216 in Figs. 2A and 2B of Pan “is clearly shown as being in an annular shape.” *Id.*

In the Preliminary Response, Patent Owner responded that Roen does not disclose a “stepped portion” surrounding circular alignment hole 32. Prelim. Resp. 14. Thus, Roen does not “remed[y] this disclosure failure” in Pan. *Id.* This argument is repeated in Patent Owner’s Response. PO Resp. 10 (Roen “does not discuss the application of a stepped structure to such an alignment hole.”) As discussed *supra*, we are persuaded that Pan meets the claim limitation calling for a stepped portion that surrounds the hole “on all sides.” Thus, we are not convinced by Patent Owner’s argument that this is a “failure” in Pan. Moreover, this argument is unconvincing because it does not address the combined teachings of Pan and Roen; instead, it addresses the references separately. This approach does not persuasively rebut an obviousness challenge. See *In re Keller*, 642 F.2d 413, 426 (CCPA 1981); *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986).

Patent Owner argues also that Roen does not “provide any other details regarding the preferred structure of the hole.” PO Resp. 10. This argument, too, is unavailing. Patent Owner does not dispute that Roen’s

Figure 2 discloses a circular alignment hole. The figures of a patent are part of the disclosure, and features in them can be relied on as prior art, even if not discussed in the specification. *See In re Aslanian*, 590 F.2d 911, 914 (CCPA 1979) (“[T]his court has stated that a drawing in a utility patent can be cited against the claims of a utility patent application even though the feature shown in the drawing was unintended or unexplained in the specification of the reference patent.”),

We are persuaded by the evidence that it would have been obvious to combine the teachings of the cited references and include a circular alignment hole in Pan that meets claims 10 and 11. Pet. 50–51. Among other reasons, a circular opening would better accommodate commonly used masking and etching processes. *Id.* at 50 (citing Coughlin I Decl. ¶ 150).

We conclude, therefore, that Petitioner has demonstrated by a preponderance of the evidence that claims 10 and 11 would have been obvious over (1) Pan and Roen and (2) Pan, Roen, and Mao.

E. Challenges Based on Yokai

1. Anticipation of claims 1–6 and 10–12 by Yokai

Petitioner contends that claims 1–6 and 10–12 of the ’126 patent are anticipated by Yokai. Pet. 55–71. Petitioner sets forth an element-by-element analysis of those claims of the ’126 patent in relation to Yokai at pages 59–71 of the Petition.

Petitioner contends that each element of these claims is met by Yokai. Pet. 59–71. For example, Petitioner contends that Figure 8m of Yokai discloses the claimed conductive layer “formed on the insulating layer,” as well as the “stepped portion” in the conductive layer and “reference hole.” *Id.* at 60–62.

Patent Owner responds that the structure in Yokai identified by Petitioner as satisfying the “stepped portion” limitation in the claims is conductive layer 8 in Yokai’s Figure 8m. PO Resp. 33. Patent Owner asserts the “conductive layer” in Figure 8m is not “formed on the insulating layer” as the claims require. *Id.* The conductive layer is separated from the insulating layer by an “intervening chromium seed film 7.” *Id.* Thus, according to Patent Owner, conductive layer 8 in Yokai not in contact with the insulating base layer. *Id.*

We are not persuaded by this argument, as it is predicated on a construction of the term “formed on” in the ’126 patent that we did not adopt. *See supra*. Specifically, we declined to construe “conductive layer formed on the insulating layer” as requiring the conductive layer to be formed directly on the insulating layer without any intervening layer. In reaching this determination, we also considered and rejected Patent Owner’s argument the chromium layer is part of the conductive layer. PO Resp. 28 (“both the thin chromium film and the copper film used in Example 1 are themselves layers of conductive metal.”) There is no dispute that chromium is a poor conductor relative to copper and the purpose of the chromium seed layer is to facilitate electroplating and not carry signals. Coughlin I Decl. ¶¶ 173, 174; Coughlin II Decl. ¶ 7; Tarnopolsky Dep. 55:18–22; Tr. 57:19–22.

Patent Owner makes a further attempt to distinguish Yokai based on its rejected claim construction and an argument that equates the seed film with the conductive layer in the claims. PO Resp. 33–36. Here is Patent Owner’s summary of that argument:

In sum, the ’126 patent’s claims do not preclude the use of multiple conductive layers. But, the claims do require a “conductive layer” that is both “formed on the insulating layer”

(i.e., is in contact with the insulating layer) and has a “stepped portion.” While Yokai includes two conductive layers, one of which is “formed on the insulating layer” and another of which is “stepped,” it lacks a single “conductive layer” that possesses both of these required features. As a result, it is not anticipatory.

Id. at 36. We are not persuaded by this argument for two reasons. First, it assumes a claim construction that requires the conductive layer to be “in contact with” the insulating layer, a construction that we reject *supra*. Second, it identifies the seed film as a “conductive layer.” For the reasons previously stated, we are not convinced by either argument.

Petitioner relies also on alleged admissions concerning Yokai by Patent Owner during examination of the Japanese equivalent of the ’126 patent. Pet. at 56–58. Patent Owner responds by pointing to differing patentability standards in Japan and differences in the claims before the Japanese Patent Office in the counterpart application. PO Resp. 37. We agree with Patent Owner that the Japanese prosecution is entitled to limited weight, and in reaching our conclusion, we do not rely on this argument by Petitioner.

Patent Owner does not challenge Petitioner’s analysis as to other elements of the claim. Accordingly, after reviewing the entire record, and for the foregoing reasons and those in Petitioner’s element-by-element analysis, we determine that Yokai meets the other elements of the challenged claims for the reasons advanced by Petitioner. See Pet. 59–71. We therefore find that Petitioner has demonstrated by a preponderance of the evidence that claims 1–6 and 10–12 are anticipated by Yokai.

2. Obviousness of claim 2 over Yokai

Claim 2 reads as follows, “The wired circuit board according to claim 1, wherein a distance between the stepped portion and the reference hole is not more than 100 μm .” Claim 2 depends from claim 1, and therefore includes the requirement that the conductive layer be “formed on the insulating layer.” In its obviousness argument for claim 2, Petitioner relies on Figures 4 and 8 of Yokai to meet the distance limitation in the claim. Pet. 71–75. Patent Owner does not challenge this aspect of Petitioner’s obviousness analysis.

Patent Owner responds that in this ground, Petitioner “focuses exclusively” on the distance limitation. PO Resp. 38. Patent Owner’s sole argument is that “Petitioner does not attempt to explain why it would have been obvious to modify Yokai’s suspension board to include missing the ‘stepped’ ‘conductive layer’ that is ‘formed on the insulating layer.’” *Id.*

This argument is predicated on Patent Owner’s rejected claim construction for “formed on.” For the reasons given above with respect to claim 1, we find that Yokai meets this limitation. *See supra*. Because we determine that Yokai meets this claim limitation without modification, we are not persuaded by Patent Owner’s argument.

Patent Owner does not challenge Petitioner’s analysis of claim 2 with respect to Yokai as to any other elements of the claim. Accordingly, after reviewing the entire record, and for the foregoing reasons and those in Petitioner’s analysis, we determine that Yokai meets the other elements of the challenged claims for the reasons advanced by Petitioner. We therefore find that Petitioner has demonstrated by a preponderance of the evidence that claim 2 would have been obvious over Yokai.

IV. MOTION TO AMEND

A. Patent Owner's Motion

In an *inter partes* review, amended claims are not added to a patent as of right, but rather must be proposed as a part of a motion to amend. 35 U.S.C. § 316(d). The Board must assess the patentability of proposed substitute claims “without placing the burden of persuasion on the patent owner.” *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1328 (Fed. Cir. 2017) (en banc). However, Patent Owner’s proposed substitute claims must meet the statutory requirements of 35 U.S.C. § 316(d) and the procedural requirements of 37 C.F.R. § 42.121. See “Guidance on Motions to Amend in view of *Aqua Products*” (Nov. 21, 2017) (https://www.uspto.gov/sites/default/files/documents/guidance_on_motions_to_amend_11_2017.pdf) (last accessed Dec. 5, 2018) (“Guidance”). Accordingly, Patent Owner must demonstrate: (1) the amendment responds to a ground of unpatentability involved in the trial; (2) the amendment does not seek to enlarge the scope of the claims of the patent or introduce new subject matter; (3) the amendment proposes a reasonable number of substitute claims; and (4) the proposed claims are supported in the original disclosure. See 35 U.S.C. § 316(d); 37 C.F.R. § 42.121.

Patent Owner’s Motion to Amend proposes new claims 13–19 as substitutes for claims 1–6 and 10–12. Mot. Amend 3. The amendment is contingent on the outcome of the IPR as to the original claims. *Id.* Patent Owner states claim 13, proposed as a substitute for claim 1, is the only claim that would be substantively amended. The other claims would be

amended only to change their dependency from claim 1 to new claim 13. *Id.* at 3–4.

Patent Owner proposes amending independent claim 1 so that the claimed “wired circuit board” includes “a cover insulating layer” in addition to the already claimed “metal supporting layer,” “insulating layer,” and “conductive layer.” *Id.* at 4. Further, the claim would be limited to a “stepped portion” that “includes a first stepped portion formed in the same layer as the insulating layer and a second stepped portion formed in the same layer as the cover insulating layer.” *Id.* Proposed substitute claim 13 follows:

13. (proposed substitute for claims 1 and 12):

A wired circuit board, comprising:

a metal supporting layer;

an insulating layer formed on the metal supporting layer;

~~and~~

a conductive layer formed on the insulating layer[.];

and

a cover insulating layer formed over the conductive layer and at least partially on the insulating layer and;

wherein a reference hole for positioning is formed in the metal supporting layer, and a stepped portion is formed so as to surround on all sides the reference hole; and

wherein the stepped portion includes a first stepped portion formed in the same layer as the insulating layer and a second stepped portion formed in the same layer as the cover insulating layer. ~~is formed in at least one of: a) the same layer as the insulating layer, b) the same layer as the conductive layer, or c) directly in the metal supporting layer.~~

Id. at 24 (additions to claim 1 underscored; deletions struck out or bracketed). Patent Owner asserts that the proposed substitute claims are not

broader than the original claims, and that the proposed substituted claims are properly supported under 35 U.S.C. § 112 by the original specification. *Id.* at 4–10. Patent Owner asserts also that the amendments made to the proposed substitute claims “are responsive to the grounds at issue in this IPR, and serve to further distinguish the claim[s] from both the art discussed in the institution decision, and other art known to Patent Owner.” *Id.* at 11.

Petitioner’s opposition challenges Patent Owner’s showing of written description support for the claims. Mot. Amend Opp. 2. Petitioner first asserts Patent Owner has failed to provide written description support for the limitation “a cover insulating layer formed . . . at least partially on the insulating layer.” Mot. Amend Opp. 2–7. Petitioner asserts the addition of the words “at least” broadens the scope of the claims. *Id.* at 2–3. According to Petitioner, this recitation is not supported by the original disclosure: “Accepting Patent Owner’s argument that ‘formed on’ requires direct contact, there are no disclosed embodiments in which the cover layer is entirely on the insulating layer.” *Id.* at 3. Petitioner argues: “Each of the disclosed embodiments discloses a conductive layer disposed between the cover and insulating layers in specific regions, such that the disclosed cover layer is exclusively partially on the insulating layer and partially on the conductive layer.” *Id.*

At the outset, we note that we have not accepted Patent Owner’s contention that “formed on” requires direct contact. *See* discussion *supra*. Therefore, we are not persuaded by Petitioner’s argument that support for the claims would require an embodiment where the insulating cover is “entirely on” the insulating base, with no conductive layer. *See* Mot. Amend Reply 3–4.

Moreover we are persuaded by Patent Owner’s analysis of Figures 3, 9, and 11 of the ’126 patent that there is support for this claim element. *Id.* at 3–4. We find that those figures show a range of coverage of the base layer by the insulating layer including partial and full coverage. *Id.*

Petitioner next asserts that Patent Owner has failed to provide written description support for a “stepped portion includ[ing] a first stepped portion . . . and a second stepped portion.” Mot. Amend Opp. 4. As support for this element, Patent Owner points to the “stepped base layer 31” and “stepped insulating cover layer 33” of Fig. 3 of the ’126 patent. *Id.* (citing Mot. Amend 8). Petitioner’s argument distinguishes between stepped parts and stepped portions: “Stepped base layer 31 is not disclosed as a ‘first stepped portion,’ in the specification as Patent Owner contends, but instead one of two stepped ‘parts’ 10, 11 (each corresponding to individual layers 31, 33) disposed within a ‘first stepped portion.’” *Id.*

We agree with Patent Owner that this difference in terminology is not significant. Mot. Amend Reply 4–5. The claimed subject matter need not be described “*in haec verba*” in the original specification in order to satisfy the written description requirement. *In re Wright*, 866 F.2d 422, 425 (Fed. Cir. 1989). Rather, “the test . . . is whether a person of ordinary skill in the art would recognize that the applicant possessed what is claimed in the later filed application as of the filing date of the earlier filed application.” *Noelle v. Lederman*, 355 F.3d 1343, 1348 (Fed. Cir. 2004).

We are, therefore, persuaded that Figure 3 of the ’126 patent and the accompanying description in the specification (Ex. 1001, col. 8, ll. 16–28) provide adequate written description for this recitation. Mot. Amend Reply 5; Tarnopolsky Decl. ¶ 165.

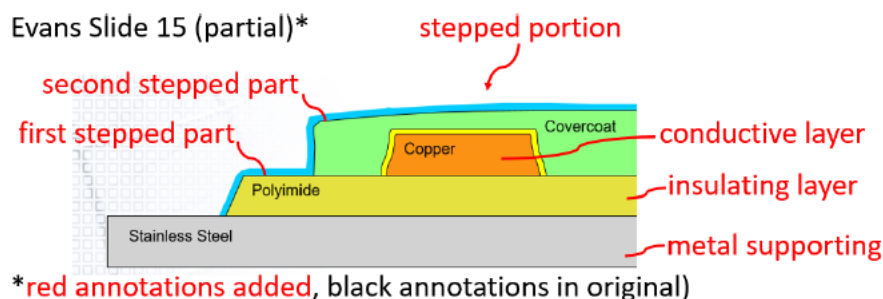
We determine that Patent Owner has satisfied the predicate requirements to considering a motion to amend, including setting forth the support in the original disclosure of the patent for each claim that is amended. *See* 37 C.F.R § 42.121.

B. Patentability of Claim 13

Petitioner challenges the patentability of independent claim 13 under 35 U.S.C. § 103(a) on two separate grounds: (1) anticipation by Evans; and (2) obviousness over Pan.

1. Evans

Evans (Ex. 1021) is a Hutchinson Technology slide presentation titled “Suspension Design for Customer Manufacturability.” According to Petitioner, Evans teaches the same layered structure of a metal supporting layer (“stainless steel”), insulating layer (“polyimide”) and conductive layer (“copper”) as claim 13. Mot. Amend Opp. 11. To illustrate this, Petitioner provides the following annotated figure from slide 15 of Evans:

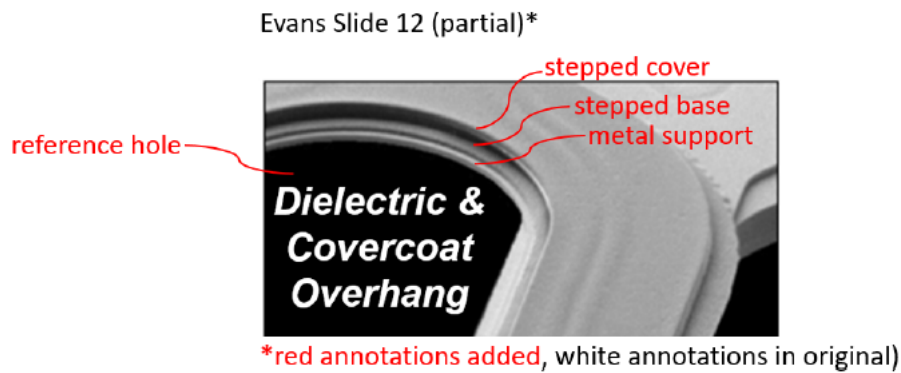


Id. The above figure from Evans is annotated by Petitioner to show a suspension with stepped insulating and covered layers and a metal supporting layer. *Id.*

Claim 13 also requires “a cover insulating layer formed over the conductive layer and at least partially on the insulating layer.” Petitioner

contends the “Covercoat” layer shown in the above figure from Evans meets this limitation. *Id.*

Petitioner contends also that Evans meets the requirements for “a reference hole for positioning is formed in the metal supporting layer, and a stepped portion is formed so as to surround on all sides the reference hole.” *Id.* at 12. As support, Petitioner provides the following annotated figure from slide 12 of Evans:



Id. The above figure from Evans is annotated by Petitioner to show “a ‘stepped portion’ surrounding the reference hole.” *Id.* Petitioner acknowledges: “While fewer than ‘all sides’ of the oval-shaped reference hole are visible in Evans Slide 12, a [person of ordinary skill] viewing Slide 12 in combination with Slide 15 would understand that the stepped portions continue around the entirety of the reference.” *Id.* (citing Coughlin II Decl. ¶ 35).

Patent Owner responds by challenging Petitioner’s showing in several respects:

1. Patent Owner asserts slide 15 of Evans does not depict any holes, but instead shows a parallel run of traces covered by insulation. Mot. Amend Reply 6.

2. Patent Owner asserts the figure in Evans' slide 12 is "cropped" and does not show all sides of the hole. *Id.* Thus "it is impossible to determine if the hole has stepped portions that surround it on 'all sides.'" *Id.*

We are persuaded by these arguments that Evans does not anticipate claim 13. We agree with Patent Owner that Evans is "deficient" as a reference for lack of any explanation as to whether the illustration in slide 15 is to be employed at every location in its suspension. *Id.* at 7. It is apparent from the '126 patent itself that there are many variations in suspension design affecting the protective layer. See Ex. 1001, Figures 3, 9, and 11. Evans is designed as a slide show presentation, with many figures but little in the way of written explanation.

We also agree that Evans' slide 12 does not sufficiently disclose a claimed stepped portion that surrounds a reference hole on all sides. The partial view provided is not sufficient to support that conclusion. The slide provides no text explaining what is shown. Evans provides no cross-sectional view of the reference hole. Moreover, the reference to an "overhang" of the dielectric and covercoat layers suggests layers that are not stepped as required by the claim. Mot. Amend Reply 8.

We understand this challenge to claim 13 to be based on anticipation. Mot. Amend Opp. 11. We therefore do not address Patent Owner's moot arguments that the claim would not have been obvious over Evans. Mot. Amend Reply 6.

2. *Pan*

Petitioner contends claim 13 would have been obvious over Pan and either Ohwe⁶ or Mao, further in view of Young. Mot. Amend Opp. 18. Petitioner relies on Pan for each of the limitations of claim 13 originally recited in claim 1. As to the additional “cover layer” limitation, Petitioner relies on Mao (Ex. 1012) and Young (Ex. 1026). *Id.* at 19. According to Petitioner, “[b]y 2009, it was well known to a person of ordinary skill in the art that a cover layer (also referred to as a covercoat or overcoat) serves the function of protecting exposed conductive features from corrosion, scratching, abrasion and the like.” *Id.* (citing Coughlin II Decl. ¶ 66).

In addition, Petitioner relies on Ohwe (Ex. 1025), an article that depicts providing a protective layer over a conductive signal line that terminates before it reaches the edge of the insulating layer. According to Petitioner, “[b]y 2009, the technique of stepping back the cover layer was also well known.” *Id.* at 20.

Patent Owner’s response focuses on the conductive features 216 and 218 of Pan, shown in Figures 2A and 2B from Pan, reproduced *supra*. These features are described by Pan as “positional reference(s), using machine vision and/or mechanical means.” Ex. 1003, col. 6, ll. 47–49. Patent Owner explains the conductive features differ from signal bearing traces that need a protective covering:

Mao, Ohwe, and Young all teach that upper layers of insulation are intended to protect a hard drive flexure’s signal bearing conductive traces during use. . . . But, Pan explains that its conductive features 216 and 218 are “disposed away from” the

⁶ Takeshi Ohwe, “Wireless Pico Suspension Improves Drive Reliability,” *Data Storage* (October 1997).

other conductive features on Pan’s flexure 204, including its traces. . . . And, Pan also notes that unlike the conductive traces—which are meant to carry the read/write signals needed for disk drive operation—the conductive features 216 and 218 are used as a positional references during assembly. . . . In view of this, there is no reason to apply the trace protecting cover insulating layers of Mao, Ohwe, or Young to Pan’s conductive features 216 and 218.

Mot. Amend Reply 10–11 (citing Tarnopolsky Decl. ¶¶ 181–183). Patent Owner’s argument goes a step further, however. Because the conductive features are positional references, Patent Owner asserts applying insulation to them would prevent them from being used in this manner. *Id.* at 11–12 (citing Tarnopolsky Decl. ¶¶ 182–183). Covering the conductive features with insulation would at least partially obscure them making use of machine vision or mechanical positioning means more difficult. *Id.* at 12 (citing Tarnopolsky Decl. ¶¶ 183–184).

Petitioner responds that this argument “overlooks deposition testimony,” citing testimony from its expert, Dr. Coughlin, to the effect that the polyimide cover layer is “at least partially transparent.” Mot. Amend Sur-reply 5. But Dr. Coughlin also testified that he did not know how translucent or transparent polyimide actually is. Coughlin II Dec. 36:3–7. We therefore do not find his testimony on this issue convincing. We agree with Patent Owner’s showing regarding the negative effects of applying an insulating cover to Pan’s conductive features. For these reasons we are not persuaded that a person of ordinary skill would have combined the teachings of Pan with Mao, Young, or Ohwe to meet the “cover layer” limitation of claim 13.

3. Summary

After reviewing the entire record, we determine Petitioner has not shown that the subject matter of claim 13 is anticipated by Evans or would have been obvious over Pan and Mao or Young and Ohwe. We therefore grant Patent Owner's motion to amend as to substitute claim 13.

C. Claims 14–19

Because proposed substitute claims 14–19 all depend from claim 13, we further grant Patent Owner's motion as to these substitute claims.

V. ORDER

It is, therefore,

ORDERED that Petitioner has proved by a preponderance of the evidence that claims 1–6 and 10–12 of U.S. Patent No. 8,692,126 are unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Amend is granted;

FURTHER ORDERED that claims 1–6 and 10–12 of the '126 patent be cancelled and claims 13–19 be added to the patent;

FURTHER ORDERED that, because this is a Final Written 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.

Case IPR2017-01607

Patent No. 8,692,126

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